United States Patent

[11] **3,566,757**

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[54] **APPARATUS FOR MAKING BUNDLES FROM THE STREAM OF PRINTED SHEETS IN ROLLING PRESS**
2 Claims, 6 Drawing Figs.

[52] **U.S. Cl.** **93/93,** 214/6.5, 271/86
[51] **Int. Cl.** **B65h 33/00**
[50] **Field of Search** ..... 93/93 (R), 93 (DP); 214/6.5; 271/86, 88

[56] **References Cited**
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Primary Examiner—Bernard Stickney
Attorney—John Lezdey

ABSTRACT: In combination with an apparatus for making bundles from the stream of printed sheets in a rolling press having a vertical passage to receive the delivered stream of printed sheets and a turn table at the bottom of said passage, an interruption plate in the passage capable of rocking up and down, a relay plate below the interruption plate, a makeup plate under table relay plate, a movable frame supporting the interruption plate, the relay plate, and the makeup plate, means to move the frame forwardly and rearwardly across the passage along a straight line settled at an angle to the passage, and means to control the rocking motion of the interruption plate and the motion of the frame for a prescribed period and manner by signals from a counter head provided at the delivery end of the stream of printed sheets.

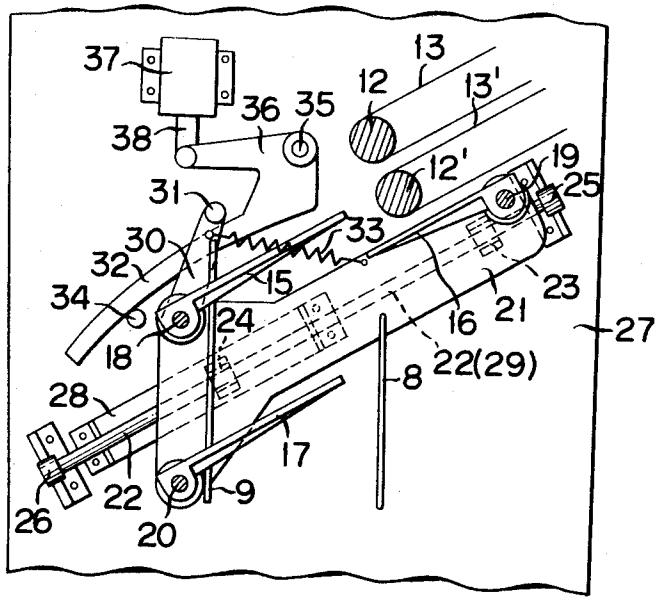


FIG. 1

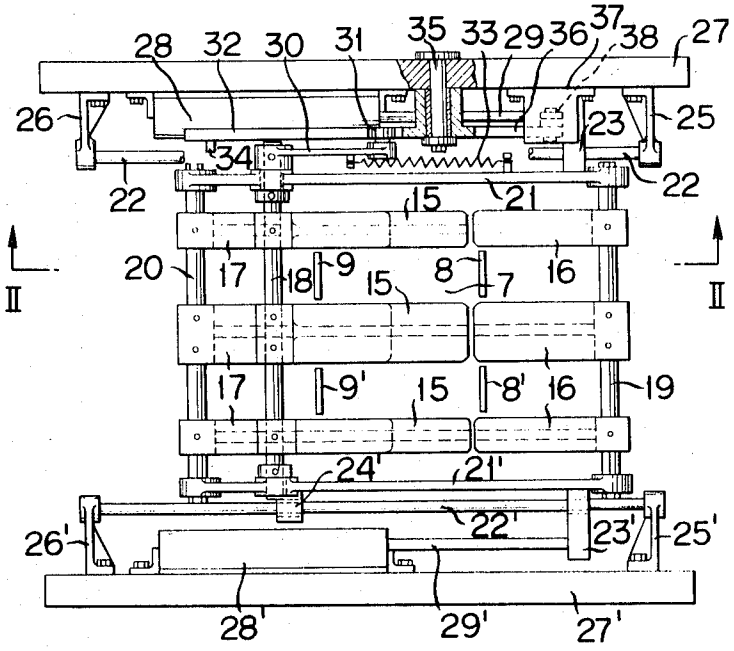

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29'
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FIG. 2

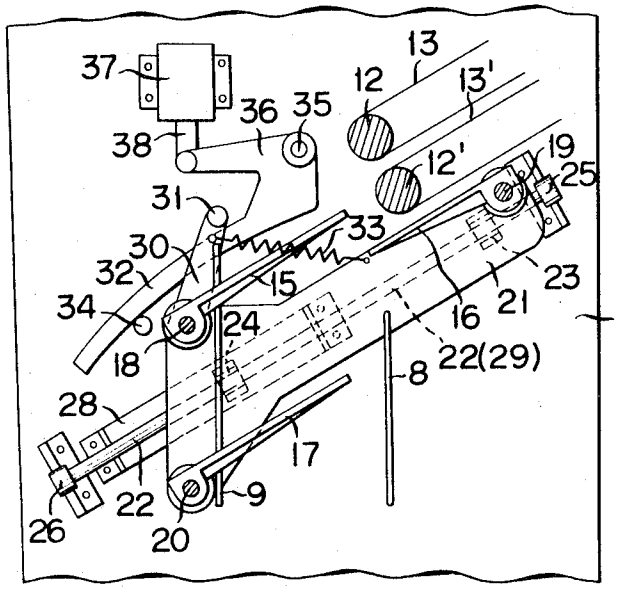

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FIG. 3

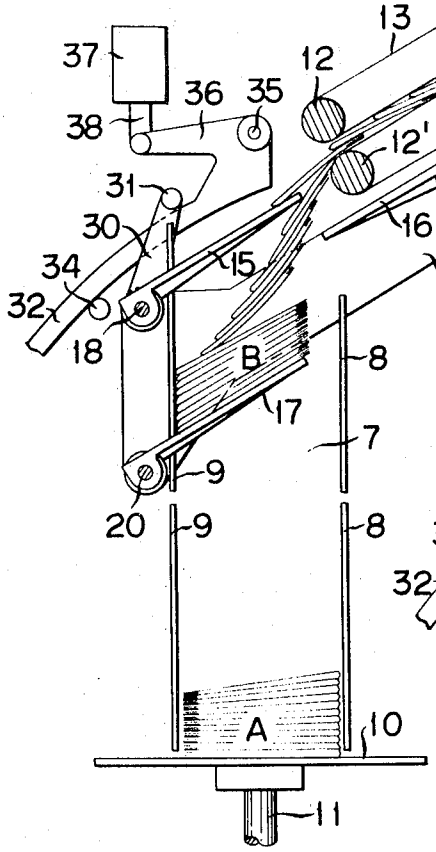

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FIG. 4

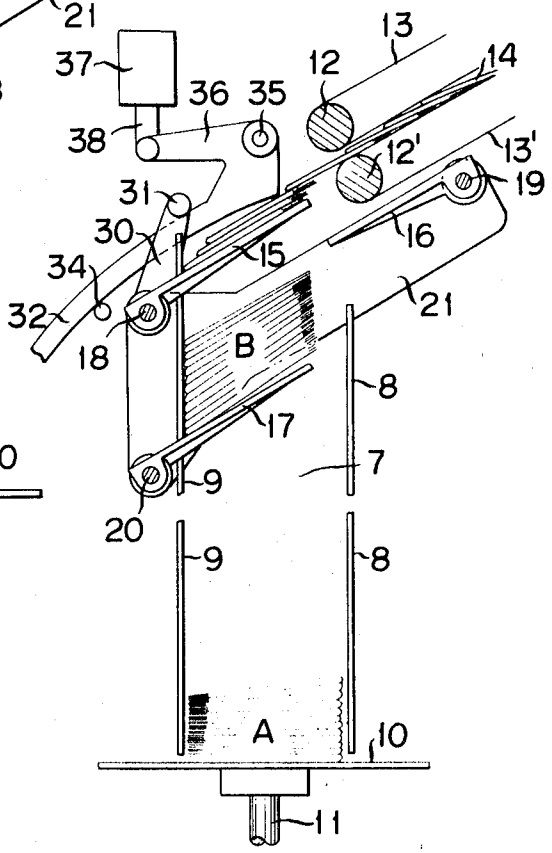

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FIG. 5

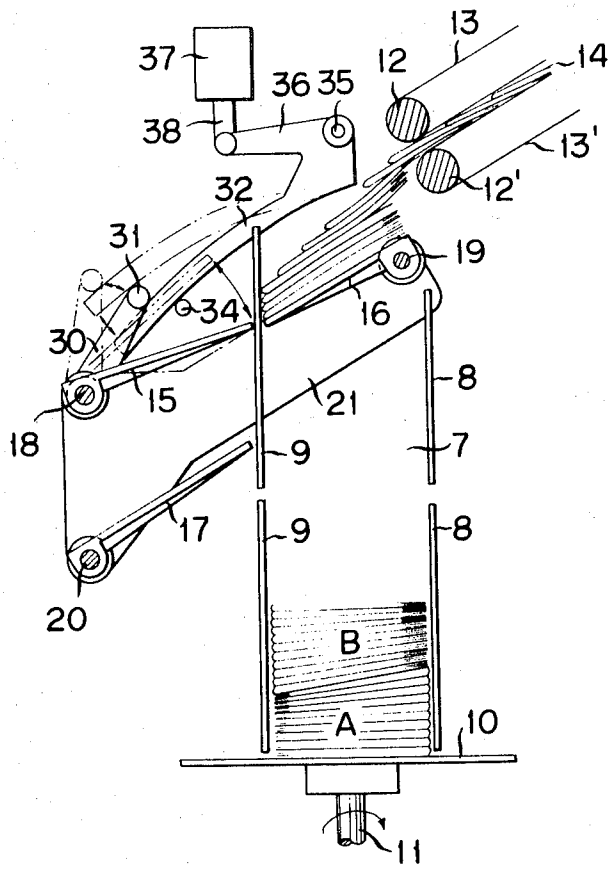
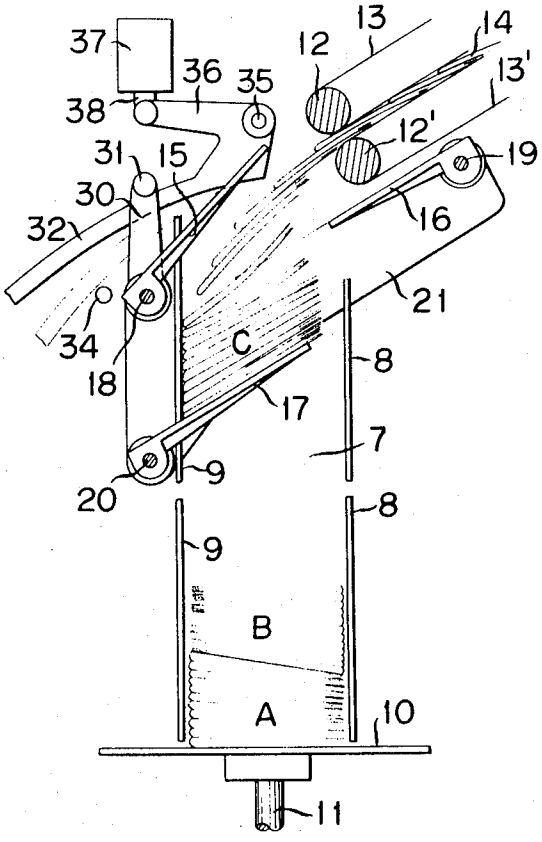

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FIG. 6


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APPARATUS FOR MAKING BUNDLES FROM THE STREAM OF PRINTED SHEETS IN ROLLING PRESS

BACKGROUND, OBJECTS AND SUMMARY OF THE INVENTION

This invention relates to an apparatus for making bundles from the stream of printed sheets in a rolling press in the best order with an extremely simplified motion so as to be suitably used with a superhigh-speed running rolling press. In the ordinary machine, there is provided a vertical passage into which the stream of folded sheets is delivered through an interruption plate and drops to the bottom. A turn table is provided that turns as far as 180° for every predetermined number of sheets arrived. In such an arrangement, especially in the case where the predetermined number of sheets is large, the pile becomes considerably thick at the side of folded edges, so as to make an orderly accumulation difficult.

To remove such defect, several prior art devices were offered. One of such devices intended the use of a plate which changes inclination gradually during accumulation on it. Another device used a plate which carries the sheets downward little by little on a turn table. However, such devices can not be used for high-speed printing, chiefly because of the complicated construction and movement.

The object of this invention is to provide an apparatus which enables an orderly accumulation of sheets by an extremely simplified motion of the parts.

According to this invention the above requirements can be attained by a simple construction and with an extremely simplified motion.

Such construction and movement together with the advantages obtained thereby will be readily understood by one skilled in the art from the following description taken in connection with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a plan view of a working example partly in section;

FIG. 2 is the side view in section taken along the line 2, 2 of FIG. 1; and

FIG. 3 to FIG. 6 illustrate the function of this invention in order.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In the drawings, passage 7, of the apparatus is enclosed by rear walls 8, 8' and front walls 9, 9'accepts delivery of printed sheets in a stream. Turn table 10 is situated at the bottom of said passage 7 upon which bundles A, B, C, are piled to form a stack. The turn table 10 is turned about pivot 11. The apparatus is provided with nipping rolls 12, 12' and conveyor belts 13, 13'. A row of front. sheets is delivered in layers with folded edges in front. An interruption plate 15 situated at one side, the upper position of which is made to interrupt the stream when a definite number of sheets has passed by a signal from a counter head located at the delivery end. A relay plate 16 is positioned under the interruption plate 15 but in the other A makeup plate 17 upon which the sheets are accumulated until they form a bundle is situated just under the relay plate 16 but in one side. There are pivot bars 18, 19, 20 to which the plates 15, 16, 17 are rigidly fixed respectively. Side members 21, 21' are in pairs forming a movable frame supporting both ends of the pivot bars 18, 19 and 20 respectively. Pivot bar 18 is supported rotatably but pivot bars 19 and 20 are rigidly supported on the frame when working. Guide bars 22, 22' are used to guide the go and return motion of the movable frame. Slide bearings 23, 23' and 24, 24' are provided on the frame through which the frame is guided by the guide bars 22, 22' when it is moved.

Brackets 25, 25', 26, 26' fixing both ends of the guide bars in pair to the machine frame 27, 27'. The fixing points of the brackets are made preferably adjustable so as to adjust the moving direction of the movable frame when required. Oil pressure cylinders 28, 28' are fixed on the machine frame, and carries piston rods 29, 29' which are connected to said bearings 23, 23' respectively.

A rocking arm 30 is rigidly fixed to the end of pivot bar 18 which carries interruption plate 15. A roller 31 touches the curved surface of cam 32 by the action of a tension spring 33. A stop pin 34 is used to limit the downward position of the cam 32. A rocking arm 36 with pivot 35 is connected integrally with cam 32 so as to form bell crank arms. An electromagnet 37 is used to move the arm 36 through the plunger 38, thereby moving the interruption plate 15.

OPERATION OF THE INVENTION

Starting at the state shown in FIG. 5, with the relay plate 16 in the passage 7, electromagnet 37 raises the interruption plate 15 to its uppermost position and at the same time, the movable frame carrying the three plates 15, 16, 17 is moved rearward (rightward facing the drawing) as shown in FIG. 6 by the action of the cylinders 28, 28' through piston rods 29, 29', slide bearings 23, 23' and guide bars 22, 22'.

The relay plate 16, fixed on the frame through pivot bar 19, is then moved out of the passage 7, and makeup plate 17, fixed on the frame through pivot bar 20, is made to enter the passage 7 so as to receive the sheets which have been accumulated on the relay plate by the aid of the rear wall 8. The stream of printed sheets is made to accumulate on the makeup plate 17 (see FIG. 6). While the accumulation proceeds and when a definite number of sheets forming a bundle have passed a counter head positioned at the delivery end (not shown in the drawing), the electromagnet 37 is demagnetized by a signaling from the counter head and the cam is moved to its lowermost position pulled by a spring 33 until the cam touches the stop pin 34. Then the lever 30 falls rightward down together with the plate 15, interrupting the stream of sheets before the head of them before a second new bundle will pass there. Thus the stream will be now accumulated on the interruption plate 15 (see FIG. 3).

While the stream of sheets are accumulated on the interruption plate 15, the frame is removed to the frontward position (leftward facing the drawing) carrying all said three plates 15, 16, 17 by reversing the action of the driving system, removing the plates 15 and 16 out of the passage and making the relay plate 16 enter into the passage 7 again. At the same time, the interruption plate 15 is lowered down to the same level as the relay plate 16 by the sliding down movement of the roller 31 along the curved surface of the cam 32, thus removing the sheets accumulated thereon on to the relay plate 16 by the cooperation of the front wall 9 (see FIG. 5). During the same motion of the movable frame, while the makeup plate 17 is also removed out of the passage, the sheets upon it which must be at a definite number so as to make up a bundle are dropped upon the turn table 10 down by the aid of front wall 9, where the preceding bundle A has been already turned 180°..

The operation stated above is repeated dividing the printed sheets into a definite number and making bundle therewith quickly and orderly.

Thus, it can be seen that the objects of the present invention are achieved by the use of an interruption plate made to rock up and down, a relay plate and makeup plate, all supported on a movable frame which is made to perform a go and return motion along a straight line, the direction of which is adjustable according to the thickness of the folded edge of the printed sheets, and that the construction is so simple and the motion of the moving parts is so extremely simplified that nodefect or mistake can take place for accomplishing the orderly division of the printed sheets and making correct bundles automatically and quickly to match the operation of the super high-speed rolling press.

Obviously, the embodiment shown is exemplary only and a wide variety of embodiments may be devised without departing from the spirit and scope of the invention.

I claim:

1. In combination with an apparatus for making bundles from the stream of sheets in a rolling press having a vertical passage to receive the delivered stream of the sheets, a turn table at the bottom of said passage, and a counter lead, an interruption plate in said passage capable of rocking up and down, a relay plate, a makeup plate, a movable frame supporting said interruption plate at one side in the upper position, said relay plate at the other side in the middle position and said makeup plate in the lower position, means to move said frame forward and rearward across said passage along a straight line at an angle to said passage, and means to control said rocking motion of said interruption plate and the motion of said frame for a predetermined period and manner by signaling from said counter head.

2. Apparatus according to claim 1 wherein the inclination of the direction of movement of said movable frame is made adjustable according to the thickness of the folded edges of the sheets.