DOCUMENT INVALIDATION MECHANISM AND DOCUMENT INVALIDATION DEVICE

TECHNICAL FIELD

The present disclosure relates generally to a technical field of document invalidation, and more particularly, to a document invalidation mechanism and 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, as card-type document and book-type document have different identifiable areas, different invalidation structures should be employed. The existing document invalidation devices for these two types of documents are arranged with two groups of punching cutters which are corresponding to different types of documents. Accordingly, the whole structure of the entire document invalidation device is more complex and requires high production cost, which should be improved.

SUMMARY

The object of this disclosure is to provide a document invalidation mechanism and a document invalidation device, aiming at the technical problems in the prior art that the different invalidation structures and punching cutters should be provided for different types of documents, which makes the whole structure of the entire document invalidation device more complex, and requires high production cost.

In a first aspect, a document invalidation mechanism arranged at an installation frame, is provided, including a drive apparatus which is arranged at the installation frame, an invalidation frame which is arranged inside the installation frame and connected with the drive apparatus, at least one invalidation position which is arranged along the invalidation frame, and an invalidation structure which is arranged opposite to each invalidation position; wherein the drive apparatus includes a drive support which is arranged at the installation frame, a drive source which is fixed at the drive support, a movable piece which is arranged at an end of the drive source, and at least one sensing switch which is arranged facing different sides of the movable piece; wherein the movable piece is movably connected with the invalidation frame and drives the invalidation structure to displace relative to each invalidation position, each sensing switch is configured to sense a movement angle or a movement stroke of the movable piece.

Optionally, the movable piece includes a rotation piece which is rotationally connected with a drive shaft of the drive source and a connection piece which is arranged at an end of the rotation piece; wherein 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 arranged between the first connection part and the second connection part.

Optionally, the sensing switch adopts a photoelectric detection switch or a groove-type photoelectric switch.

Optionally, the invalidation frame includes an installation part for installing the invalidation structure, and a fixation part which is matched with the second connection part and arranged along the installation part.

Optionally, the installation part includes an installation plate which penetrates through each invalidation structure and a fixation plate which abuts against the installation plate; wherein the fixation part includes a connection notch which is arranged along an end face of the fixation plate.

Optionally, the invalidation frame further includes a guide apparatus which is arranged inside the installation frame, wherein the guide apparatus includes a guide column which successively penetrates through the installation plate and the fixation plate, a guide cover plate which covers the fixation plate, and an elastic piece which is embedded into the guide column.

Optionally, the invalidation structure includes a plurality of invalidation cutters which are arranged along the installation part, 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 an identifiable information area of the document, a cutter passing channel which is corresponding to each invalidation cutter one by one is arranged along each invalidation position.

Optionally, the invalidation structure further includes a discharge plate which is arranged along an opposite side of the installation plate and a document female die which is arranged below the discharge plate; wherein the document female die is embedded into a female die fixation bottom plate of the installation frame.

Optionally, the discharge plate is provided with a plurality of cutter passing grooves, the document female die is provided with a cutter passing insertion hole

that is respectively matched with each cutter passing groove, wherein the cutter passing insertion hole is connected with the cutter passing channel;

wherein the female die fixation bottom plate is provided with a waste discharge hole which is matched with the cutter passing insertion hole, and the waste discharge hole is connected with the cutter passing channel.

Optionally, the invalidation structure further includes a pressing sheet which is located above the fixation plate and a document pressing component with one end abuts against the pressing sheet and the other end elastically presses against the discharge plate.

Optionally, the invalidation structure further includes a detection apparatus which is arranged along each invalidation position.

Optionally, the document pressing component includes a plurality of document pressing guide columns which are arranged along the discharge plate and a plurality of document pressing elastic pieces which are sleeved at each document pressing guide column; wherein a plurality of through holes are arranged coaxially along the fixation plate, the installation plate and the discharge plate, wherein the through holes penetrate through the document pressing guide column.

In a second aspect, a document invalidation device is provided, including the document invalidation mechanism discussed above and a waste recycling mechanism which is arranged below the document invalidation mechanism.

Optionally, the document invalidation device includes an identification module for identifying a document information area, and the identification module is adjacent to the document invalidation mechanism.

Optionally, the identification module adopts an RFID identification module and/or an OCR scanning module.

The technical scheme of this disclosure provides a document invalidation mechanism arranged at an installation frame, which includes a drive apparatus which

is arranged at the installation frame, an invalidation frame which is arranged inside the installation frame and connected with the drive apparatus, at least one invalidation position which is arranged along the invalidation frame and an invalidation structure which is arranged opposite to each invalidation position; wherein the drive apparatus includes a drive support which is arranged at the installation frame, a drive source which is fixed at the drive support, a movable piece which is arranged at an end of the drive source, and at least one sensing switch which is arranged facing different sides of the movable piece; wherein the movable piece is movably connected with the invalidation frame and can drive the invalidation structure to displace relative to each invalidation position, each sensing switch is configured to sense a movement angle or a movement stroke of the movable piece. In this way, the invalidation frame drives the invalidation structure to move different displacements along each invalidation position through different angles or different strokes of the movable pieces. The invalidations of different types of documents are completed according to the different displacements. The sensing switch detects the movement angle or stroke of the movable pieces to determine the types of documents which are invalidated by the invalidation structure. The document invalidation device with such invalidation mechanism can use one invalidation structure to complete the invalidation of different types of documents, which improves the invalidation efficiency and simplifies the device structure.

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 this 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 mechanism provided by an embodiment of this disclosure.

Fig.2 is a first partial structure diagram of a document invalidation mechanism provided by an embodiment of this disclosure.

Fig. 3 is a structural diagram of a rotation piece of a document invalidation mechanism provided by an embodiment of this disclosure.

Fig.4 is a schematic diagram of a first movement state of a document invalidation mechanism provided by an embodiment of this disclosure.

Fig.5 is a schematic diagram of a second movement state of a document invalidation mechanism provided by an embodiment of this disclosure;

Fig.6 is a second partial structure diagram of a document invalidation mechanism provided by an embodiment of this disclosure.

Fig.7 is a structural diagram of an installation plate of a document invalidation mechanism provided by an embodiment of this disclosure.

Fig.8 is a structural diagram of a fixation plate of a document invalidation mechanism provided by an embodiment of this disclosure.

Fig.9 is a third partial structure diagram of a document invalidation mechanism provided by an embodiment of this disclosure.

Fig.10 is a structural diagram of a discharging plate of a document invalidation mechanism provided by an embodiment of this disclosure.

Fig.11 is a structural diagram of a female die fixation bottom plate of a document invalidation mechanism provided by an embodiment of this disclosure.

Fig.12 is a structure diagram of a document invalidation device provided by an embodiment of this disclosure.

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

Document invalidation mechanism	10	Installation frame	11
Drive apparatus	12	Invalidation frame	13
Invalidation position	14	Invalidation structure	15
Drive support	121	Drive source	122
Movable piece	123	Sensing switch	124
Drive motor	125	Drive shaft	126
Rotation piece	127	Connection piece	128
Driving part	1271	Driven part	1272
First through hole	1273	Second through hole	1274
First connection part	1281	Second connection part	1282
Joint part	1283	Invalidation cutter	151
First invalidation cutter	1511	Second invalidation cutter	1512
First invalidation position	141	Second invalidation position	142
Installation plate	131	Fixation plate	132
Installation notch	134	Connection notch	133
Guide column	135	Guide cover plate	136
Elastic piece	137	Cutter passing channel	143
Discharge plate	153	Document female die	154
Cutter passing groove	155	Cutter passing insertion hole	156
Female die fixation bottom plate	111	Fixation groove	112
Pressing sheet	157	Document pressing component	158
Document pressing guide column	1581	Document pressing elastic piece	1582
Detection apparatus	159	Document invalidation device	200
Waste recycling mechanism	201		

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

In order to make the object, technical scheme and advantages of this disclosure clearer, this 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 this disclosure and are not used to limit this 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 with 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 this 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 this disclosure, “several” or “a plurality of” means two or more, unless otherwise is specifically defined.

Please refer to Figures 1 to 12, simultaneously. This disclosure provides a document invalidation mechanism 10 configured at a document invalidation device 200. The document invalidation device 200 is mainly configured 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 some document information is stored on a chip of the document, so RFID identification module can be used to identify the document 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, OCR identification or scanning can be used 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. As these 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.

Specifically, referring to Figure 1, an embodiment of this disclosure provides a document invalidation mechanism 10, which is arranged at an installation frame 11, including a drive apparatus 12 which is arranged at the installation frame 11, an invalidation frame 13 which is arranged inside the installation frame 11 and connected with the drive apparatus 12, at least one invalidation position 14 which is arranged along the invalidation frame 13, and an invalidation structure 15 which is arranged opposite to each invalidation position 14. The drive apparatus 12 includes a drive support 121 which is arranged at the installation frame 11, a drive source 122 which is fixed at the drive support 121, a movable piece 123 which is arranged at an end of the drive source 122, and at least one sensing switch 124 which is arranged facing different sides of the movable piece 123. The invalidation frame 13 drives the invalidation structure 15 to displace with respect to each invalidation position 14 through the movable piece 123, and each sensing switch 124 is configured to sense a movement angle or a movement stroke of the movable piece 123. In this way, the invalidation frame 13 drives the invalidation structure 15 to displace and invalidate the document along each invalidation position 14 through different angles or different strokes of the movable piece 123. The sensing switch 124 can detect the

movement angle or stroke of the movable piece 123 and determine the type of the document which is invalidated by the invalidation structure 15.

Please refer to Figures 1 and 2 , simultaneously. In this embodiment, the drive source 122 includes a drive motor 125 and a drive shaft 126, wherein the drive shaft 126 is rotatably arranged at an end of the drive motor 125, so as to drive the drive shaft 126 through the drive motor 125. It should be noted that the drive source 122 can also use an electric cylinder, a stepping motor or a screw motor, etc., which is not specifically limited herein.

Please refer to Figures 1 to 3, simultaneously. Furthermore, the movable piece 123 includes a rotation piece 127 which is rotationally connected with the drive shaft 126 and a connection piece 128 which is arranged at an end of the rotation piece 127. Wherein, the rotation piece 127 is driven by the drive shaft 126 to rotate through a crank connection rod mechanism which is rotationally sleeved at the drive shaft 126. The rotation piece 127 includes a driving part 1271 which is sleeved at the drive shaft 126 and a driven part 1272 which is connected with the driving part 1271. A first through-hole 1273, which is matched with the shape and size of the drive shaft 126, is arranged along the driving part 1271. The first through-hole 1273 preferably adopts a circular through-hole or other hole shapes, which are not specifically limited here. The drive shaft 126 drives the driving part 1271 to rotate through the first through-hole 1273, thereby driving the driven part 1272 to rotate. Here, the rotation piece 127 can also be sleeved at the drive shaft 126 with a rotation block or a rotation rod, which is not described further for concise.

Refer to Figures 1 to 3, simultaneously. Further, the connection piece 128 includes a first connection part 1281 which is connected with the rotation piece 127, a second connection part 1282 which is connected with the invalidation frame 13, and a joint part 1283 which is movably arranged between the first connection part 1281 and the second connection part 1282. Specifically, the first connection part

1281 is rotationally connected with the driven part 1272 of the rotation piece 127, and a second through-hole 1274 is arranged along the driven part 1272. The first connection part 1281 is rotationally connected with the driven part 1272 through the second through-hole 1274. It should be noted that the second through-hole 1274 and the first through-hole 1273 are arranged in parallel with each other. Optionally, the first connection part 1281 uses a spherical bearing which is rotatably connected with the driven part 1272, the second connection part 1282 uses a spherical bearing which is rotatably connected with the invalidation frame 13, and the joint part 1283 uses a connection rod or connection screw with an adjustable length, that can move along the first connection part 1281 and the second connection part 1282. In this way, the first connection part 1281 and the second connection part 1282 using the spherical bearing, are adopted to reduce the friction during the rotation process and improve the rotation efficiency. In addition, the joint part 1283 uses the connection rod or connection screw with an adjustable length to enable it to reciprocate between the first connection part 1281 and the second connection part 1282, which can adjust the stock of the invalidation frame 13 along the invalidation position 14.

Please refer to Figures 1 to 3, simultaneously. Furthermore, in this embodiment, the sensing switch 124 uses a photoelectric detection switch to detect a position information of the rotation piece 127 and sends the corresponding position information to a control system. In this embodiment, optionally, the photoelectric detection switch can be a diffuse reflective photoelectric detection switch, which integrates a transmitter and a receiver. When the rotation piece 127 passes by, the rotation piece 127 reflects enough light emitted by the transmitter of the sensing switch 124 to the receiver, so the sensing switch 124 generates a switch signal.

In addition, as an optional embodiment of this disclosure, the sensing switch 124 can adopt a groove-type photoelectric switch, and correspondingly, a sensing sheet is arranged along an end of the rotation piece 127. The sensing sheet can be

embedded into the sensing switch 124 under the rotation movement of the rotation piece 127. Therefore, the sensing switch 124 generates a switch signal, and the use of the groove-type photoelectric switch can more accurately sense the rotation piece 127 with a faster rotation amplitude, making the detection safer and more reliable.

Please refer to Figure 4 and Figure 5, simultaneously. Specifically, in this embodiment, an initial position of the rotation piece 127 is defined as point A. A sensing switch 124 is arranged along point A to detect whether the rotation piece 127 is at the initial position. When the rotation piece 127 rotates 120 degrees, the position here is defined as point B. A sensing switch 124 is arranged at point B to detect whether the rotation piece 127 has reached this position. At this time, the connection piece 128 drives the invalidation frame 13 to move a first stroke, so as to drive the invalidation structure 15 to move a corresponding first stroke relative to the invalidation position 14. In this embodiment, it is defined that after the rotation piece 127 rotates 360 degrees along the initial position A, the connection piece 128 drives the invalidation frame 13 to move a second stroke, and the second stroke is greater than the first stroke. At this time, the invalidation structure 15 is driven to move a corresponding second stroke relative to the invalidation position 14. In this way, the drive source 122 drives the rotation piece 127 to rotate at different angles to drive the connection piece 128 to bring the invalidation frame 13 to move different strokes relative to the invalidation position 14, so that the invalidation structure 15 moves different strokes relative to the invalidation position 14, and the invalidations to different documents are completed according to the different strokes.

Please refer to Figures 4 to 6, simultaneously. Specifically, the invalidation structure 15 includes several invalidation cutters 151, including a first invalidation cutter 1511 for invalidating the card-type document and the second invalidation cutter 1512 for invalidating the book-type document. Each invalidation position 14 includes a first invalidation position 141 corresponding to the first invalidation cutter

1511 and a second invalidation position 142 corresponding to the second invalidation cutter 1512. The invalidation stroke of the first invalidation cutter 1511 to the first invalidation position 141 is different from the invalidation stroke of the second invalidation cutter 1512 to the second invalidation position 142, which exactly correspond to the first stroke and the second stroke, respectively. In this way, the invalidation frame 13 moves different strokes along the invalidation position 14 to drive different invalidation cutters 151 to move different strokes along the corresponding invalidation position, so as to achieve the invalidation strokes of card-type document invalidation or book-type document invalidation, realize the invalidations of two different types of documents, and improve the invalidation efficiency. Specifically, when the rotation piece 127 rotates 120 degrees along the initial position A point to reach the position B, the connection piece 128 drives the invalidation frame 13 to move the first stroke, so as to drive the first invalidation cutter 1511 to move the first stroke towards the first invalidation position 141, and simultaneously, the second invalidation cutter 1512 moves the first stroke towards the second invalidation position 142. When the first invalidation cutter 1511 moves the first stroke towards the first invalidation position 141, the first stroke coincides with the invalidation stroke of the first invalidation cutter 1511 to invalidate the card-type document. In this way, the card-type document is invalidated. When the rotation piece 127 rotates 360 degrees along the initial position A to reach the initial position point A, the connection part 128 drives the invalidation frame 13 to move the second stroke, so as to drive the first invalidation cutter 1511 to move the second stroke towards the first invalidation position 141, and simultaneously, the second invalidation cutter 1512 moves the second stroke towards the second invalidation position 142. As the first stroke is smaller the second stroke, the second stroke coincides with the invalidation stroke of the second invalidation cutter 1512 to invalidate the book-type document. In this way, the book-type document is

invalidated. By arranging the first invalidation cutter 1511 and the second invalidation cutter 1512 combined with their different invalidation strokes relative to the corresponding first invalidation position 141 and second invalidation position 142, the card-type document and book-type document are invalidated. This arrangement improves the invalidation efficiency of the document invalidation device, and simplifies the structure of the document invalidation device.

In this embodiment, each invalidation position 14 adopts a groove-type position for directional insertion of the document to be invalidated, and plays a role of position-limiting. In addition, there can be a plurality of first invalidation cutter and second invalidation cutter, and the specific number of them is not further limited herein.

In this embodiment, the document invalidation through the invalidation cutter 151 includes punching or cutting the identifiable information area of the document to be invalidated, and the document information at the identifiable information area of the invalidated document cannot be identified by the identification module. Punching refers to perforating operation in the information area of the document to be invalidated. The hole shape can be selected optionally, depending on the selection of the invalidation cutter. Cutting refers to cutting the identifiable information area of the document to be invalidated. Cutting or punching both destroy the integrity of the identifiable information area.

Please refer to Figures 6 to 9, simultaneously. In this embodiment, the invalidation frame 13 includes an installation part for installing the invalidation structure 15, and a fixation part which is matched with the second connection part 1282 and arranged along the installation part. The installation part includes an installation plate 131 which penetrates through the invalidation structure 15 and a fixation plate 132 which abuts against the installation plate 131. Among them, the invalidation cutters 151 are arranged at the installation part. Specifically, along the

installation plate 131, there are several installation notches 134 that can pass through each invalidation cutter 151 one by one. A handle of each invalidation cutter 151 penetrates through the installation notches 134 and is connected with the fixation plate 132. The fixation plate 132 is arranged along an upper part of the installation plate 131. The fixation plate 132 and the installation plate 131 can be fixed by connection pieces such as screws and bolts. Each invalidation cutter 151 passes through the installation plate 131 and abuts against the fixation plate 132.

Please also refer to Figures 6 to 9, simultaneously. As an optional embodiment of this disclosure, The handle of each invalidation cutter 151 uses a round handle or a rectangular handle. Since each invalidation cutter 151 passes through the installation notch 134 and abuts against the top of the fixation plate 132, the installation notch 134 uses a notch body with a circular or rectangular hole located inside, and the internal circular or rectangular hole matches the overall size of the handle of each invalidation cutter 151, which guarantees the stability of each invalidation cutter 151 for passing through the installation notch 134 and being fixed with the installation plate 131. The fixation connection between the fixation plate 132 and the installation plate 131 guarantees the stability and reliability of the abutting connection between the handle of each invalidation cutter 151 and the fixation plate 132. Therefore, when the rotation piece 127 drives the fixation plate 132 to move relative to each invalidation position 14 through the first connection part 1281, the joint part 1283 and the second connection part 1282 successively, each invalidation cutter 151 can be guaranteed to move relative to each invalidation position 14, such that the stability of the movement of the invalidation cutter 151 is improved.

Refer to Figures 6 to 9, simultaneously. Furthermore, the fixation part includes a connection notch 133 which is arranged along an end face of the fixation plate 132 and is matched with the second connection part 1282 of the connection piece 128.

The invalidation frame 13 is matched with the second connection part 1282 through the fixation plate 132, such that the second connection part 1282 rotates to drive the invalidation frame 13 to displace. On the one hand, the movement distance of the invalidation frame 13 can be flexibly adjusted, and on the other hand, it is convenient for disassembly and installation. Specifically, the connection notch 133 for inserting the end of the second connection part 1282 is recessed along the end face of the fixation plate 132. The connection notch 133 uses a notch part that is adapted to the end of the second connection part 1282, so that the second connection part 1282 and the fixation plate 132 are hinged, ensuring the reliability of the connection between the second connection part 1282 and the fixation plate 132.

Please refer to Figures 6 to 9, simultaneously. Furthermore, the invalidation frame 13 further includes a guide apparatus which is arranged inside the installation frame 11. The guide apparatus includes a guide column 135 which successively penetrates through the installation plate 131 and the fixation plate 132, a guide cover plate 136 which covers the fixation plate 132, and an elastic piece 137 which is embedded into the guide column 135. To guarantee that each invalidation cutter 151 can move relative to each invalidation position 14 without offset or displacement, in this embodiment, the guide apparatus can be arranged along both ends of the invalidation frame 13. Specifically, fixation holes are coaxially arranged along both ends of the installation plate 131 and the fixation plate 132 of the invalidation frame 13, and the size and shape of the fixation holes are adapted to the guide column 135. In this embodiment, circular holes or square holes can be used, while the guide column 135 can also use a cylinder or a column body, which is not specifically limited herein. The elastic piece 137 outside the guide column 135 can use a spiral spring. Specifically, when the drive source 122 drives the rotation piece 127 to rotate, and drives each invalidation cutter 151 at the invalidation frame 13 to move towards each invalidation position 14 through the first connection part 1281 and the second

connection part 1282, the elastic piece 137 is in a compressed state, and the guide column 135 and the guide cover plate 136 are driven to move vertically along the fixation plate 132 and the installation plate 131 towards each invalidation position through the fixation hole. At this time, the document is invalidated. After the invalidation is completed, when the drive source 122 drives the rotation piece 127 to rotate, and drives each invalidation cutter 151 at the invalidation frame 13 to move away from each invalidation position 14 through the first connection part 1281 and the second connection part 1282, the elastic force of the elastic piece 137 recovers, and the guide column 135 and the guide cover plate 136 are driven to move vertically along the fixation plate 132 and the installation plate 131 and away from each invalidation position through the fixation hole. At this time, the document invalidation is ended. This arrangement guarantees that each invalidation cutter 151 can be moved to each invalidation position 14 accurately without deviation or displacement, and improves the accuracy and efficiency of document invalidation.

Please refer to Figures 6 to 9, simultaneously. Further, one end of each invalidation cutter 151 which is away from the installation plate 131 is provided with at least one inner wall facing each invalidation position 14. A cutter head of the invalidation cutter 151 is opposite to the identifiable information area of the document, and each invalidation position 14 is provided with a cutter passing channel 143 corresponding to each invalidation cutter 151. In this way, when the identifiable information area of the document is to be invalidated, each invalidation cutter 151 aims at the identifiable information area of the document and passes through the identifiable information area along the cutter passing channel 143 to invalidate the document, and the waste generated in the invalidation process is discharged along the cutter passing channel 143. In this embodiment, on the one hand, each cutter passing channel 143 cooperates with each invalidation cutter 151

to complete the document invalidation, and on the other hand, the cutter passing channel 143 has the function of waste discharge.

Please refer to Figures 7 to 11, simultaneously. Furthermore, the invalidation structure 15 further includes a discharge plate 153 which is arranged along the opposite side of the installation plate 131 and a document female die 154 which is arranged along the lower part of the discharge plate 153. A plurality of cutter passing grooves 155 which are matched with each installation notch 134 respectively, are arranged along the discharge plate 153. The document female die 154 is provided with a cutter passing insertion hole 156 matched with each cutter passing groove 155, and the cutter passing insertion hole 156 is connected with the cutter passing channel 143. Specifically, in this embodiment, each invalidation position 14 is located at the document female die 154 and can be matched with each invalidation cutter 151 to complete the document invalidation. Preferably, the bottom of the document female die 154 is fixed at a female die fixation bottom plate 111 which is located inside the installation frame 11. Along the female die fixation bottom plate 111 is provided with a fixation groove 112 that matches the size and shape of the document female die 154, so that the document female die 154 is stably fixed inside the installation frame 11. Wherein, the cutter passing channel groove 155 is matched with the shape and size of the installation notch 134, and is coaxially arranged with the installation notch 134. In addition, the cutter passing insertion hole 156 is matched with the shapes and sizes of the cutter passing channel groove 155 and the installation notch 134, and is coaxially arranged with the cutter passing channel groove 155 and the installation notch 134. The discharge plate 153 acts on the document female die 154 to discharge the invalidated document along the document female die 154. In this way, the cutter head of the invalidation cutter 151 passing through the cutter passing channel 143 penetrates through the discharge plate 153 to invalidate the document located at the document female die 154. The discharge plate

153 is used to discharge the invalidated document along the document female die 154, and the waste is discharged along the cutter passing channel 143. In addition, the fixation groove 112 of the female die fixation bottom plate 111 is provided with a waste discharge hole which is matched with the cutter passing insertion hole 156. After the document is invalidated, the waste is discharged from the waste discharge hole through the cutter passing channel 143, so that the waste discharged can be collected and managed in a centralized way.

Please refer to Figures 7 to 11, simultaneously. Furthermore, the invalidation structure 15 further includes a document pressing component 158 with one end abuts against a pressing sheet 157 which is fixed above the fixation plate 132 and with the other end which elastically presses against the discharge plate 153. A plurality of through holes are arranged along the fixation plate 132, the installation plate 131 and the discharge plate 153, wherein the through holes penetrate through the document pressing component 158. On the one hand, This arrangement can prevent affecting the invalidation accuracy of the information area of the document to be invalidated during the invalidation process and resulting in invalidation failure. On the other hand, the invalidated document can be easily separated from the invalidation cutter 151. The document pressing component 158 always elastically presses against the document at the document female die 154 during the separation, so this design further has the effect of reducing the noise for removing the cutter.

Please refer to Figures 7 to 11, simultaneously. As an optional embodiment of this disclosure, the document pressing component 158 includes a plurality of document pressing guide columns 1581 which are arranged along the discharge plate 153 and a plurality of document pressing elastic pieces 1582 which are sleeved at each document pressing guide column 1581. One end of each document pressing guide column 1581 passes through several through holes and abuts against the discharge plate 153, and the other end of each document pressing guide column 1581

passes through the installation plate 131 and fixation plate 132 successively and abuts against the pressing sheet 157 located at the fixation plate 132. Each document pressing guide column 1581 can reciprocate in the through hole. In this way, when the fixation plate 132 moves downward towards the invalidation position 14 at the document female die 154 to invalidate the document, it drives the pressing sheet 157 located at the fixation plate 132 to press the document pressing elastic piece 1582 downward towards the invalidation position 14, thus driving the document pressing guide column 1581 to move towards each invalidation position 14, that is, driving the discharge plate 153 to move towards each invalidation position 14. At this time, the cutter head of the invalidation cutter 151 cooperates with the document female die 154 to complete the document invalidation. At this time, the document pressing guide column 1581 drives the discharge plate 153 to move towards the document female die 154 to press the document at each invalidation position 14 of the document female die 154. The elastic force guarantees that the documents never displace or move when they are invalidated by the invalidation impact of the invalidation cutter 151. In addition, after the invalidation is completed, when the fixation plate 132 is driven by the drive source 122 to move upward away from the invalidation position 14 of the document female die 154, the invalidation cutter 151 is separated from the invalidation position 14 at the document female die 154. At this time, the document pressing guide column 1581 drives the discharge plate 153 to press the invalidation position 14 at the document female die 154, so as to prevent the document from being offset or upwarped when the invalidation cutter 151 moves away from the invalidation position 14, ensuring that the invalidation cutter 151 can be quickly and stably separated from the invalidated document. When the operator takes away the invalidated document, because each invalidation position 14 is empty, the pressing sheet 157 located at the fixation plate 132 drives the document pressing elastic piece 1582 to elastically reset upward and move away from each invalidation

position 14 under the action of the fixation plate 132, thus driving the document pressing guide column 1581 to move upward away from each invalidation position 14, and then driving the discharge plate 153 to move away from each invalidation position 14 at the document female die 154. On the one hand, this arrangement plays a guidance role through the document pressing component 158, and on the other hand guarantees that the document is always stably located at each invalidation position 14, thus improving the accuracy and efficiency of invalidation.

Please refer to Figures 7 to 11, simultaneously. Further, the invalidation structure 15 further includes a detection apparatus 159 for detecting whether the document is inserted into each invalidation position 14. The detection apparatus 159 uses a position sensor. When the document is moved into the corresponding invalidation position 14, the control system obtains a position signal. At this time, the control system controls the drive source 122 to drive the rotation piece 127, so as to bring the invalidation frame 13 to drive the invalidation cutter 151 towards the corresponding invalidation position 14 through the connection piece 128 to invalidate the document. If the detection apparatus 159 fails to detect that the document reaches the invalidation position 14, the control system acquires such position signal, and at this time the control system controls the drive source 122 not to start. This arrangement guarantees the invalidation accuracy.

Referring to Figure 12, this disclosure also provides a document invalidation device 200, including the above document invalidation mechanism 10 and a waste recycling mechanism 201 which is arranged below the document invalidation mechanism 10. Among them, the waste recycling mechanism 201 is arranged below each invalidation position 14 of the document female die 154 to recycle the waste discharged along the cutter passing channel 143.

The waste recycling mechanism 201 can employ any know technical solution of the prior art.

In addition, the document invalidation device 200 further includes an identification module for identifying the document information area of the document. The identification module is adjacent to the document invalidation mechanism 10, and can use an RFID identification module or an OCR scanning module to identify the document before the document enters the document invalidation mechanism 10, and indicate that the information of the document is complete and the document can enter the document invalidation mechanism 10 for invalidation. In addition, when the document invalidation mechanism 10 has completed the document invalidation, the identification module identifies the invalidated document for the second time. If the document information can be obtained, it means the document has failed to be invalidated. If the document information cannot be obtained, it means the document has been invalidated. successfully, which improves the invalidated efficiency of the device.

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

CLAIMS

1. A document invalidation mechanism arranged at an installation frame, comprising a drive apparatus which is arranged at the installation frame, an invalidation frame which is arranged inside the installation frame and connected with the drive apparatus, at least one invalidation position which is arranged along the invalidation frame, and an invalidation structure which is arranged opposite to each invalidation position; wherein the drive apparatus comprises a drive support which is arranged at the installation frame, a drive source which is fixed at the drive support, a movable piece which is arranged at an end of the drive source, and at least one sensing switch which is arranged facing different sides of the movable piece; wherein the movable piece is movably connected with the invalidation frame and drives the invalidation structure to displace relative to each invalidation position, each sensing switch is configured to sense a movement angle or a movement stroke of the movable piece.

2. The document invalidation mechanism according to claim 1, wherein the movable piece comprises a rotation piece which is rotationally connected with a drive shaft of the drive source and a connection piece which is arranged at an end of the rotation piece; 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 arranged between the first connection part and the second connection part.

3. The document invalidation mechanism according to claim 2, wherein the sensing switch adopts a photoelectric detection switch or a groove-type photoelectric switch.

4. The document invalidation mechanism according to claim 2, wherein the invalidation frame comprises an installation part for installing the invalidation

structure, and a fixation part which is matched with the second connection part and arranged along the installation part.

5. The document invalidation mechanism according to claim 4, wherein the installation part comprises an installation plate which penetrates through each invalidation structure and a fixation plate which abuts against the installation plate; wherein the fixation part comprises a connection notch which is arranged along an end face of the fixation plate.

6. The document invalidation mechanism according to claim 5, wherein the invalidation frame further comprises a guide apparatus which is arranged inside the installation frame, wherein the guide apparatus comprises a guide column which successively penetrates through the installation plate and the fixation plate, a guide cover plate which covers the fixation plate, and an elastic piece which is embedded into the guide column.

7. The document invalidation mechanism according to claim 6, wherein the invalidation structure comprises a plurality of invalidation cutters which are arranged along the installation part, 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 an identifiable information area of a document, a cutter passing channel which is corresponding to each invalidation cutter one by one is arranged along each invalidation position.

8. The document invalidation mechanism according to claim 7, wherein the invalidation structure further comprises a discharge plate which is arranged along an opposite side of the installation plate and a document female die which is arranged below the discharge plate; wherein the document female die is embedded into a female die fixation bottom plate of the installation frame.

9. The document invalidation mechanism according to claim 8, wherein the discharge plate is provided with a plurality of cutter passing grooves, the document

female die is provided with a cutter passing insertion hole that is respectively matched with each cutter passing groove, wherein the cutter passing insertion hole is connected with the cutter passing channel;

wherein the female die fixation bottom plate is provided with a waste discharge hole which is matched with the cutter passing insertion hole, and the waste discharge hole is connected with the cutter passing channel.

10. The document invalidation mechanism according to claim 9, wherein the invalidation structure further comprises a pressing sheet which is located above the fixation plate and a document pressing component with one end abuts against the pressing sheet and the other end elastically presses against the discharge plate.

11. The document invalidation mechanism according to claim 10, wherein the document pressing component comprises a plurality of document pressing guide columns which are arranged along the discharge plate and a plurality of document pressing elastic pieces which are sleeved at each document pressing guide column; wherein a plurality of through holes are arranged coaxially along the fixation plate, the installation plate and the discharge plate, wherein the through holes penetrate through the document pressing guide column.

12. The document invalidation mechanism according to claim 11, wherein the invalidation structure further comprises a detection apparatus which is arranged along each invalidation position.

13. A document invalidation device comprising the document invalidation mechanism according to any one of claims 1-12 and a waste recycling mechanism which is arranged below the document invalidation mechanism.

14. The document invalidation mechanism according to claim 13, wherein the document invalidation device comprises an identification module for identifying a document information area, and the identification module is adjacent to the document invalidation mechanism.

15. The document invalidation mechanism according to claim 14, wherein the identification module adopts an RFID identification module and/or an OCR scanning module.