DOCUMENT INVALIDATION DEVICE

TECHNICAL FIELD

The present disclosure relates generally to a technical field of document invalidation, and more particularly, to a document invalidation device.

BACKGROUND

Document, which is stored and managed in the document management device, has a valid period of use. When the valid period of the document expires, the old document needs to be invalidated by a document invalidation device. That is, the identifiable identity information recited in the document should be invalidated. The administrator takes the document to be invalidated out of the document management device and puts it into the document invalidation device for invalidation. However, for card-type document, if the operation is improper, information recited in the invalidated document can also be identified through a document identification apparatus. Therefore, the safe invalidation of document has become a technical problem that needs to be solved urgently. At present, most documents are invalidated manually, which is inefficient. Furthermore, the identifiable information areas of the book-type document and the card-type document are different. Accordingly, the different identifiable information areas should be determined and then invalidated. Accordingly, this manual invalidation method may lead to inaccurate invalidation, and affect the invalidation efficiency.

SUMMARY

The object of the present disclosure is to provide a document invalidation device aiming at the technical problems of low efficiency and high cost in the prior art of manual invalidation.

In a first aspect, a document invalidation device is provided, including an installation frame which has a feeding area and an invalidation area; a feeding apparatus which is arranged inside the installation frame and includes a gripping structure, a transport structure and a first drive apparatus, wherein the first drive apparatus drives the gripping structure to reciprocate between the feeding area and the invalidation area and the gripping structure is connected with the transport structure in a slidable way; an invalidation apparatus, which is arranged at the invalidation area and includes a second drive apparatus, an invalidation frame, at least one invalidation position and several invalidation structures, wherein the second drive apparatus is arranged at the installation frame, the invalidation frame is in drive connection with the second drive apparatus, each invalidation structure is arranged along the invalidation frame, and each invalidation position is arranged relative to each invalidation structure; and an identification apparatus which is located below the feeding apparatus and configure to identify chip information of a document to be invalidated and chip information of a document after being invalidated.

In an embodiment of this disclosure, the installation frame is provided with a through transport cavity, and one cavity opening of the transport cavity is opposite to the feeding area and the other cavity opening of the transport cavity is opposite to the invalidation area.

In an embodiment of this disclosure, the installation frame includes two connection plates which are arranged opposite to each other and two stiffener

plates which are arranged at an angle with each other, wherein each connection plate and each stiffener plate enclose to form the through transport cavity.

In an embodiment of this disclosure, the gripping structure includes a gripping power source which includes a drive source and a transmission frame, wherein the drive source is in drive connection with the transmission frame; a gripping component which includes a transmission mechanism and a gripping mechanism, wherein the gripping mechanism is arranged inside the transmission frame, the transmission mechanism is rotationally connected with the transmission frame, and the transmission mechanism drives the gripping mechanism to reciprocate toward or away from the document; and a gripping fixation frame which is provided with a plurality of installation cavities, including a first installation cavity for installing the drive source and a second installation cavity inserted with a guide piece, wherein an end of the guide piece is connected with the transmission frame..

In an embodiment of this disclosure, wherein the gripping structure further includes the guide piece which is inserted inside the second installation cavity, and both ends of the guide piece are respectively connected with top and bottom ends of the transmission frame.

In an embodiment of this disclosure, the document invalidation device further includes a feeding module which is arranged along the gripping fixation frame, and the feeding module is arranged corresponding to the feeding area of the installation frame, so that the document enters a lower part of the gripping structure along the feeding module.

In an embodiment of this disclosure, the feeding module includes a feeding drive piece, a feeding frame which is driven by the feeding drive piece, at least one feeding channel which is arranged below the feeding frame, and several feeding inlets which are arranged inside each feeding channel.

In an embodiment of this disclosure, the transmission mechanism includes a transmission power source, a synchronous belt, a driving wheel and a driven wheel, wherein the transmission power source is fixed inside the transmission frame, the driving wheel is sleeved at a power output shaft of the transmission power source and rotates synchronously with the power output shaft, the driven wheel is connected with the gripping mechanism, and the synchronous belt is sleeved at peripheries of the driving wheel and the driven wheel.

In an embodiment of this disclosure, the gripping mechanism includes a transmission shaft which penetrates through the driven wheel and a transmission wheel which is sleeved at both ends of the transmission shaft, and both transmission wheels respectively abut against both ends of the transmission frame.

In an embodiment of this disclosure, the transport structure includes a slide rail component which includes at least one guide rail arranged along a top of the installation frame; and a slide block component which includes a plurality of slide blocks correspondingly arranged with each guide rail, each slide block has a slide groove which is in slidable connection with each guide rail, and the slide block component is embedded into one installation cavity of the gripping fixation frame.

In an embodiment of this disclosure, the first drive apparatus includes a first drive support which includes a fixation base and an installation base, the fixation base is arranged inside another installation cavity of the gripping fixation frame, and the installation base is detachably connected with the fixation base; a first drive module which is detachably fixed at the installation base; a first drive shaft, wherein one end of the first drive shaft is connected with the first drive module, and the other end of the first drive shaft penetrates through the fixation base and extends to the invalidation area; and a bearing substrate, which is arranged along the invalidation area and includes an installation position which penetrates through the other end of the first drive shaft.

In an embodiment of this disclosure, the second drive apparatus includes a second drive support which is arranged at the installation frame and includes a fixation substrate and at least one stiffener plate, and each stiffener plate is arranged along and abuts against left and right sides of the fixation substrate; a second drive module which is detachably fixed at the second drive support; a second drive shaft, wherein one end of the second drive shaft is connected with the second drive module, and the other end of the second drive shaft penetrates through the fixation substrate; a movable piece which is connected with either end of the second drive shaft which is way from the second drive module and includes a rotation piece and a connection piece, wherein the rotation piece is sleeved either end of the second drive shaft, one end of the connection piece is rotatably arranged at the rotation piece, and the other end of the connection piece is connected with the invalidation frame; and at least one sensing apparatus, wherein a sensing terminal of each sensing apparatus is arranged toward the movable piece and includes a sensing substrate and a sensing switch, wherein the sensing substrate is movably arranged at the fixation substrate, and the sensing terminal of the sensing switch faces the rotation piece and configured to sense a rotation angle of the rotation piece.

In an embodiment of this disclosure, the connection piece includes a first connection part which is connected with the rotation piece, a second connection part which is connected with the invalidation frame, and a joint part which is movably arranged between the first connection part and the second connection part.

In an embodiment of this disclosure, the invalidation frame includes an installation part which includes an installation plate and a fixation plate, the invalidation structure penetrates through and is arranged at the installation plate, and the fixation plate is supported on the installation plate; and a guide apparatus

which includes a guide column, a guide cover plate and a guide elastic piece, wherein the guide column sequentially penetrates through and is arranged at the installation plate and the fixation plate, with its end abutting against the installation frame, the guide cover plate covers the fixation plate, and the guide elastic piece is embedded into the guide column.

In an embodiment of this disclosure, the invalidation structure includes several invalidation cutters, a handle of each invalidation cutter penetrates through the installation plate and abuts against the fixation plate, a cutter head of each invalidation cutter is opposite to identifiable information area of the document, and the invalidation cutters include a first invalidation cutter and a second invalidation cutter, wherein the first invalidation cutter is configured to invalidate a card-type document, and the second invalidation cutter is configured to invalidate a book-type document; a discharge component which includes a discharge plate and a document pressing module, wherein the discharge plate is arranged along an opposite side of the installation plate, one end of the document pressing module abuts against the discharge plate, and the other end of the document pressing module sequentially penetrates through the installation plate and the fixation plate; and a female die component which includes several document female dies and a female die fixation base; wherein each document female die is located at a side of the discharge plate which is away from the document pressing module and is fixed inside the female die fixation base, wherein the female die fixation base is located inside the installation frame.

In an embodiment of this disclosure, the document pressing module includes several document pressing guide columns, one end of each document pressing guide column abuts against the discharge plate, and the other end of each document pressing guide column sequentially penetrates through the installation plate and the fixation plate; several document pressing elastic pieces, each

document pressing elastic piece is sleeved at each document pressing guide column; and several document pressing blocks, each document pressing block is located above the fixation plate and connected with each document pressing guide column.

An embodiment of this disclosure further includes a waste recycling mechanism, which is located below the invalidation apparatus and configured to collect waste materials of the invalidation apparatus for invalidating the document.

The technical scheme of this disclosure has the following technical effects. The document to be invalidated is transported from the feeding area to the invalidation area of the invalidation apparatus through the feeding apparatus, and identified through the identification apparatus. The whole working process of the document invalidation device is automated, which improves the invalidation efficiency and reduces the invalidation cost.

BRIEF DESCRIPTION OF THE DRAWINGS

In order to more clearly illustrate the technical solution in the embodiment of the present disclosure, the drawings used in the embodiments or prior arts will be briefly introduced. It is obvious that the drawings in the following description are only some embodiments of the present disclosure. For ordinary technicians in the present art, they can also obtain other drawings without paying creative labor according to these drawings.

Fig. 1 is an overall structure diagram of a document invalidation device provided by an embodiment of this disclosure.

Fig. 2 is a structural diagram of a feeding apparatus provided by an embodiment of this disclosure.

Fig. 3 is a structural diagram of an invalidation apparatus provided by an embodiment of this disclosure.

Fig. 4 is a structural diagram of an installation frame provided by an embodiment of this disclosure.

Fig. 5 is a first partial structure diagram of a feeding apparatus provided by an embodiment of this disclosure.

Fig. 6 is a second partial structure diagram of a feeding apparatus provided by an embodiment of this disclosure.

Fig. 7 is a third partial structure diagram of a feeding apparatus provided by an embodiment of this disclosure.

Fig. 8 is a fourth partial structure diagram of a feeding apparatus provided by an embodiment of this disclosure.

Fig. 9 is a fifth partial structure diagram of a feeding apparatus provided by an embodiment of this disclosure.

Fig. 10 is a sixth partial structure diagram of a feeding apparatus provided by an embodiment of this disclosure.

Fig. 11 is a first partial structure diagram of an invalidation apparatus provided by an embodiment of this disclosure.

Fig. 12 is a second local structure diagram of an invalidation apparatus provided by an embodiment of this disclosure.

Fig. 13 is a third partial structure diagram of an invalidation apparatus provided by an embodiment of this disclosure.

Fig. 14 is a partially exploded diagram of an invalidation apparatus provided by an embodiment of this disclosure.

Fig. 15 is a fourth partial structure diagram of an invalidation apparatus provided by an embodiment of this disclosure.

Fig. 16 is a fifth partial structure diagram of an invalidation apparatus provided by an embodiment of this disclosure.

The reference number for each component in the drawings are as follows.

Document invalidation device	10	Installation frame	100
Feeding apparatus	200	Invalidation apparatus	300
Identification apparatus	400	Feeding area	101
Invalidation area	102	Gripping structure	201
Transport structure	202	first drive apparatus	203
Second drive apparatus	301	Invalidation frame	302
Invalidation position	303	Invalidation structure	304
Connection plate	111	Stiffener plate	112
Gripping power source	21	Gripping component	22
Drive source	23	Transmission frame	24
Transmission mechanism	25	Gripping mechanism	26
Gripping fixation frame	27	Installation cavity	271
Guide piece	28	Feeding module	29
Feeding drive piece	291	Feeding frame	292
Feeding channel	293	Feeding inlet	294
First feeding channel	2931	Second feeding channel	2932
First feeding inlet	2941	Second feeding inlet	2942
Transmission power source	251	Synchronous belt	252
Driving wheel	253	Driven wheel	254
Transmission shaft	261	Transmission wheel	262
Slide rail component	2021	Slide block component	2022
Guide rail	2023	Slide block	2024
First drive support	2031	First drive module	2032
First drive shaft	2033	Bearing substrate	2034
Fixation base	2035	Installation base	2036
Second drive support	3011	Second drive module	3012
Second drive shaft	3013	Movable piece	3014
Sensing apparatus	3015	Fixation substrate	3016
Reinforcement plate	3017	Rotation piece	31
Connection piece	32	First connection part	321
Second connection part	322	Joint part	323
Sensing substrate	34	Sensing switch	35
Installation part	3021	Guide apparatus	3022
Installation plate	36	Fixation plate	37
Installation groove	361	Guide column	38
Guide cover plate	39	Guide elastic piece	40

Invalidation cutter	3041	Discharge component	3042
Female die component	3043	Cutter passing channel	41
Discharge plate	42	Document pressing module	43
Cutter passing groove	421	Document pressing guide column	431
Document pressing elastic piece	432	Document pressing block	433
Document female die	45	Female die fixation base	46
Cutter passing insertion hole	451	Fixation groove	461
Waste recycling mechanism	500		

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

In order to make the object, technical scheme and advantages of the present disclosure clearer, the present disclosure will be further described in detail in combination with the drawings and the embodiments. It should be understood that the specific embodiments described herein are only used to explain the present disclosure and are not used to limit the present disclosure.

It should be noted that when an element/component is mentioned as being "fixed" or "arranged" on another element/component, it can be directly on another element/component or it may be indirectly fixed or arranged on another element/component through a third element/component. When an element/component is mentioned as being "connected" with another element/component, it may be directly connected with another element/component or it may be indirectly connected to another element/component through a third component.

It should be noted that the technical terms, such as “length”, “width”, “upper”, “lower”, “front”, “back”, “left”, “right”, “vertical”, “horizontal”, “top”, “bottom”, “inner”, “outer”, indicating the orientation or position relationship are based on the orientation or position relationship shown in the attached drawings. They are just for the description convenience and simplifying, rather than indicating or implying

that the device or element referred to must have the specific orientation, or be constructed and operated in the specific orientation, and cannot be understood as the limitation of the present disclosure.

In addition, the terms "first" and "second" are used for descriptive purposes only and cannot be understood as indicating or implying the relative importance or implicitly indicating the number of technical features. Thus, the features defined with "first" and "second" can explicitly or implicitly include one or more of these features. In the description of the present disclosure, “several” or “a plurality of” means two or more, unless otherwise is specifically defined.

Referring Figures.1-16, the present disclosure has provided a document invalidation device 10 which is mainly used to invalidate card-type documents, such as Singapore ID card, Hong Kong and Macao ID card, social security card, bank card and so on, as well as book-type documents, such as passport, residence booklet and so on. As the card-type documents and book-type documents have a legal validity period, it is necessary to invalidate document information through the document invalidation device 10 after expiration to guarantee that the document cannot be used normally.

Refer to Figure 1. Specifically, the embodiment of this disclosure provides a document invalidation device 10, which includes an installation frame 100, a feeding apparatus 200, an invalidation apparatus 300, and an identification apparatus 400. Among them, the installation frame 100 includes a feeding area 101 and an invalidation area 102. The document to be invalidated enters the installation frame 100 along the feeding area 101. The feeding apparatus 200 transports the document located inside the feeding area 101 to the invalidation apparatus 300 located inside the invalidation area 102. The invalidation apparatus 300 can invalidate the document transported to the invalidation area 102. In addition, the identification apparatus 400 is used to guarantee the integrity and accuracy of the

chip information of the document to be invalidated. At the same time, when the invalidation apparatus 300 completes the document invalidation, the feeding apparatus 200 moves the document located inside the invalidation area 102 to the feeding area 101 for returning the document. In this process, the identification apparatus 400 is also required to identify the chip information of the invalidated document to guarantee that the information invalidation of the document has completed, which improves the accuracy of the invalidation. The whole process of the document invalidation apparatus 10 is fully automated, which improves the invalidation efficiency.

Referring to Figures 1 and 2, simultaneously, furthermore, the feeding apparatus 200 is arranged inside the installation frame 100, which includes a gripping structure 201, a transport structure 202 and a first drive apparatus 203. The gripping structure 201 can automatically grip and release documents. The first drive apparatus 203 can drive the gripping structure 201 to reciprocate between the feeding area 101 and the invalidation area 102. The gripping structure 201 is connected with the transport structure 202 in a slidable way, so that the first drive apparatus 203 drives the gripping structure 201 to slide back and forth between the feeding area 101 and the invalidation area 102 along the transport structure 202. Specifically, the document to be invalidated is moved to the feeding area 101. At this time, the gripping structure 201 automatically grips the document to be invalidated located inside the feeding area 101. The first drive apparatus 203 drives the gripping structure 201 to slide along the transport structure 202 to the invalidation area 102. At this time, the gripping structure 201 automatically releases the document to be invalidated into the invalidation area 102 for invalidation. When the invalidation is completed, the gripping structure 201 automatically grips the document located inside the invalidation area 102. The first drive apparatus 203 drives the gripping structure 201 to slide along the transport

structure 202 to the feeding area 101. At this time, the gripping structure 201 automatically releases the document located inside the feeding area 101 for the convenience of document recycling. The feeding apparatus 200 can completely replace manual operation, eliminate the tedious operations of manual document transport and manual searching for target document, obtain the effect of fast and accurate transport of document, save time and labor, greatly reduce the cost investment and achieve intelligent and automatic transmission.

Please refer to Figures 1 to 3, simultaneously. Furthermore, the invalidation apparatus 300 is configured inside the invalidation area 102, and includes a second drive apparatus 301, an invalidation frame 302, at least one invalidation position 303 and several invalidation structures 304. The second drive apparatus 301 is arranged at the installation frame 100, the invalidation frame 302 is in drive connection with the second drive apparatus 301, each invalidation structure 304 is arranged along the invalidation frame 302, and each invalidation position 303 is arranged relative to each invalidation structure 304. The second drive apparatus 301 can drive the invalidation frame 302 to move towards or away from each invalidation position 303, thus driving the invalidation structure 304 to move towards or away from each invalidation position 303 for completing the document invalidation process. Specifically, when the document to be invalidated is transported from the feeding apparatus 200 to the invalidation area 102, the second drive apparatus 301 drives the invalidation frame 302 to move towards each invalidation position 303, thus driving each invalidation structure 304 to move towards each invalidation position 303 to invalidate the document information. When the invalidation is completed, the second drive apparatus 301 drives the invalidation frame 302 to move away from the invalidation position 303, thus driving the invalidation structure 304 to move away from the invalidation position 303 and resetting the invalidation frame 302. In this way, the invalidation process

is completed. The invalidation apparatus 300 can automatically complete the document invalidation operation, abandon the previous manual cutting method, improve the invalidation efficiency, and help to reduce the investment cost.

Refer to Figure 1. Furthermore, the identification apparatus 400 is located below the feeding apparatus 200 to identify the chip information of the document to be invalidated and the chip information of the document after being invalidated. Some document information is stored on a chip of the document, so the identification apparatus 400 can use RFID identification module to identify the information. In addition, some document information is typewritten or printed on the document, such as barcode, QR code and other special forms or text information. Therefore, the identification apparatus 400 can use OCR identification module or scanning module to obtain the typewritten or printed information on the document. The typewritten or printed information can include document number, type, identity information of the holder, etc., on the document. The identification apparatus 400 can identify the information before the document is invalidated. If the document information can be obtained, it indicates that the document information is complete. If the document information cannot be obtained, it indicates that the document information is incorrect and needs to be returned. In addition, the identification apparatus 400 can also identify the invalidated document for the second time. If the document information can be obtained, it indicates that the document invalidation is failed. If the document information cannot be obtained, it indicates that the document has been invalidated successfully. The identification device 400 can automatically acquire the document information in the whole process, thereby improving the invalidation efficiency and accuracy of the document invalidation apparatus 10.

Please refer to Figures 1 to 4, simultaneously. In an embodiment of this disclosure, the installation frame 100 is provided with a through transport cavity,

and one cavity opening of the transport cavity is opposite to the feeding area 101 and the other cavity opening of the transport cavity is opposite to the invalidation area 102. Optionally, the installation frame 100 includes two connection plates 111 which are arranged opposite to each other and two stiffener plates 112 which are arranged at an angle with each connection plate 111. Two connection plates 111 and two stiffener plates 112 enclose to form the through transport cavity. Preferably, the two opposite connection plate 111 and the two stiffener plates 112 are vertically arranged relative to each other. In addition, each connection plate 111 and each stiffener plate 112 can adopt a rectangular plate body, such that a square transport cavity is formed. One cavity opening of the transport cavity is opposite to the feeding area 101, so that the document enters the feeding area 101 along this cavity opening. The other cavity opening is opposite to the invalidation area 102, so that the document enters the invalidation area 102 along the other cavity opening. In addition, in order to reduce the overall weight of the installation frame 100, the two stiffener plates 112 are internally hollow. In this disclosure, the angle and shape between the connection plate 111 and the stiffener plate 112 are not subject to specific restrictions as if they can be used to enclose a frame body with a transport cavity. It should be noted that each connection plate 111 and each stiffener plate 112 can be disassembled and connected to facilitate assembly and production. The connection methods here include bolt connection, riveting or other connection methods, which is not repeated herein for concise.

Referring to Figures 2 to 6 simultaneously, in an embodiment of this disclosure, the gripping structure 201 includes a gripping power source 21 and a gripping component 22, the gripping power source 21 includes a drive source 23 and a transmission frame 24, wherein the drive source 23 is in drive connection with the transmission frame 24. The gripping component 22 includes a transmission mechanism 25 and a gripping mechanism 26, which are arranged

inside the transmission frame 24. The transmission mechanism 25 is rotationally connected with the transmission frame 24, and the transmission mechanism 25 drives the gripping mechanism 26 to reciprocate towards or away from the document. The gripping structure 201 also includes a gripping fixation frame 27, which is provided with a plurality of installation cavities 271, including a first installation cavity for installing the drive source 23 and a second installation cavity inserted with a guide piece 28. An end of the guide piece 28 is connected with the transmission frame 24. Specifically, the drive source 23 drives the transmission frame 24 to reciprocate towards or away from the document, thus driving the transmission mechanism 25 to reciprocate towards or away from the document. Since the transmission mechanism 25 is in transmission connection with the gripping mechanism 26, the drive source 23 drives the gripping mechanism 26 to move towards or away from the document to grip or release the document. In this embodiment, the gripping structure 201 includes the guide piece 28. The guide piece 28 uses a guide column with two ends penetrating into the second installation cavity, and the two ends are respectively connected with top and bottom ends of the transmission frame 24, so as to guide the movement of the transmission frame 24, guarantee that the gripping structure 201 can accurately grip or release the document without deviation, and guarantee the stability and reliability of feeding. This arrangement further indirectly guarantees the stability of the document gripping or releasing by the gripping mechanism 26, so that the document can be accurately gripped and released.

Please refer to Figures 1 to 7, simultaneously. As an optional embodiment of this disclosure, a feeding module 29 is arranged along the gripping fixation frame 27, and the feeding module 29 is arranged corresponding to the feeding area 101 of the installation frame 100, so that the document enters a lower part of the gripping structure 201 along the feeding module 29. Specifically, the feeding module 29

includes a feeding drive piece 291, a feeding frame 292 driven by the feeding drive piece 291, at least one feeding channel 293 arranged below the feeding frame 292, and several feeding inlets 294 which are arranged inside each feeding channel 293. Among them, each feeding channel 293 has a feeding position difference, and the feeding drive piece 291 can drive the feeding frame 292 to reciprocate in a vertical direction to move toward or away from the document, so that the purpose of switching the feeding channel 293 can be achieved. Optionally, each feeding channel 293 includes a first feeding channel 2931 for receiving the card-type document and a second feeding channel 2932 for receiving the book-type document. Generally, the size of the book-type document is greater than the size of the card-type document. Therefore, in this embodiment, both ends of the first feeding channel 2931 respectively abut against both ends of a bottom plate of the feeding frame 292, while the second feeding channel 2932 can be embedded into the middle of the first feeding channel 2931. In addition, a distance between the first feeding channel 2931 and the plane where the document is inserted is less than a distance between the second feeding channel 2932 and the plane where the document is inserted, which guarantees the difference between feeding heights of the first feeding channel 2931 and the second feeding channel 2932. Simultaneously, the feeding inlets 294 include a first feeding inlet 2941 which is arranged at the first feeding channel 2931, and the book-type document can enter along the first feeding inlet 2941. The feeding inlets 294 also include a second feeding inlet 2942 which is arranged at the second feeding channel 2932, and the card-type document can enter along the second feeding inlet 2942. In this embodiment, in the initial state, the first feeding channel 2931 abuts against the insertion plane of the document. At this time, the distance between the second feeding channel 2932 and the insertion plane of the document just matches the thickness of the card-type document, that is, the card-type document can be

inserted along the second feeding inlet 2942 to reach the lower part of the gripping structure 201. In addition, when the feeding drive piece 291 drives the feeding frame 292 to move upward to be away from the insertion plane of the document, the distance between the second feeding channel 2932 and the insertion plane of the document exactly matches the thickness of the book-type document, which guarantees that the book-type document can be inserted along the first feeding inlet 2941 to reach the lower part of the gripping structure 201. After the book-type document is inserted, the feeding drive piece 291 drives the feeding frame 292 to move down toward the insertion plane of the document and abut again document, and finally reach the initial state. In this way, through two feeding channels 293 with different feeding heights, it is possible to quickly switch the feeding channels when feeding different types of documents, which improves the feeding efficiency, simplifies the structure and saves production costs.

Please refer to Figures 1 to 7, simultaneously. As an optional embodiment of this disclosure, the feeding drive piece 291 can be one of linear motor, electric cylinder or hydraulic cylinder, no specific restrictions are defined herein. In addition, the feeding drive piece 291 is detachably connected with the gripping fixation frame 27, and one of the installation cavities of the gripping fixation frame 27 is matched with the size of the feeding drive piece 291, ensuring the stability and accuracy of the installation of the feeding drive piece 291. In addition, the feeding frame 292 is provided with a fixation part, which is used to fix the feeding drive piece 291, so that the feeding drive piece 291 can stably drive the feeding frame 292 to move upward and downward, ensuring that the document can smoothly reach the lower part of the gripping structure 201, so as to facilitate the gripping of the document.

Please refer to Figures 1 to 7, simultaneously. As an optional embodiment of this disclosure, the drive source 23 can be one of linear motor, electric cylinder or

hydraulic cylinder, and there is no specific limitation herein. In addition, the drive source 23 just matches the shape and size of the first installation cavity of the gripping fixation frame 27, and the drive source 23 and the gripping fixation frame 27 are detachably connected. In such a way, on the one hand, the stability of the drive source 23 is guaranteed, and the vibration or shaking of the drive source 23 during operation due to the installation accuracy problem, which affects the drive efficiency, is avoided. On the other hand, it is also convenient for disassembly and maintenance. In addition, the drive source 23 and the transmission frame 24 are connected by a connection piece, which can adopt a connection block to enable the drive source 23 and the transmission frame 24 to connect with each other movably.

Please refer to Figures 1 to 7, simultaneously. Furthermore, the transmission frame 24 can be made up of a plurality of plates to form a support body or a frame body having a plurality of installation cavities. It can contain other structures such as the guide piece 28 and the transmission mechanism 25. Such arrangement guarantees the installation accuracy on the one hand, and facilitates modular production and assembly on the other hand.

Please refer to Figures 1 to 8, simultaneously. Furthermore, the transmission mechanism 25 includes a transmission power source 251, a synchronous belt 252, a driving wheel 253 and a driven wheel 254, wherein the transmission power source 251 is fixed inside the transmission frame 24, the driving wheel 253 is rotatably sleeved at a power output shaft of the transmission power source 151 and rotates synchronously with the power output shaft, the driven wheel 254 is connected with the gripping mechanism 26, and the synchronous belt 252 is sleeved at peripheries of the driving wheel 253 and the driven wheel 254. The driving wheel 253 is driven to rotate by the transmission power source 251, and the driven wheel 254 is driven to rotate by the synchronous belt 252, so as to drive the gripping mechanism 26 to move towards or away from the document, thus

realizing the gripping and releasing of the document. Specifically, in this embodiment, the transmission power source 251 is driven by a motor, the synchronous belt 252 is a toothed belt, and the driving wheel 253 and the driven wheel 254 are both toothed wheels. Both the driving wheel 253 and the driven wheel 254 are engaged with the synchronous belt 252, which improves the efficiency and stability of transmission.

Please refer to Figures 1 to 8 simultaneously. Furthermore, the gripping mechanism 26 includes a transmission shaft 261 which penetrates through the driven wheel 254 and a transmission wheel 262 which is sleeved at both ends of the transmission shaft 261 respectively. Both transmission wheels 262 respectively abut against both ends of the transmission frame 24. Optionally, the drive wheel 262 uses a rubber coated roller, and the rubber coated roller can use an annular roller, a circular roller, etc., which is not described further herein. In this way, the transmission power source 251 drives the driving wheel 253 to rotate, the driven wheel 254 rotates synchronously with the driving wheel 253 under the drive of the synchronous belt 252, and the transmission wheel 262 is driven by the transmission shaft 261. Since a surface of the transmission wheel 262 contains colloidal materials, when the document passes through, it is stuck to the surface of the transmission wheel 262, such that the document is driven to reciprocate between the feeding area 101 and the invalidation area 102.

Referring to Figures 1 and 9 simultaneously, in an embodiment of this disclosure, the transport structure 202 includes a slide rail component 2021 arranged at a top of the installation frame 100 and a slide block component 2022 which coordinates with the slide rail component 2021. Wherein, the slide rail component 2021 includes at least one guide rail 2023 which is arranged along the top of the installation frame 100. Preferably, two oppositely distributed guide rails 2023 are arranged along the transport channel of the installation frame 100, which

corresponds to the transport channel of the document. In addition, the slide block component 2022 includes two slide blocks 2024 which are correspondingly arranged with two guide rails 2023 and can slide along the two guide rails 2023, wherein two slide blocks 2024 have slide grooves which are connected with the two guide rails 2023 in a slidable way, and the slide block component 2022 is embedded into one installation cavity of the gripping fixation frame 27. In this embodiment, the guide rail 2023 extends from the feeding area 101 to the invalidation area 102 along the top of the installation frame 100, and slides along the two guide rails 2023 through two slide blocks 2024, thus driving the gripping fixation frame 27 to reciprocate between the feeding area 101 and the invalidation area 102, and then driving the gripping structure 201 to reciprocate between the feeding area 101 and the invalidation area 102. Since the gripping structure 201 grips the document, the document can reciprocate between the feeding area 101 and the invalidation area 102. In addition, in the optional embodiment of this disclosure, the transmission structure 202 can also use the transmission mode of rolling block and rolling chain to replace the above embodiments, no specific restrictions are defined herein.

Refer to Figure 10. In an embodiment of this disclosure, the first drive apparatus 203 includes a first drive support 2031, a first drive module 2032, a first drive shaft 2033 and a bearing substrate 2034, wherein the first drive module 2032 is fixed at the first drive support 2031, one end of the first drive shaft 2033 is connected with the first drive module 2032, the other end of the first drive shaft 2033 penetrates through the first drive support 2031 and extends to the invalidation area 102, and the bearing substrate 2034 is arranged along the invalidation area 102. Specifically, the first drive support 2031 includes a fixation base 2035 and an installation base 2036, the fixation base 2035 is arranged inside one installation cavity of the gripping fixation frame 27, and the installation base 2036 is

detachably connected with the fixation base 2035. Preferably, the fixation base 2035 includes two ends respectively located on both sides of the gripping fixation frame 27, and the two ends are integrally formed. The inner side of the fixation base 2035 is coaxially provided with an installation hole for penetrating through and arranging the first drive shaft 2033, while the installation base 2036 includes a through-hole which is corresponding to the installation hole and is fixed with the installation base 2036 by means of bolt connection. The first drive module 2032 is fixed at the installation base 2036 and driven by a motor. The first drive shaft 2033 is rotationally connected with the first drive module 2032. With this arrangement, the first drive module 2032 drives the first drive shaft 2033 to rotate, drives the gripping fixation frame 27 to reciprocate between the feeding area 101 and the invalidation area 102 through the installation base 2036, and drives the document to reciprocate along the feeding area 101 and the invalidation area 102, thus improving the stability and accuracy of feeding. It should be noted that the first drive module 2032 in this embodiment can also be replaced by a hydraulic drive module or a pneumatic drive module, which is not limited here.

Please refer to Figures 3 and 11, simultaneously. In an embodiment of this disclosure, the second drive apparatus 301 includes a second drive support 3011, a second drive module 3012, a second drive shaft 3013, a movable piece 3014, and at least one sensing apparatus 3015. Wherein, the second drive support 3011 is arranged at the installation frame 100, the second drive module 3012 is detachably fixed at the second drive support 3011. One end of the second drive shaft 3013 is connected with the second drive module 3012, the other end of the second drive shaft 3013 penetrates through the second drive support 3011. One end of the movable piece 3014 is connected with the second drive shaft 3013, the other end of the movable piece 3014 is connected with the invalidation frame 302, the sensing terminal of the sensing apparatus 3015 faces the movable piece 3014. In this way,

the second drive shaft 3013 is driven to rotate by the second drive module 3012, thus driving the movable piece 3014 to rotate, and driving the invalidation frame 302 to move relatively along the invalidation position 303. In this way, it is convenient to adjust the invalidation stroke, avoiding affecting the accuracy of invalidation by a too large or too small invalidation stroke.

Please refer to Figures 3 and 11 simultaneously. Specifically, the second drive support 3011 includes a fixation substrate 3016 and at least one reinforcement plate 3017, wherein each reinforcement plate 3017 is arranged along and abuts against left and right sides of the fixation substrate 3016. Preferably, the fixation substrate 3016 adopts a rectangular plate body, and its middle part has a hole for the second drive shaft 3013 to penetrate through. The reinforcement plate 3017 abuts against the plate body of the fixation substrate 3016 along its left and right sides, and can adopt triangle or other shapes. There are no specific restrictions herein. The fixation substrate 3016 and the reinforcement plate 3017 are detachably connected, and their bottoms both abut against the installation frame 100. This arrangement guarantees the stability of the installation of the second drive module 3012, and avoids shaking or deflection which affects the drive efficiency, during its operation due to the installation accuracy of the second drive module 3012.

Please refer to Figures 3 and 11 simultaneously. Furthermore, the second drive module 3012 can be detachably fixed at the fixation substrate 3016. Preferably, the second drive module 3012 is driven by a motor, and of course, it can also be driven by hydraulic pressure or pneumatic pressure, which is not limited herein. One end of the second drive shaft 3013 is rotationally connected with the second drive module 3012, and the other end of the second drive shaft 3013 penetrates through the fixation substrate 3016. In addition, the movable piece 3014 is rotationally connected with one end of the second drive shaft 3013 which

is away from the second drive module 3012. With this arrangement, the second drive module 3012 drives the second drive shaft 3013 to rotate, thus driving the movable piece 3014 to rotate.

Please refer to Figures 3 and 11 simultaneously. For an optional embodiment of this disclosure, the movable piece 3014 includes a rotation piece 31 and a connection piece 32, wherein the rotation piece 31 is sleeved at one end of the second drive shaft 3013. One end of the connection piece 32 is rotatably arranged at the rotation piece 31, and the other end of the connection piece 32 is connected with the invalidation frame 302. Specifically, the rotation piece 31 uses a crank linkage mechanism that is rotatably sleeved at the second drive shaft 3013 and is driven by the second drive shaft 3013 to rotate. Here, the rotation piece 31 can also be sleeved at the second drive shaft 3013 with a rotation block or a rotation rod, etc., no specific restrictions are defined herein.

Referring to Figures 3 and 11, simultaneously, the connection piece 32 further includes a first connection part 321 which is connected with the rotation piece 31, a second connection part 322 which is connected with the invalidation frame 302, and a joint part 323 which is movably arranged between the first connection part 321 and the second connection part 322. Specifically, the first connection part 321 uses a spherical bearing which is rotatably connected with the rotation piece 31, the second connection part 322 uses the spherical bearing which is rotatably connected with the invalidation frame 302, and the joint part 1283 uses an connection rod or connection screw that have an adjustable length and can move along the first connection part 321 and the second connection part 322. This arrangement can reduce the friction in the rotation process and improve the rotation efficiency. In addition, the joint part 323 uses a connection rod or connection screw with an adjustable length to enable it to reciprocate between the first connection part 321 and the second connection part 322, such that the stroke

of the invalidation frame 302 moving along the invalidation position 303 can be adjusted. In this way, when the second drive module 3012 drives the second drive shaft 3013 to rotate, it drives the rotation piece 31 to rotate, such that through the first connection part 321, the second connection part 322 and the joint part 323, it drives the invalidation frame 302 to move towards or away from the invalidation position 303 to complete the invalidation of the document. With this arrangement, it is easy to adjust the stroke of the invalidation frame 302 moving along the invalidation position 303 to improve the invalidation accuracy. In addition, the stroke of the invalidation frame 302 moving along the invalidation position 303 can be used to set the invalidation stroke of different documents, so as to adapt to the invalidation of multiple documents and improve the utilization rate and production efficiency of the device.

Please refer to Figures 3 and 11 simultaneously. Furthermore, a rotation angle of the rotation piece 31 of the movable piece 3014 is detected through the sensing apparatus 3015. The sensing apparatus 3015 includes a sensing substrate 34 and a sensing switch 35. The sensing substrate 34 is movably arranged at the fixation substrate 3016. The sensing terminal of the sensing switch 35 faces the rotation piece 31 and is configured to sense the rotation angle of the rotation piece 31. Specifically, the sensing substrate 34 is provided with an adjustment hole relative to the fixation substrate 3016 to facilitate flexible adjustment of the position of the sensing substrate 34 relative to the fixation substrate 3016. In addition, the sensing switch 35 can use a photoelectric detection sensor, a displacement sensor or an infrared sensor, and the rotation angle of the rotation piece 31 can be obtained in real time from the sensing terminal face to the rotation piece 31, which is not detailed herein for concise.

Refer to Figures 3 and 11, simultaneously. As an optional embodiment of this disclosure, the invalidation frame 302 is driven to move along the invalidation

position 303 by different rotation angles of the rotation piece 31, and the rotation angle is detected in real time through the sensing switch 35. Specifically, this technical solution defines that when the rotation piece 31 moves a first angle from an initial position, the sensing switch 35 detects and feeds it back to drive the invalidation frame 302 to move a first stroke along the invalidation position 303 through the connection piece 32. In addition, when the rotation piece 31 moves from the initial position to a second angle, the sensing switch 35 detects and feeds it back to drive the invalidation frame 302 to move a second stroke along the invalidation position 303 through the connection piece 32. Specifically, the second angle is greater than the first angle, and the corresponding second stroke is greater than the first stroke. In addition, both book-type document and card-type document can be transported to the invalidation position 303 through the gripping structure 201, while the invalidation frame 302 is respectively provided with different invalidation structures 304 that invalidate book-type document and card-type document. The distances between each invalidation structure 304 and invalidation position 303 are different, that is, the invalidation strokes of book-type document and card-type document are different. In this disclosure, when the invalidation frame 302 is defined to move the first stroke towards the invalidation position 303, the invalidation structure 304 can invalidate the card-type document, that is, the first stroke is corresponding to the invalidation stroke of card-type document of the invalidation structure 304. When the invalidation frame 302 is defined to move the second stroke towards the invalidation position 303, the invalidation structure 304 can invalidate the book-type document, that is, the second stroke is corresponding to the invalidation stroke of book-type document of the invalidation structure 304. In this way, the invalidation of different types of documents can be realized.

Refer to Figures 12 and 13 simultaneously. In an embodiment of this disclosure, the invalidation frame 302 includes an installation part 3021 and a

guide apparatus 3022, wherein the installation part 3021 includes an installation plate 36 and a fixation plate 37, the installation plate 36 is provided with the invalidation structure 304, and the fixation plate 37 is supported on the installation plate 36. Specifically, the installation plate 36 is provided with installation grooves 361 that penetrated with the invalidation structures 304 in one-to-one correspondence. The invalidation structure 304 penetrates through the installation groove 361 and abuts against the fixation plate 37. Each installation groove 361 can adopt a groove body with a circular hole or a rectangular hole, which can be adapted to the size and shape of the invalidation structure 304, thus ensuring the installation stability of the invalidation structure 304 and avoiding dislocation or inclination.

Please refer to Figures 11 and 12 simultaneously. Furthermore, the fixation plate 37 and the installation plate 36 can be fixed by connection pieces such as bolts and screws. The invalidation structure 304 penetrates through the installation plate 36 and then abuts against the fixation plate 37. The fixation plate 37 is also provided with a connection groove matched with the second connection part 322. Through the connection groove, the fixation plate 37 is connected with the second connection part 322, and the fixation plate 37 and the installation plate 36 are stably driven through the second connection part 322 to drive the invalidation structure 304 to move relatively along the invalidation position 303, thus ensuring the stability and reliability of the invalidation.

Refer to Figures 3 and 12 simultaneously. Furthermore, the guide apparatus 3022 includes a guide column 38, a guide cover plate 39 and a guide elastic piece 40. The guide column 38 sequentially penetrates through and is arranged at the installation plate 36 and the fixation plate 37, with its end abutting against the installation frame 100. The guide cover plate 39 covers the fixation plate 37, and the guide elastic piece 40 is embedded into the guide column 38. In order to

guarantee that the invalidation frame 302 never deflects or displaces when it moves relative to the invalidation position 303, the guide apparatus 3022 is arranged along the end of the invalidation frame 302. Specifically, fixation holes are coaxially arranged along the ends of the installation plate 36 and the fixation plate 37 of the invalidation frame 302, and their dimensions and shapes are adapted to the guide column 38. In this embodiment, circular holes or square holes can be used, and the corresponding guide column 38 can also be a cylinder or a column, which is not subject to specific restrictions. In addition, the guide elastic piece 40 outside the guide column 38 adopts a coil spring. This arrangement guarantees that the invalidation structure 304 can move to the corresponding invalidation position 303 accurately without deviation or misregistration, thus improving the accuracy and efficiency of document invalidation.

Refer to Figures 3 and 12, simultaneously. In an embodiment of this disclosure, the invalidation structure 304 includes a plurality of invalidation cutters 3041, a discharge component 3042 and a female die component 3043. Among them, each invalidation cutter 3041 includes a first invalidation cutter that invalidates the card-type document and a second invalidation cutter that invalidates the book-type document. Accordingly, the invalidation position 303 includes a first invalidation position corresponding to the first invalidation cutter and a second invalidation position corresponding to the second invalidation cutter. The invalidation stroke for the first invalidation cutter to reach the first invalidation position is different from the invalidation stroke for the second invalidation cutter to reach the second invalidation position. These invalidation strokes are exactly corresponding to the first stroke and the second stroke respectively. In this way, when the invalidation frame 302 moves relative to the invalidation position 303, the card-type document or book-type document can be invalidated by moving the

invalidation cutters 3041 relative to their corresponding invalidation positions 303 for different strokes, thus improving the invalidation efficiency.

Please refer to Figure 12 and Figure 13, simultaneously. Furthermore, a handle of each invalidation cutter 3041 can penetrate the installation plate 36 and abut against the fixation plate 37. In order to match the installation groove 361 of the invalidation structure 304 penetrating with the installation plate 36, the handle of each invalidation cutter 3041 needs to match the size and shape of the installation groove 361, so as to guarantee the stability and reliability of the installation of each invalidation cutter 3041.

Please refer to Figures 12 to 14, simultaneously. A cutter head of each invalidation cutter 3041 is provided with at least one inner wall which faces each invalidation position 303 and is opposite to identifiable information area of the document. A cutter passing channel 41 are one-to-one correspondingly arranged between each invalidation position 303 and each invalidation cutter 3041. In this way, when the identifiable information area of the document is to be invalidated, each invalidation cutter 3041 aims at the identifiable information area of the document and passes through the identifiable information area along the cutter passing channel 41 to invalidate the document. This arrangement improves the accuracy and efficiency of document invalidation.

It should be noted that in this embodiment, the way to invalidate the document includes punching the identifiable information area of the document, so that the relevant information of the invalidated document can no longer be identified, and this punching can be implemented by perforating, but no specific restrictions are defined herein.

Please refer to Figures 12 to 15, simultaneously. In an embodiment of this disclosure, the discharge component 3042 includes a discharge plate 42 and a document pressing module 43. The discharge plate 42 is arranged along an

opposite side of the installation plate 36. One end of the document pressing module 43 abuts against the discharge plate 42, and the other end of the document pressing module sequentially penetrates through the installation plate 36 and the fixation plate 37. The discharge plate 42 is used to cooperate with the document pressing module 43, so that the invalidated documents can be smoothly separated from the invalidation cutters 3041, and the noise generated during moving away from the cutter can be reduced. Specifically, the discharge plate 42 is provided with a plurality of cutter passing grooves 421, which are respectively arranged opposite to each invalidation position 303, and each cutter passing groove 421 is arranged along each cutter passing channel 41. In addition, the document pressing module 43 includes several document pressing guide columns 431, several document pressing elastic pieces 432 and several document pressing blocks 433. One end of each document pressing guide column 431 abuts against the discharge plate 42, and the other end of each document pressing guide column 431 sequentially penetrates through the installation plate 36 and the fixation plate 37 and abuts against several document pressing blocks 433. Each document pressing elastic piece 432 is sleeved at each document pressing guide column 431, and each document pressing block 433 is located above the fixation plate 37 and connected with each document pressing guide column 431. Specifically, a plurality of through holes which penetrate through each document pressing guide column 431 are arranged along the fixation plate 37 and the installation plate 36. When the fixation plate 37 and the installation plate 36 move relative to each invalidation position 303, each document pressing guide column 431 reciprocates along each through hole, so as to cooperate with the discharge plate 42 to release the cutter. Such arrangement can reduce the noise generated during moving away from the cutter.

Please refer to Figures 12 to 16, simultaneously. As an optional embodiment of this disclosure, the female die component 3043 includes several document female dies 45 and a female die fixation base 46. Each document female die 45 is located at a side of the discharge plate 42 which is away from the document pressing module 43 and is fixed inside female die fixation base 46. The female die fixation base 46 is located inside the installation frame 100. Among them, each document female die 45 is matched with the size and shape of the card-type document and book-type document. Along each document female die 45 is provided with a cutter passing insertion hole 451 which is matched with several cutter passing grooves 421 of each discharge plate 42. Both the cutter passing insertion hole 451 and the cutter passing groove 421 are connected with the cutter passing channel 41. Specifically, along the female die fixation base 46, a fixation groove 461 matching the dimension and shape of the document female die 45 is arranged, so that the document female die 45 is stably fixed inside the female die fixation base 46. Wherein, the cutter passing groove 421 is matched with the shape and size of the cutter passing insertion hole 451, and they are coaxially arranged. In this way, when the fixation plate 37 and the installation plate 36 move along each invalidation position 303, the document pressing module 43 drives the discharge plate 42 to move along each invalidation position 303. In addition, in this embodiment, each invalidation position 303 is arranged along several document female dies 45, so the document pressing module 43 drives the discharge plate 42 to apply elastic pressure to the document located at each document female die 45, this elastic force guarantees that when the document is invalidated by the impact of the invalidation cutter 3041, it never displaces or moves and is also easy to be moved from the cutter quickly. In addition, the fixation groove 461 of the female die fixation base 46 is provided with a waste discharge hole which is matched with the cutter passing insertion hole 451. After

the document is invalidated, the waste is discharged through the waste discharge hole from the cutter passing channel 41, so that the waste discharged can be collected and managed in a centralized manner.

Please refer to Figure 14. As an optional embodiment of this disclosure, a groove-type position can be used as the invalidation position 303 to facilitate the insertion of card-type documents and book-type documents.

Refer to Figure 1 and Figure 16, simultaneously. The embodiment of this disclosure also includes a waste recycling mechanism 500, which is located below the invalidation apparatus 300 and configured to collect waste materials of the invalidation apparatus 300 for invalidating the document. Among them, the waste recycling mechanism 500 is connected with the waste discharge hole of the fixation groove 461 of the female die fixation base 46. When the waste is discharged from the waste discharge hole through the cutter passing channel 41 after the document is invalidated, the waste recycling mechanism 500 is used to recycle the waste generated from the invalidation and clean it manually.

The technical scheme of this disclosure has the following technical effects. The document to be invalidated is transported from the feeding area 101 of the installation frame 100 to the invalidation area 102 of the invalidation apparatus 300 through the feeding apparatus 200, and identified through the identification apparatus 400. The waste obtained after the document is invalidated can also be recycled by the waste recycling mechanism 500. The whole working process of the document invalidation device is automated and intelligent, which improves the invalidation efficiency and reduces the invalidation cost.

The above descriptions are only better embodiments of the present disclosure, and not to limit the present disclosure. Any modification, equivalent replacement and improvement made within the spirit and principle of the present disclosure shall be included in the protection scope of the present disclosure.

CLAIMS

1. A document invalidation device, comprising:

an installation frame which has a feeding area and an invalidation area;

a feeding apparatus which is arranged inside the installation frame and comprises a gripping structure, a transport structure and a first drive apparatus, wherein the first drive apparatus drives the gripping structure to reciprocate between the feeding area and the invalidation area and the gripping structure is connected with the transport structure in a slidable way;

an invalidation apparatus, which is arranged at the invalidation area and comprises a second drive apparatus, an invalidation frame, at least one invalidation position and several invalidation structures, wherein the second drive apparatus is arranged at the installation frame, the invalidation frame is in drive connection with the second drive apparatus, each invalidation structure is arranged along the invalidation frame, and each invalidation position is arranged relative to each invalidation structure; and

an identification apparatus which is located below the feeding apparatus and configure to identify chip information of a document to be invalidated and chip information of a document after being invalidated.

2. The document invalidation device according to claim 1, wherein the installation frame is provided with a through transport cavity, and one cavity opening of the transport cavity is opposite to the feeding area and the other cavity opening of the transport cavity is opposite to the invalidation area.

3. The document invalidation device according to claim 2, wherein the installation frame comprises two connection plates which are arranged opposite to each other and two stiffener plates which are arranged at an angle with each

connection plate , wherein each connection plate and each stiffener plate enclose to form the through transport cavity.

4. The document invalidation device according to claim 3, wherein the gripping structure comprises:

a gripping power source which comprises a drive source and a transmission frame, wherein the drive source is in drive connection with the transmission frame;

a gripping component which comprises a transmission mechanism and a gripping mechanism, wherein the gripping mechanism is arranged inside the transmission frame, the transmission mechanism is rotationally connected with the transmission frame, and the transmission mechanism drives the gripping mechanism to reciprocate toward or away from the document; and

a gripping fixation frame which is provided with a plurality of installation cavities, including a first installation cavity for installing the drive source and a second installation cavity inserted with a guide piece, wherein an end of the guide piece is connected with the transmission frame.

5. The document invalidation device according to claim 4, wherein the gripping structure further comprises the guide piece which is inserted inside the second installation cavity, and both ends of the guide piece are respectively connected with top and bottom ends of the transmission frame.

6. The document invalidation device according to claim 5, wherein the document invalidation device further comprises a feeding module which is arranged along the gripping fixation frame, and the feeding module is arranged corresponding to the feeding area of the installation frame, so that the document enters a lower part of the gripping structure along the feeding module.

7. The document invalidation device according to claim 6, wherein the feeding module comprises a feeding drive piece, a feeding frame which is driven by the feeding drive piece, at least one feeding channel which is arranged below

the feeding frame, and several feeding inlets which are arranged inside each feeding channel.

8. The document invalidation device according to claim 7, wherein the transmission mechanism comprises a transmission power source, a synchronous belt, a driving wheel and a driven wheel, wherein the transmission power source is fixed inside the transmission frame, the driving wheel is sleeved at a power output shaft of the transmission power source and rotates synchronously with the power output shaft, the driven wheel is connected with the gripping mechanism, and the synchronous belt is sleeved at peripheries of the driving wheel and the driven wheel.

9. The document invalidation device according to claim 8, wherein the gripping mechanism comprises a transmission shaft which penetrates through the driven wheel and a transmission wheel which is sleeved at both ends of the transmission shaft, and both transmission wheels respectively abut against both ends of the transmission frame.

10. The document invalidation device according to claim 9, wherein the transport structure comprises:

a slide rail component which comprises at least one guide rail arranged along a top of the installation frame; and

a slide block component which comprises a plurality of slide blocks correspondingly arranged with each guide rail, each slide block has a slide groove which is in slidable connection with each guide rail, and the slide block component is embedded into one installation cavity of the gripping fixation frame.

11. The document invalidation device according to claim 10, wherein the first drive apparatus comprises:

a first drive support which comprises a fixation base and an installation base, the fixation base is arranged inside another installation cavity of the gripping

fixation frame, and the installation base is detachably connected with the fixation base;

a first drive module which is detachably fixed at the installation base;

a first drive shaft, wherein one end of the first drive shaft is connected with the first drive module, and the other end of the first drive shaft penetrates through the fixation base and extends to the invalidation area; and

a bearing substrate, which is arranged along the invalidation area and comprises an installation position which penetrates through the other end of the first drive shaft.

12. The document invalidation device according to claim 11, wherein the second drive apparatus comprises:

a second drive support which is arranged at the installation frame and comprises a fixation substrate and at least one stiffener plate, and each stiffener plate is arranged along and abuts against left and right sides of the fixation substrate;

a second drive module which is detachably fixed at the second drive support;

a second drive shaft, wherein one end of the second drive shaft is connected with the second drive module, and the other end of the second drive shaft penetrates through the fixation substrate;

a movable piece which is connected with either end of the second drive shaft which is way from the second drive module and comprises a rotation piece and a connection piece, wherein the rotation piece is sleeved at either end of the second drive shaft, one end of the connection piece is rotatably arranged at the rotation piece, and the other end of the connection piece is connected with the invalidation frame; and

at least one sensing apparatus, wherein a sensing terminal of each sensing apparatus is arranged toward the movable piece and comprises a sensing substrate

and a sensing switch, wherein the sensing substrate is movably arranged at the fixation substrate, and the sensing terminal of the sensing switch faces the rotation piece and configured to sense a rotation angle of the rotation piece.

13. The document invalidation device according to claim 12, wherein the connection piece comprises a first connection part which is connected with the rotation piece, a second connection part which is connected with the invalidation frame, and a joint part which is movably arranged between the first connection part and the second connection part.

14. The document invalidation device according to claim 13, wherein the invalidation frame comprises:

an installation part which comprises an installation plate and a fixation plate, the invalidation structure penetrates through and is arranged at the installation plate, and the fixation plate is supported on the installation plate; and

a guide apparatus which comprises a guide column, a guide cover plate and a guide elastic piece, wherein the guide column sequentially penetrates through and is arranged at the installation plate and the fixation plate, with its end abutting against the installation frame, the guide cover plate covers the fixation plate, and the guide elastic piece is embedded into the guide column.

15. The document invalidation device according to claim 14, wherein the invalidation structure comprises:

several invalidation cutters, wherein a handle of each invalidation cutter penetrates through the installation plate and abuts against the fixation plate, a cutter head of each invalidation cutter is opposite to identifiable information area of the document, and the invalidation cutters include a first invalidation cutter and a second invalidation cutter, wherein the first invalidation cutter is configured to invalidate a card-type document, and the second invalidation cutter is configured to invalidate a book-type document;

a discharge component which comprises a discharge plate and a document pressing module, wherein the discharge plate is arranged along an opposite side of the installation plate, one end of the document pressing module abuts against the discharge plate, and the other end of the document pressing module sequentially penetrates through the installation plate and the fixation plate; and

a female die component which comprises several document female dies and a female die fixation base; wherein each document female die is located at a side of the discharge plate which is away from the document pressing module and is fixed inside the female die fixation base, wherein the female die fixation base is located inside the installation frame.

16. The document invalidation device according to claim 15, wherein the document pressing module comprises:

several document pressing guide columns, one end of each document pressing guide column abuts against the discharge plate, and the other end of each document pressing guide column sequentially penetrates through the installation plate and the fixation plate;

several document pressing elastic pieces, each document pressing elastic piece is sleeved at each document pressing guide column; and

several document pressing blocks, each document pressing block is located above the fixation plate and connected with each document pressing guide column.

17. The document invalidation device according to any one of claims 1-16, wherein the document invalidation device further comprises a waste recycling mechanism, which is located below the invalidation apparatus and configured to collect waste materials of the invalidation apparatus for invalidating the document.