Nov. 27, 1945. A. L. HESS 2,389,854

SHEET HANDLING METHOD

Filed Sept. 25, 1942 5 Sheets-Sheet 1

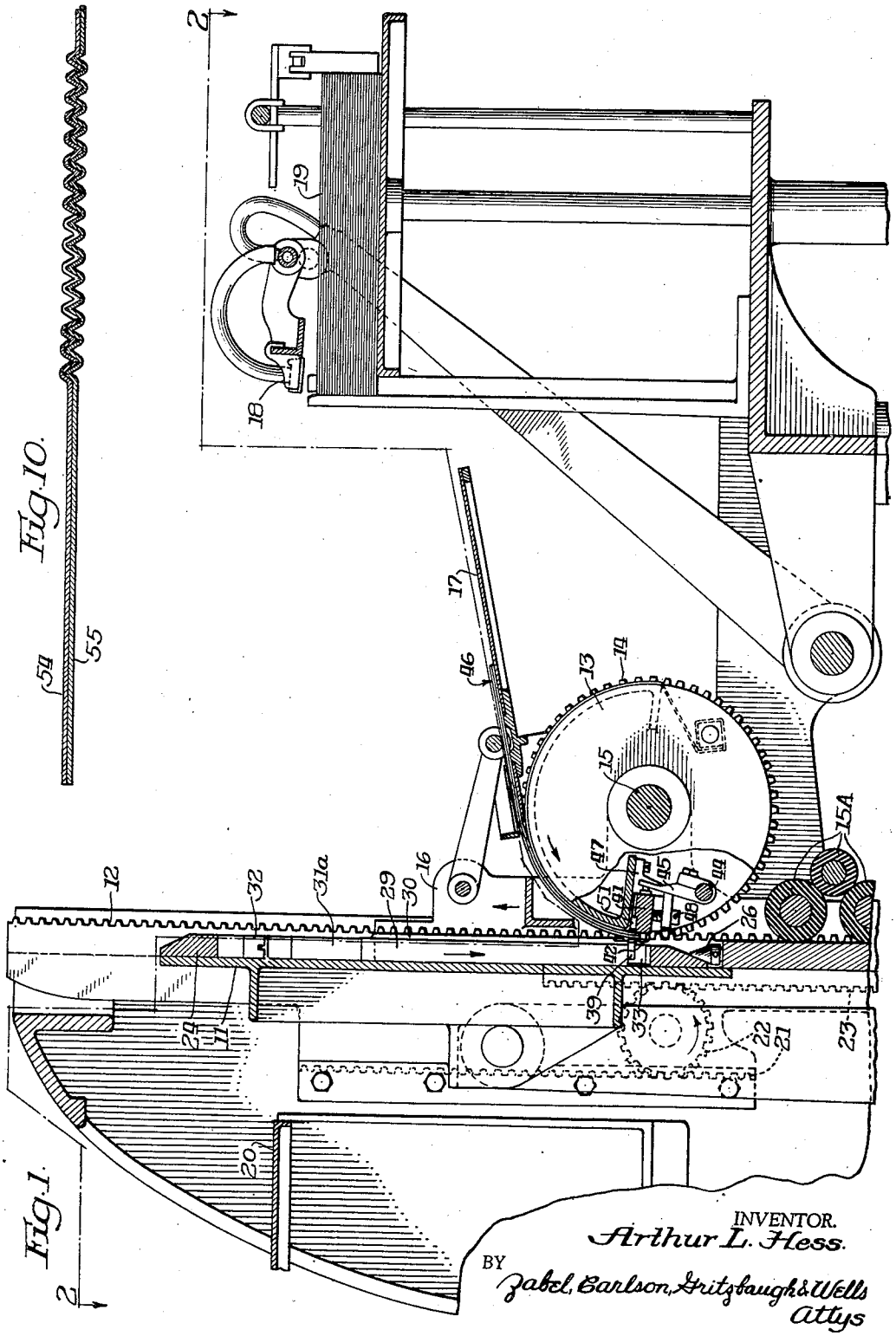


Fig. 1.

Fig. 10.

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SHEET HANDLING METHOD

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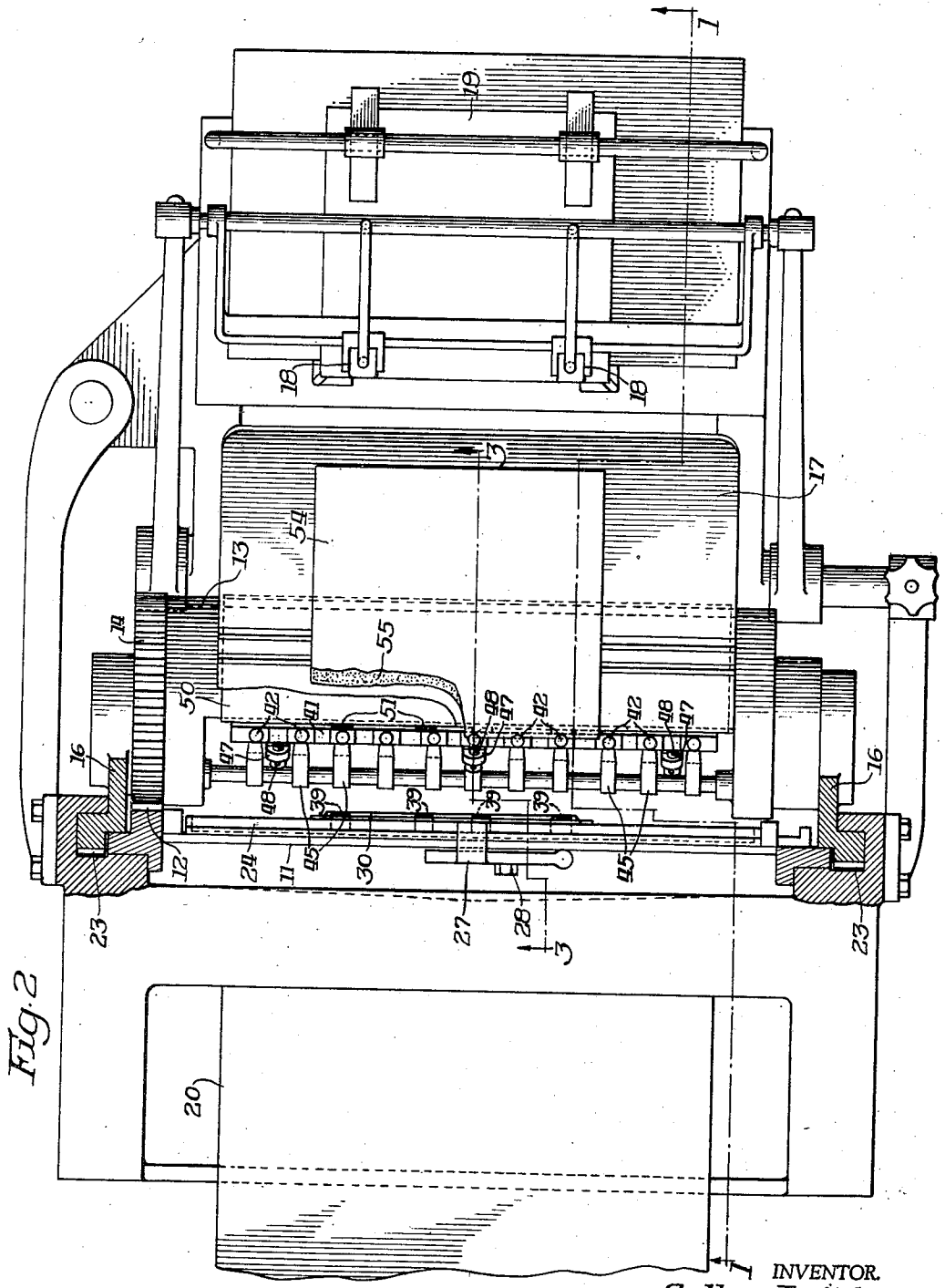


Fig. 2

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SHEET HANDLING METHOD

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Fig. 3.

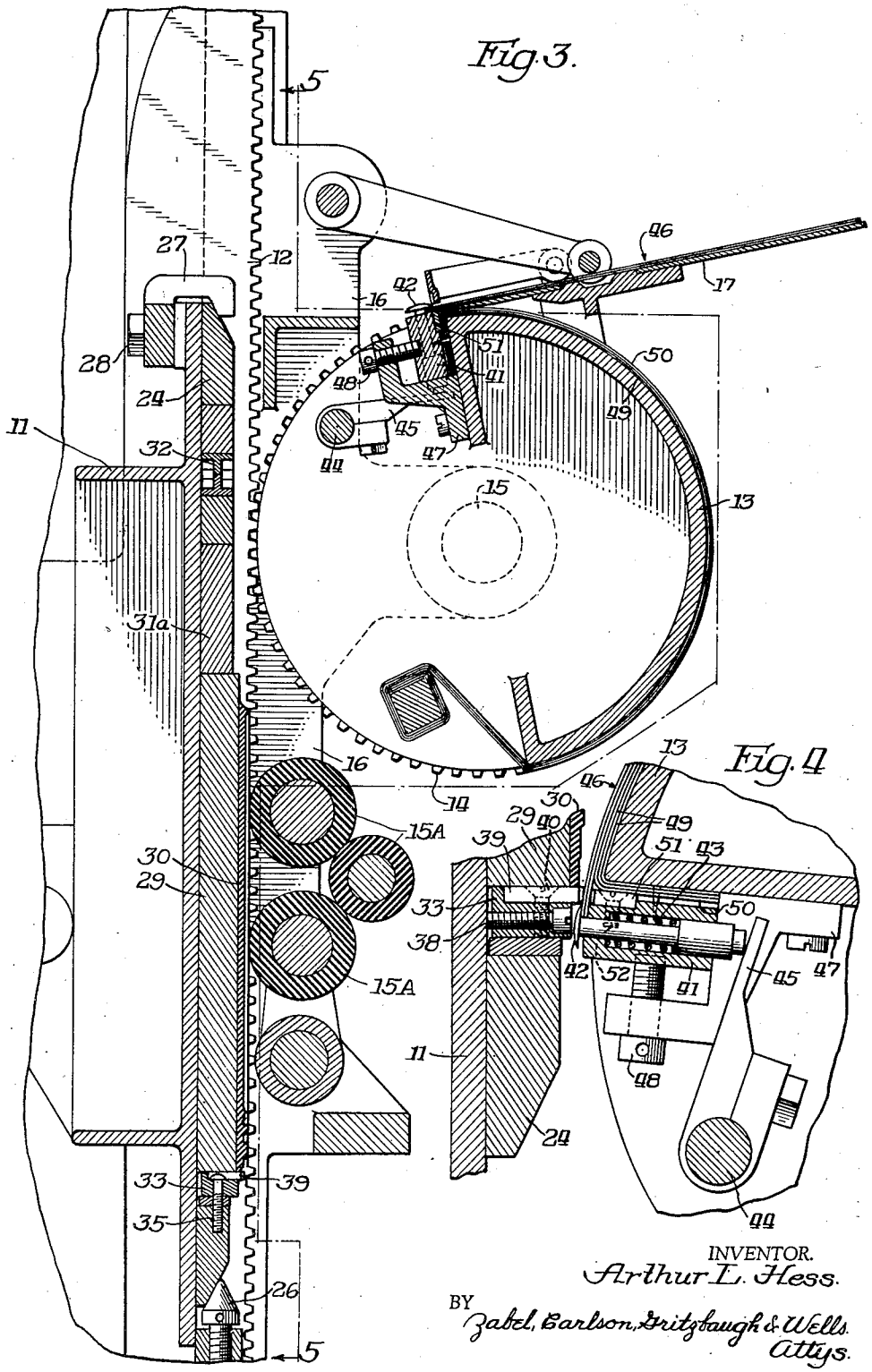


Fig. 4

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SHEET HANDLING METHOD

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Fig. 5.

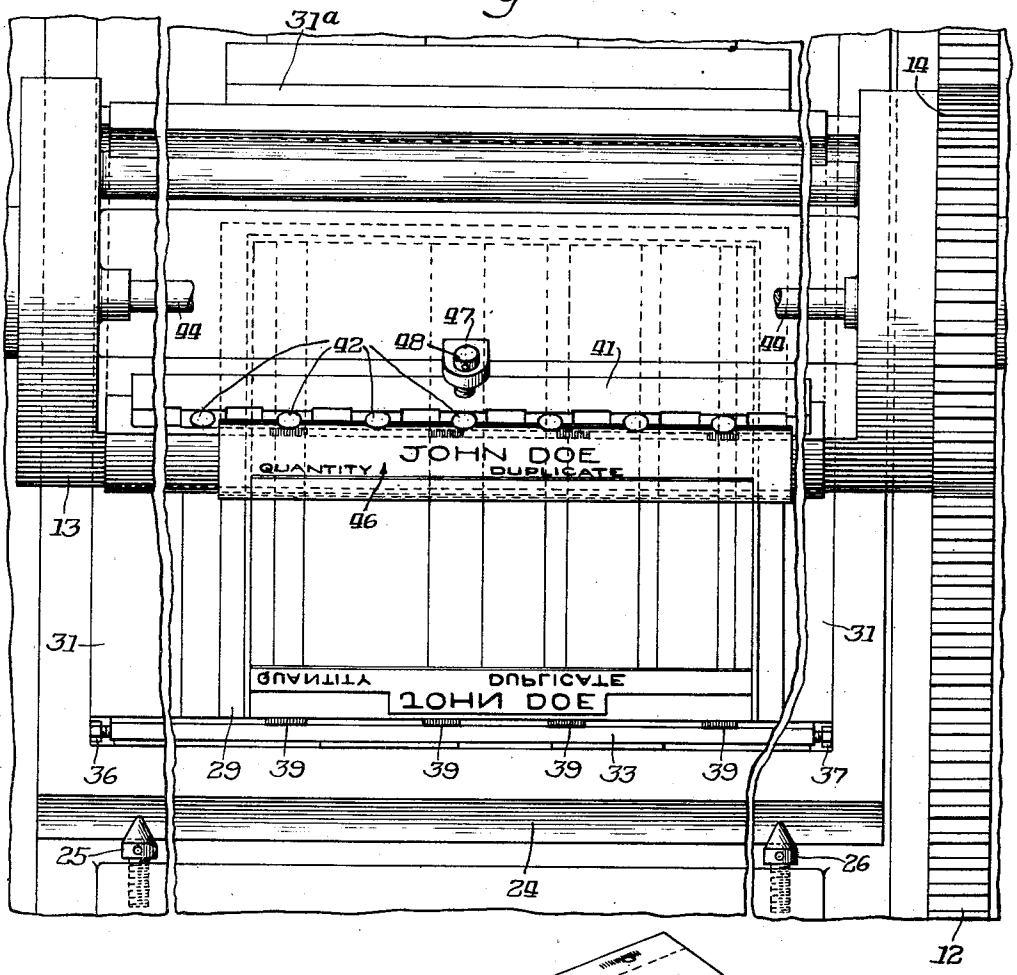
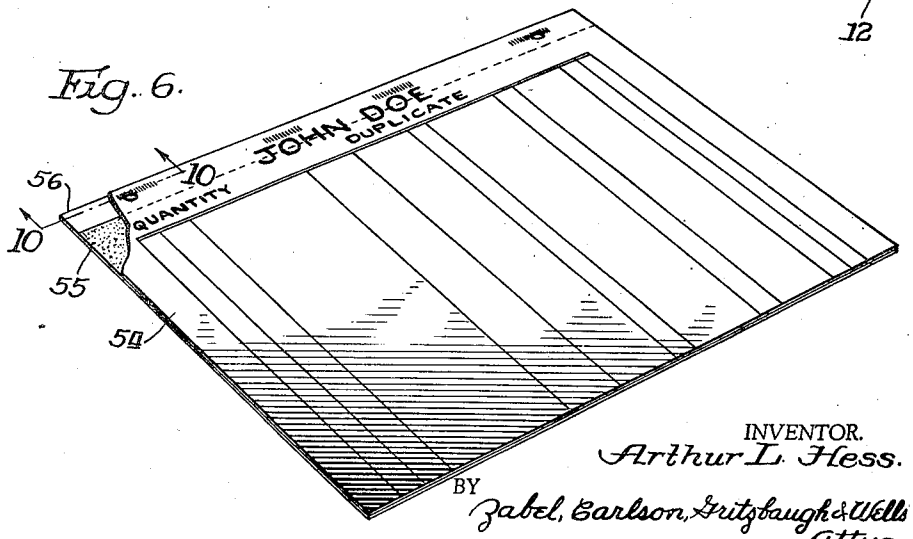


Fig. 6.



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Fig. 7.

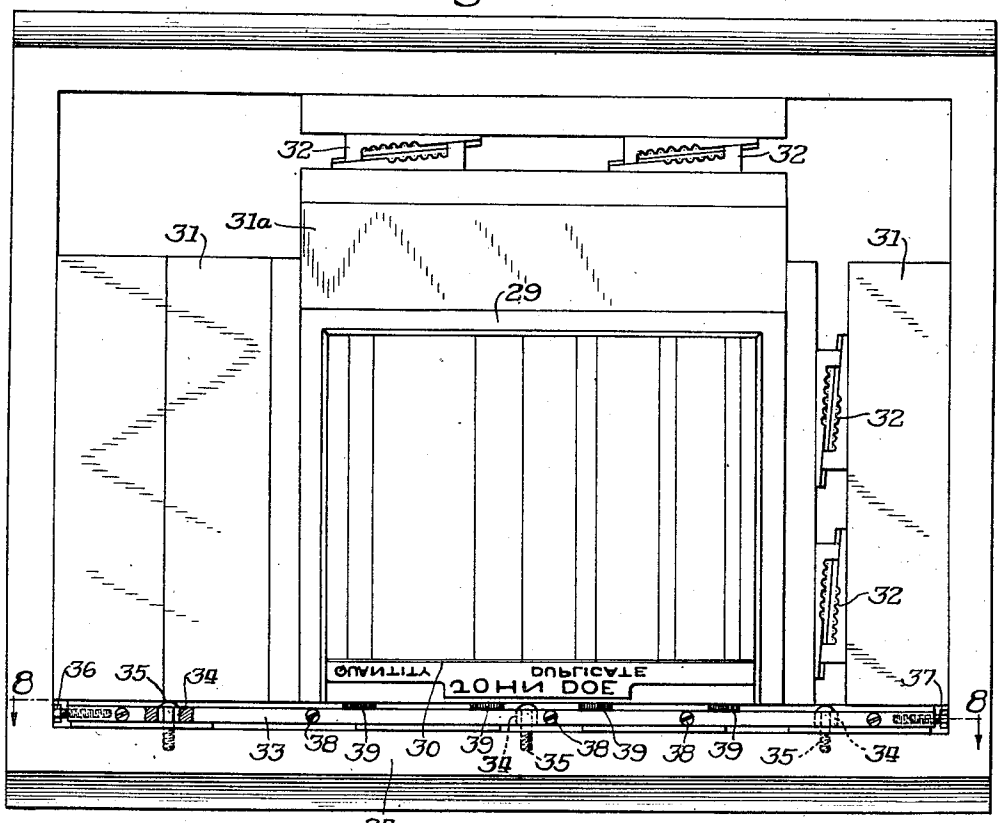


Fig. 8.

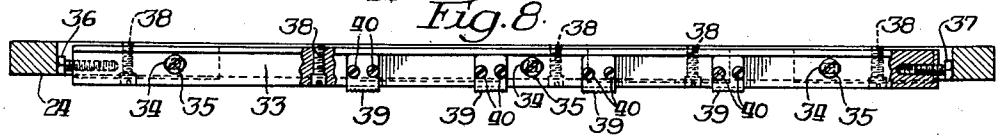
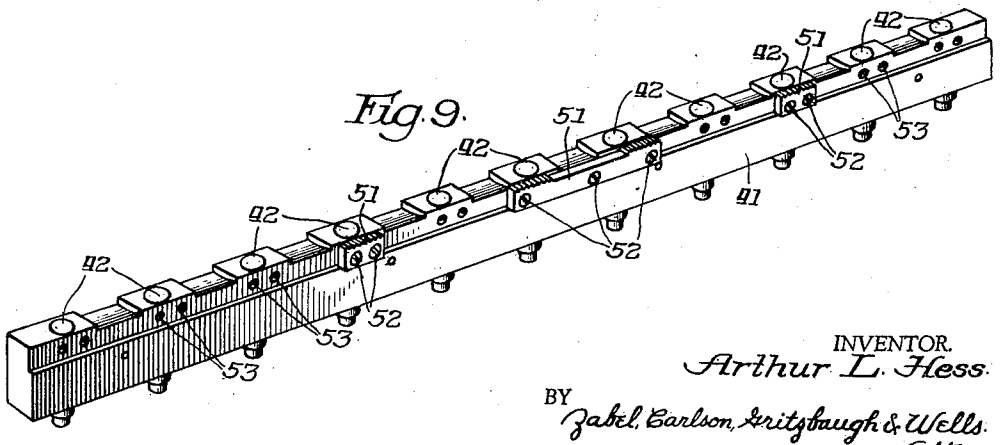


Fig. 9.



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2,389,854

UNITED STATES PATENT OFFICE

2,389,854

SHEET HANDLING METHOD

Arthur L. Hess, Cincinnati, Ohio, assignor to Ditto, Incorporated, Chicago, Ill., a corporation of West Virginia

Application September 25, 1942, Serial No. 459,725

2 Claims. (Cl. 270—1)

The present invention relates to printing presses and is particularly directed to a novel combination whereby a cylinder press such as a Miehle vertically moving bed cylinder type press can be caused to crimp together a sheet to be printed upon and one or more underlying sheets as the sheets are advanced by the cylinder to printing position. A preferred form of the invention is embodied in a printing press of the type above referred to and comprises a set of crimping dies on the gripper bar of the impression cylinder and a corresponding set of dies locked into the chase of the press. The invention is shown in connection with a standard Miehle press of the type above referred to. However, it is obvious that the invention is not limited to the particular press but as will be pointed out hereinafter it is applicable to any cylinder press of the same general type.

It is a further object of the present invention to provide a novel apparatus and method for printing adapted to perform, in a single printing operation, the crimping together of a master sheet and an underlying carbon sheet so that they are releasably fastened together, printing upon one side of the master sheet directly by the press, and imprinting the same message on the opposite side of the master sheet in reverse whereby the master sheet may be used in a direct process duplicating operation to make copies of the matter imprinted thereon.

It is a further and more specific object of the invention to provide an attachment for a cylinder press whereby a plurality of sheets arranged in superposed relation and gripped by the impression cylinder may be crimped together as the printing press performs its usual printing cycle.

The features and advantages of the invention will appear more fully as the description proceeds, reference being made to the accompanying drawings wherein a preferred form of the invention is shown.

In the drawings:

Fig. 1 is a longitudinal sectional view through a printing press, taken on the line 1—1 of Fig. 2;

Fig. 2 is a plan sectional view taken on the line 2—2 of Fig. 1;

Fig. 3 is an enlarged fragmentary sectional view taken on the line 3—3 of Fig. 2;

Fig. 4 is a fragmentary sectional view on an enlarged scale of a portion of the construction shown in Fig. 3 but showing the parts in different position;

Fig. 5 is a vertical sectional view taken on the line 5—5 of Fig. 3;

Fig. 6 is a perspective view of a completed printed master and carbon sheet assembly such as would be turned out by the press;

Fig. 7 is an enlarged front face view of the printing chase showing the printing plate mounted in position;

Fig. 8 is a sectional view taken on the line 8—8 of Fig. 7;

Fig. 9 is a perspective view illustrating the mounting of the crimping dies upon the gripper bar of the impression cylinder; and

Fig. 10 is an enlarged fragmentary sectional view taken on the line 10—10 of Fig. 6 showing how the sheets are crimped together.

Referring now in detail to the drawings, the present invention is embodied in a printing press such as a Miehle vertical cylinder type press wherein the numeral 11 indicates the vertically reciprocating bed of the press. The numeral 12 indicates a gear rack which is formed along one side edge of the press and which is adapted to engage a gear 14 at one end of an impression cylinder 13. The impression cylinder is journaled in the frame of the press on a shaft 15, the frame being indicated at 16. A series of inking rollers is shown at 15A.

The cylinder 13 is carried by the frame 16, which frame also carries a feed tray 17 upon which sheets are adapted to be fed by a suction feeder 18 from a pile of sheets 19. The construction of the suction feeder and its operation form no part of the present invention except insofar as they may be said to pick up sheets in a well known manner and deposit them upon the feed tray 17. A receiving tray 20 is adapted to receive the sheets after they are printed upon, suitable means, not shown, being utilized to take the sheets from the printing cylinder 13 and deposit them upon the receiving tray 20. In the usual press of this type another arm similar to the suction feed arm here which carries the suction device 18 removes the sheets from the cylinder and deposits them upon the tray 20.

It will be observed that the bed 11 is guided in the main frame of the machine for vertical movement and that it carries racks 21 which mesh with two drive gears 22. The drive gears 22 also mesh with racks 23 that are attached to the frame 16. The operation of a press of this type is as follows: in the initial stroke of the press the gears 22 rotate in the direction indicated by the arrow thereon so as to move the bed 11 downwardly while the frame 16 is moved upwardly. On this down stroke the inking rollers 15A ink a printing plate on the bed 11. The direction of

rotation of the gears 22 is then reversed and the bed 11 is moved upwardly carrying with it the inked printing plate, the cylinder being out of contact with the printing plate. Before the next downward stroke of the bed 11 the cylinder has received a sheet and as the bed moves downwardly the cylinder presses the sheet against the raised characters on the printing plate attached to the bed.

The bed in the present instance carries a chase 24 which is held in position by two lower adjustable wedges 25 and 26 and an upper pivoted clamp 27 that is pivoted by means of a pin 28 to the frame of the bed 11. The chase which is a rectangular metal frame mounts a backing plate 29 which carries a printing plate 30 that may be of soft rubber for certain types of printing and may be hard for other types of printing. The printing plate is held in the chase by filler bars such as are indicated at 31 and 31A, the assembly being locked in place by quoins indicated at 32.

In accordance with my invention the chase carries a crimping die mounting bar 33 (see Figs. 7 and 8) at its lower extremity. This bar has a series of elongated slots 34 therein that are adapted to receive a plurality of screws 35 that are threaded into the wall of the chase. In addition the bar 33 has two stops 36 and 37 at its opposite ends, the stops comprising polygonal headed, screw threaded pins that are threaded into the ends of the bar 33. A plurality of positioning screws 38 are also provided in the bar, these screws extending horizontally through the plate from the front to the back so as to serve to position the plate with respect to the bed of the press. A series of crimping dies 39 is fastened on the bar 33 by means of screws 40. In the present instance I have shown four of these crimping dies although of course a bar may be fitted with more or less of them, depending upon the nature of the work. It will be evident from the foregoing description that the bar 33 may be adjusted lengthwise in the chase and locked in position by the screws 35. It may also be adjusted toward and away from the bed of the press by means of the screws 38. Since the chase itself can be adjusted vertically by means of the pins 25 and 26 universal adjustment of the bar 33 and the dies that it carries may be accomplished.

Referring now to Figs. 3 to 6 and 9, it will be observed that the cylinder 13 carries a gripper bar 41 which mounts a multiplicity of gripper pins 42. These gripper pins in known presses of the type above referred to are normally spring pressed by means of a number of springs 43 mounted in the bar 41 toward gripping position. The cylinder carries a cam shaft 44 having arms 45 thereon that are adapted to force the pins 42 outwardly against the tension of springs 43 in certain positions of the cylinder so as to permit the insertion of sheets to be printed upon. Such sheets are indicated in Fig. 3, for example, on the feed tray 17 by the numeral 46. The gripper bar 41 is releasably mounted in the cylinder by means of a bracket 47 and a clamping screw 48. There is however no particular adjustment of the gripper bar 41; it bears against the inturned edges of a plurality of backing sheets 49 and a tympan sheet 50 that are mounted on the cylinder 13. The gripper bar (see Fig. 9) also carries a multiplicity of crimping dies shown at 51 in Fig. 9. It will be noted that these dies are held by screws 52 and that additional threaded openings indicated at 53 are provided in the event that it is desired to utilize a bar having additional crimping dies thereon. The crimping dies 51 and the crimping dies 39 are of course matched up by adjusting the bar 33 in the chase 24.

In the operation of the press two sheets, for example, a plain white master sheet 54 and a hectograph carbon sheet 55 are arranged together in a stack 19 so that the two may be picked up at once by the suction device 18 and fed to the tray 17. The particular manner of picking up the two sheets at once forms the subject matter of a separate application Serial No. 459,726 and will not be described further herein. It will be noted that the carbon sheet 55 has a clear strip 56 along the top edge thereof and this edge is the edge that is fed to the gripper pins 42. When the two sheets 54 and 55 are gripped by the gripper pins 42 the clear portion 56 and a corresponding portion of the top sheet 54 overlie the crimping dies 51. This is indicated clearly in Fig. 2 of the drawings wherein portions of the sheets 54 and 55 are broken away to expose the crimpers 51. On the downward printing stroke of the press, that is, after the printing plate has been inked and the sheets have been fed to the cylinder, the cylinder, in rotating, carries the sheets between the dies 51 and the dies 39 and the dies are forced into the paper so as to distort it and press the fibres of the two sheets together into the condition shown in Fig. 10. The section 56 of the sheet 55 is the portion that is engaged by the crimping dies so that the carbon itself is not included in the crimped portion of the paper. I have found this to be particularly essential since the carbon tends to destroy the bond between the crimped sheets. If the printing stroke of the press continues the printing plate will impress its legend upon the sheet 54 in the usual manner. Moreover, whenever it is desired to have this legend appear in reverse on the back of the sheet 54, for example, for use in making copies on a wet process duplicating machine, I use metallic type, making a hard printing surface, and heavy pressure is exerted between the cylinder and the printing plate whereby to cause the carbon sheet to imprint upon the back of the sheet 54. If this is not desired then the use of the soft rubber printing plates makes it possible to print the master sheet 54 without causing any smudging of its back surface due to the carbon.

From the foregoing description it is believed to be evident that I have provided a simple, efficient apparatus whereby a plurality of sheets may be secured together by crimping during the act of printing upon the sheets. It is obvious of course that the apparatus will crimp together far more than two sheets. Thus it is entirely possible to fasten the carbon sheet between two outer sheets and print upon the top sheet. The rate at which the crimping can be carried out depends upon the rate at which the printing press operates. In the event that no printing is desired and the sheets are to be crimped together, all that is necessary is to remove the printing plate, in which case the crimping operation can be carried out alone.

While there have been shown and described certain embodiments of the invention, it is to be understood that it is capable of many modifications. Changes, therefore, may be made without departing from the scope of the invention as described in the appended claims, in which it is the intention to claim all novelty inherent in the invention as broadly as possible, in view of the prior art.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A method of printing upon a sheet and crimping a carbon thereto in the same operation, comprising gripping the sheets with the carbon sheet underneath upon an impression cylinder, pressing the sheet and cylinder into contact with a printing bed and chase, and crimping the sheets together between crimping devices on the cylinder and bed as the bed traverses the cylinder to print on the outer sheet.

2. A method of providing a master sheet and carbon sheet set simultaneously with a printed form in printing ink on one side of the master sheet and a mirror script of said form in copyable hectograph ink on the other side thereof, said method comprising the application of a hectograph carbon sheet to one face of a master sheet with the active face of said carbon sheet toward the master sheet, mounting the superposed sheets with the master sheet on top upon an impression cylinder of a printing press, crimping the mounted sheets together along the advancing edges thereof, and bringing the cylinder against a hard printing plate with sufficient pressure to cause the carbon sheet to deposit the hectograph ink in reverse on the back side of the master sheet as the form is printed directly on the front side thereof.

ARTHUR L. HESS.