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DRAWINGS ATTACHED

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(54) ARRANGEMENT FOR THE PREPARATION OF PRINTING ORDERS

(71) We, AGFA-GEVAERT AKTIENGESELLSCHAFT, a body corporate recognised under German Law, of Leverkusen, Germany, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:

This invention relates to an arrangement for the preparation of printing orders from film strips and strips bearing the corresponding prints.

In printing establishments for the production of prints from the films of amateur photographers, picture strips can be produced with a relatively small staff by using printing apparatuses in which the films are handled after being glued together to form one long film strip. After the exposed films have been developed and printed the prints are subjected to a visual check in a corresponding rewinding station. Unsaleable prints which must be repeated, are provided with a scannable mark by means of which these marked, unusable prints can be sorted out in a cutting apparatus. In order to prepare the order it is then necessary to combine the cut pictures of an order with the processed film, which is generally cut into strips of five or six frames. At the same time, in order to calculate the cost of the order, it is necessary to determine the brand of film in question, the type of presentation, and the number and size of prints being supplied. All these data are necessary for invoicing. In the method of operation used hitherto, these operations are carried out to a great extent by hand, and a disproportionately high expenditure in working hours is necessary for this purpose.

It is an object of the invention to rationalise the preparation of printing orders.

The present invention provides an arrangement for the preparation of printing orders from film strips and strips bearing the corresponding prints, which comprises means for cutting a print-bearing strip into individual prints in response to scannable marks of a first type, the print-cutting means being arranged to cease operation in response to a scannable mark of a second type, means for cutting a film strip into packable lengths by severing the strip at certain dividing bars and at connections between joined strips, the film-cutting means being arranged to cease operation on severing such a connection, and control means for co-ordinating the operation of the print-cutting and film-cutting means.

An arrangement according to the invention enables the collation of the pictures and film strips of an order to be carried out in one place of operation, in which the pictures are cut and the films are divided into strips. By telescoping the running times of the individual apparatuses it is possible to occupy the operator so that there is very little waiting time.

Because the time required to cut the prints of an order will generally exceed the time required to cut the corresponding film strip, it is desirable for the cutting of the prints to commence before the cutting of the film strip. Advantageously, the control means is arranged to actuate the print-cutting means in response to a start signal, and to actuate the film-cutting means when the print-cutting means ceases operation.

Preferably, there is provided means for stamping details of an order onto a data carrier, which carrier may be a despatched voucher or, especially, an order wallet. Such details will generally include, for example, the number of cut prints in an order, and there is advantageously provided means for counting the number of cuts effected by the print-cutting means, the said counting means being arranged to cause the stamping means to stamp the corresponding number onto the data carrier, to produce a cor-

[Price 25p]

responding signal for communication to a computer, and to be erased when the print-cutting means ceases operation.

The computer calculates the cost of each order and, to enable the appropriate customer account to be debited, there is advantageously provided a device for reading information in automatically readable form from the data carrier and for feeding the information to a computer. In this way, the dealer and/or commission number on the data carrier is fed into the computer. The computer may also receive special information regarding each order, for example, the print size, brand of film, type of presentation, date, and the processing apparatus. Such information (some of which is relevant to the price of the order) may be fed into the computer by way of an input keyboard. If desired, the computer may be arranged to cause the stamping means to print the order price on the data carrier.

An arrangement in accordance with the invention will now be described, by way of example, with reference to the accompanying drawings, in which:

Fig. 1 is a diagram showing the spatial arrangement of the components of the arrangement:

Fig. 2 shows a block wiring diagram of the control system of the arrangement shown in Fig. 1; and

Fig. 3 is a diagram showing the times of utilisation of the components of the arrangement, together with the tasks carried out by the operator.

Referring to Fig. 1, the reference numeral 1 indicates a kidney-shaped worktable inside which a seat 2 is provided for the operator of the order-preparing arrangement. On the left-hand side of the table as shown in the Figure there is arranged a known film cutting apparatus 3. A suitable film cutting apparatus is disclosed, for example, in our German Publication Text No. 1 497 400. The purpose of the apparatus is to cut the rolled films, which have been glued together to form a long strip into strips which are just of a packable length, the cuts being made at the edges of the pictures. The cutting operations performed by the apparatus 3 are controlled by edge notches or perforations associated with the exposed negatives. In addition, the cutting apparatus 3 responds to a scannable mark at the splicing point between two films, which at the same time marks the end of an order. The scannable mark may be, for example, notches on both sides of the film strip, or a splicing tape which can be detected by its lower transparency value. Furthermore, the cutting apparatus 3 is provided with a discharge means 4 in which the cut strips are collected and formed into a stack. A particularly suitable discharge and stacking means is disclosed in German Offenlegungsschrift P 20 48 412.2. Also arranged at the discharge point 4 is a scanning device (not shown) which is arranged to emit a signal when there are no film strips in the discharge station. Scanning may for example be effected mechanically by means of a microswitch, or photoelectrically by means of a light bar. Beneath the discharge point 4 for the cut film strips is a magazine 5 in which film wallets are held upright so that stacks of film strips which are taken with both hands from the discharge means 4 can readily be inserted into the wallets.

A magazine 6 containing order wallets is arranged in the centre of the table 1. The order wallets are the packaging units in which the pictures and the corresponding films will be brought together. In commercial practice, during or before the entry of the order into the printing establishment a commission number and a dealer's number will have been stamped onto the wallets in automatically readable, that is to say, coded form. The order wallet may also have been sent to the printing establishment by the dealer acting as order reception agent with the information on the order.

Between the order wallet magazine 6 and the front edge of the table there is provided a stamping mechanism arranged under the table surface and having an inlet aperture 7 into which an order wallet can be introduced. An automatic reading device is associated with the stamping device and, when the order wallet is pushed in the correct position into the aperture 7, the automatic device reads off the dealer and commission numbers and passes them on to a central computer.

The right-hand section of the worktable carries a cutting apparatus 8 for cutting picture strips into individual frames in accordance with scannable marks of a first type printed on the reverse side of the pictures. The reverse side of the picture strip also bears scannable of a second type marks to indicate the end of the order. These marks will have been applied to the reverse side of the paper strip in the printing apparatus on the basis of the scanning of the film splicing points.

The cutting apparatus 8 is so arranged that, after a start pulse, it cuts the pictures until an order end mark is located and then stops. An unwinding device 9 serves to drive the relatively heavy roll of paper strip in order to reduce the traction on the paper strip in the cutting apparatus 8. The cutting apparatus 8 is followed by a sorting device 10 which may be constructed, for example, approximately as described in German Publication Text

1 912 759. On the basis of marks applied to unsaleable pictures, the sorting device 10 sorts the pictures of each order into saleable and unsaleable pictures. The cutting apparatus 8 contains a counting device of known construction, which counts the actuations of the cutting apparatus within an order and passes the number on to the central computer. In addition, a device is provided to count the actuations of the sorting device 10 so that the number of pictures needing re-printing within an order is also indicated.

In an easily accessible part of the worktable 1 there is a keyboard 11, into which the operator can feed a series of further items of information which are necessary for the pricing of the order for the stamping device and the computer. This data includes, for example, the date on which the order was fulfilled, data regarding the person executing the order, especially at the printing apparatus, data regarding the picture size, the brand of film, and the type of presentation. In addition, the number of cut prints is indicated. Furthermore, there is the possibility of correcting the print number ascertained in the event of the end mark having been overlooked and a correspondingly greater number of prints being ascertained.

Referring to the block wiring diagram shown in Fig. 2, the input of the paper or picture cutting apparatus 8 is derived from an And-gate 12, to which are fed start signals released by hand or by a foot-operated switch 33. Such start signals are only effective, however, when L-signals are supplied to the other two inputs of the AND-gate 12. One of these L-signals is supplied by the cutting apparatus 8 itself, when a corresponding switching position has been set for automatic operation, and the origin of the other L-signal will be described hereinafter.

The picture cutting apparatus 8 has three outputs, the first of which (13) leads to a counting mechanism which ascertains the number of actuations and thus the number of cut prints. This result is passed to the indicating means, to the stamping device which is arranged near the aperture 7, and to a data carrier for the computer.

When an order end mark is located a pulse is sent to the second output 14; this information goes to the computer, which thereupon forms an intermediate sum, and also goes to the AND-gate 15, the second input of which is connected to the film cutting apparatus 3. In a particular switching position, that is to say, the one for "programme synchronisation", the gate 15 receives an L-signal. If this type of operation has been preselected at the start, for example, a pulse from the output 14 of the picture cutting apparatus 8 will always pass directly through the gate 15 to a store 16, the so-called "order end store". The effect of the pulse from the gate 15 is to switch the store 16 into a position such that it delivers a standing positive potential to a following And-gate 17. The gate 17 has a second input 18 from the scanning device at the film strip discharge point 4. A positive potential is applied to the input 18 when the film discharge point is empty.

The gate 17 is followed by a differentiation device 19, which is designed to form a short pulse from the standing potential which is delivered to the store 16. This pulse is passed on directly as a start pulse to the film cutting apparatus 3, which then begins to cut the next film into packable strips. The short pulse issuing from the differentiation device 19 is also passed onto a store 20 which is switched over by means of the pulse and atfer a certain beat moves back the "order end" store 16 by way of a corresponding lead. In this position of the store 16, an L-signal is applied to the And-gate 12 at the input of the picture cutting apparatus 8, so enabling the picture cutting apparatus 8 to be re-started by actuation of the start key.

The third output of the picture cutting apparatus 8, which is indicated by the reference numeral 21, receives a signal when the sorting device 10 has been actuated, that is to say, when prints identified as being unusable occur in the picture strips. This signal is passed on to the stamping device and also to a so-called pre-store 22, which is brought into its other position by means of the signal. The store 22 is connected by its negative output to a differentiation device 23 which forms a series of a negative and a positive pulse out of the negative potential of the store 22 which is limited with respect to time by means of the store 20 until the end of order signal. The negative pulse is led off by means of an earthed diode 24 and the positive pulse is lead to a store 25 which, in the position brought about by the pulse, delivers a start signal to the second input of the film cutting device 3. The effect of this start signal is that the film is run through the film cutting apparatus 3 without being cut until the end of film signal occurs. This end of film signal causes the strip to be cut and also moves back the store 25 by means of the output 26 of the film cutting device. The pre-store 22 has already been returned to its initial position by means of the signal from the store 20 at the end of the order.

Fig. 3 is a chart showing in diagrammatic form the times at which the various procedures involved in the preparation of an

order are carried out. The method of operation of the arrangement shown in Figs. 1 and 2 can be seen readily from this chart.

In the topmost line of Fig. 3 the operating times of the picture cutting apparatus 8 are shown, and the line immediately below shows the operating times for the film cutting apparatus 3. Below this line, the various work phases of the operator are shown. The line 32 shows the times in which data is keyed-in at the keyboard 11, and the line 27 shows the time spans in which the pictures are first removed from the discharge means of the picture cutting apparatus 8 and then inserted in the order wallets. The line 28 indicates the period in which the films strips are removed from the discharge point 4, and in line 29 the time for the removal of the order wallets is shown, which is the final operation in each cycle. The checking of picture with original and the commission number on the order wallet and the film to see that they match, shown in line 30, is followed by the start for the next operating cycle. The actuation of the printing mechanism takes place simultaneously according to line 31.

In operation, a picture roll and the corresponding film roll are first fed into the group of apparatuses, together with the corresponding stack of order wallets. After the check for matching, the paper or picture cutting apparatus 8 begins its operation with the cutting of, for example, twenty prints. During this time, the order wallets are introduced into the aperture 7 and the data are fed into the keyboard 11. When these prints have been cut, the end of order signal occurs by way of the lead 14 (see Fig. 2). The actuation of the computer print-out is thereby released and in the manner which has already been described with reference to Fig. 2 the film cutting apparatus 3 is started as indicated in the second line in Fig. 3. The apparatus 3 cuts the film corresponding to the prints into strips of approximately equal length and deposits them on the discharge means 4. During the operation of the film cutting apparatus, the stack of pictures is removed from the discharge means of the picture cutting apparatus 8 (see line 27). After the matching check for the next order (line 30) cutting of the pictures of the next order is begun (line 8), and the printing of the data stored in the stamping device onto the order wallet in the inlet aperture 7 is completed at the same time (line 31). After the wallet has been stamped, the operator places the pictures in the order wallet according to line 27 and then removes the film strips from the film strip discharge point 4 (line 28). The pictures and film strips of the order are now brought together in the order wallet, which is then removed (line 29) and led to a discharge device from which it can be despatched. The pricing data were delivered by the reading device at the aperture 7, the keyboard 11, and the counter at the picture cutting apparatus 8, to the central computer of an intermediate store, for example, a card punch.

During this time the pictures of the next order have already been cut. If the operator has not been quick enough in removing the film strips of the preceding order from the discharge point 4, the starting of the film cutting apparatus 3 will be prevented by the absence of a signal at the gate 17 from the scanning device 18. The film cutting apparatus cannot start until the operator has cleared the discharge point 4. Immediately after the preceding order is finished, the order wallet for the next order is removed from the magazine 6 and introduced into the aperture 7. The cycle described can then continue, so that there is practically no waiting time for the operator.

The third section of Fig. 3 shows the sequence of operations which take place if an unusable print is detected in the cutting/sorting arrangement 8, 10. As described with reference to Fig. 2, this information is immediately delivered to the computer and a pulse is fed to the second input of the film cutting apparatus 3, which then winds the film through without cutting, as far as the splicing point. In this case the order is not dealt with as previously described, but the good pictures are inserted in order wallet and the poor ones, together with the uncut film which has been pulled through, reach a repeat circuit, where the poor prints are repeated using different correction values. The prints from the repeat circuit are then added to the good pictures which are already in the order wallet, and the film is cut on the other apparatus and the cut strips are also inserted in the order wallet.

Since pricing could be carried out fully even with this order, it is not necessary at this stage.

The described arrangement makes it possible to achieve a large output from a printing installation organisationally with a single operator. The expenditure on apparatus for this purpose is not much greater than if the individual units were to be operated independently. After suitable adaptation, individual units which have already been used as such can be used in arrangements in accordance with the invention. The output of the arrangement described with reference to Figs. 1 to 3 is substantially determined by the picture cutting apparatus 8, which can be re-started immediately after the removal of the pictures from an order and checking the prints and film for the next order (line 30 in Fig. 3).

WHAT WE CLAIM IS:

1. An arrangement for the preparation of printing orders from film strips and strips bearing the corresponding prints, which comprises means for cutting a print-bearing strip into individual prints in response to scannable marks of a first type, the print-cutting means being arranged to cease operation in response to a scannable mark of a second type, means for cutting a film strip into packable lengths by severing the strip at certain dividing bars and at connections between joined strips, the film-cutting means being arranged to cease operation on severing such a connection and control means for co-ordinating the operation of the print-cutting and film-cutting means.

2. An arrangement as claimed in claim 1, wherein the control means is arranged to actuate the print-cutting means in response to a start signal, and to actuate the film-cutting means when the print-cutting means ceases operation.

3. An arrangement as claimed in claim 2, which includes means for sorting the cut prints into usable and unusable prints in accordance with scannable marks on unusable prints, and in which the control means is arranged to cause the corresponding film to be run uncut through the film-cutting means when the order includes an unusable print.

4. An arrangement as claimed in claim 3, which includes means for ascertaining and indicating the number of unusable prints in an order.

5. An arrangement as claimed in any one of claims 1 to 4, which includes means for stamping details of an order onto a data carrier.

6. An arrangement as claimed in claim 5, which includes means for counting the number of cuts effected by the print-cutting means, the said counting means being arranged to cause the stamping means to stamp a corresponding number onto the data carrier, to produce a corresponding signal for communication to a computer, and to be erased when the print-cutting means ceases operation.

7. An arrangement as claimed in claim 5 or claim 6, which includes a device for reading information in automatically readable form from the data carrier and for feeding the information to a computer.

8. An arrangement as claimed in claim 7, wherein the reading device is provided with a slot for receiving the data carrier, and the stamping means is arranged to act on a data carrier in the slot.

9. An arrangement as claimed in any one of claims 5 to 8, which includes an input keyboard for feeding information into a computer and to the stamping means.

10. An arrangement as claimed in any one of claims 1 to 9, which is such that the removal of cut film strips and cut prints can be performed by a single operator, and that the first or last print in each order can be compared with the first or last original, respectively, on the film strip, and/or that an identification number on an order wallet can be compared with an identification number on the film.

11. An arrangement as claimed in any one of claims 1 to 10, wherein there is provided means for scanning the discharge location of the film-cutting means, which scanning means is arranged to prevent the control means from actuating the film-cutting means when there are any cut strips at the discharge location.

12. An arrangement as claimed in both claim 3 and claim 11, in which the control means comprises a digital circuit.

13. An arrangement as claimed in claim 12, wherein the film-cutting means has two signal inputs, one for the mode of operation in which the film is cut, and the other for the operation in which the film is run through uncut, and that the control means is arranged to deliver a signal to the said one input when the print-cutting means ceases operation, and to deliver a signal to the said other input when the said sorting means detects an unusable print.

14. An arrangement as claimed in claim 12 or claim 13, which includes a manually-operated or foot-operated switch for delivering a start signal to the print-cutting means, and in which the control means is such that the said start signal is effective only after the control means has received an end-of-order signal from the print-cutting means.

15. An arrangement for the preparation of printing orders, substantially as hereinbefore described with reference to, and as shown in, the accompanying drawings.

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