Nov. 3, 1942. E. F. DUDLEY 2,300,657

FEEDER PILE CONTROL

Filed Dec. 18, 1940 3 Sheets-Sheet 1

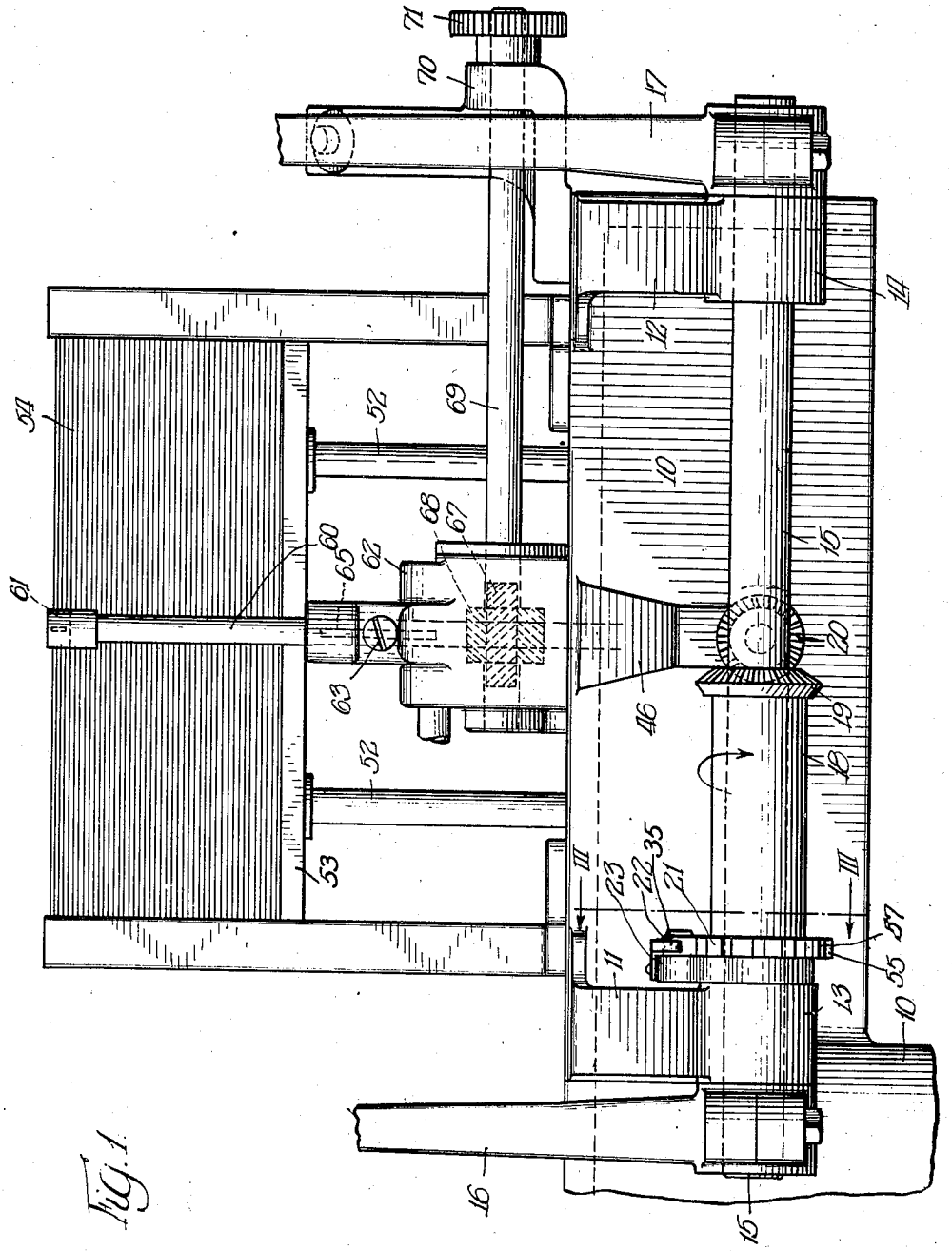


Fig. 1.

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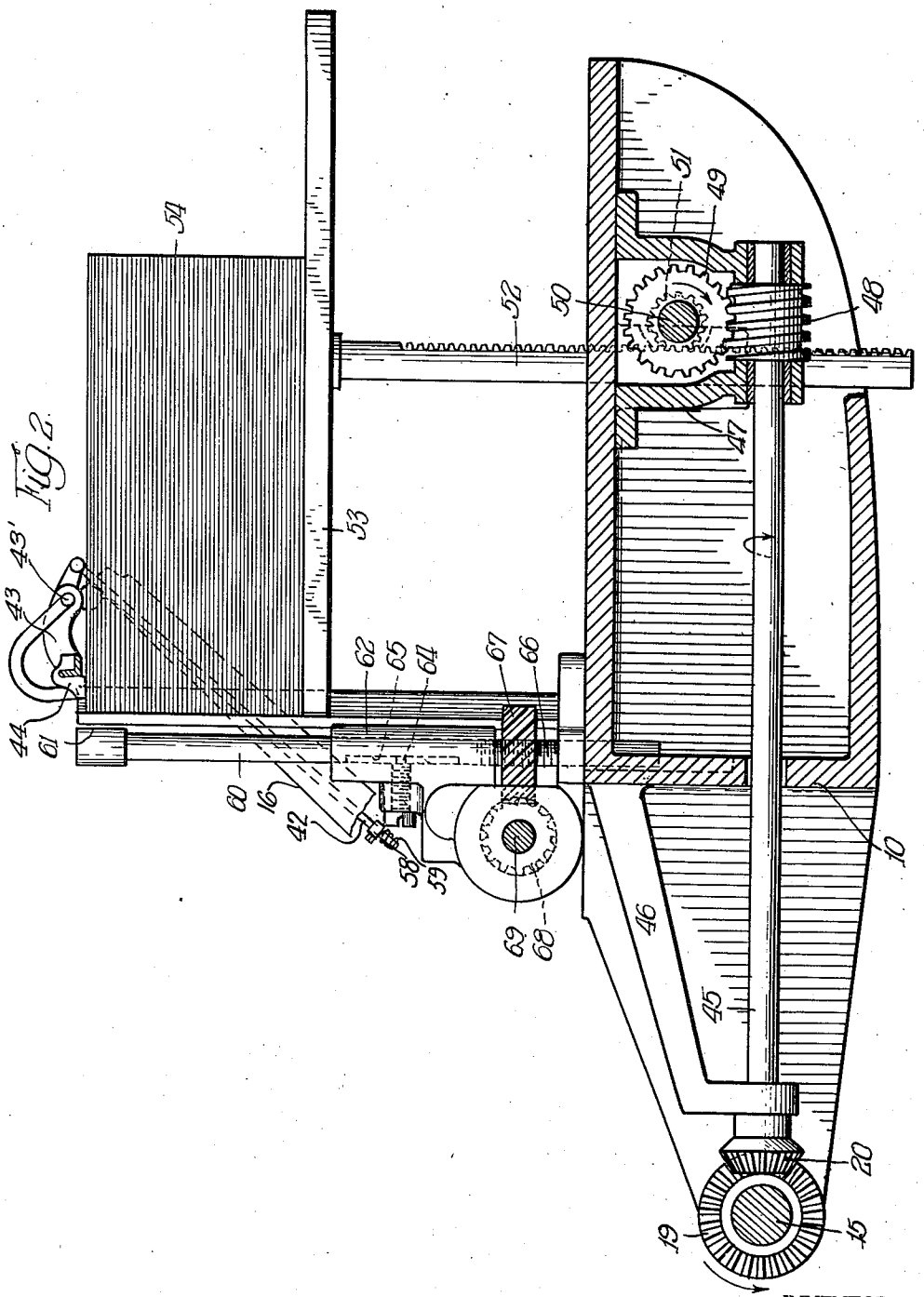


Fig. 2.

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Fig. 4.

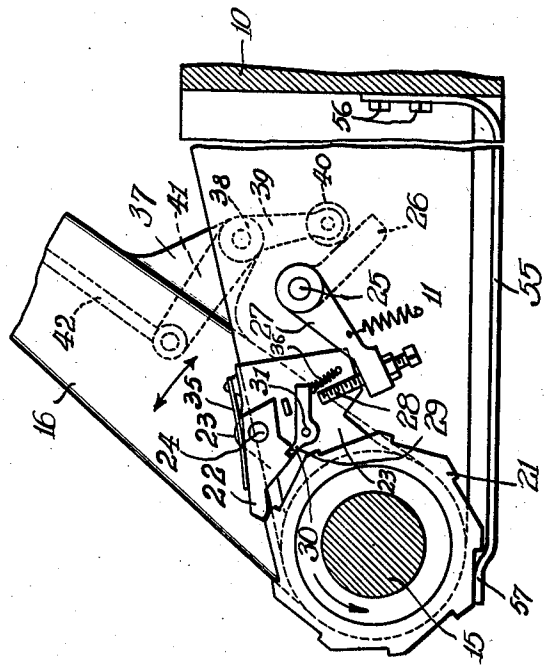
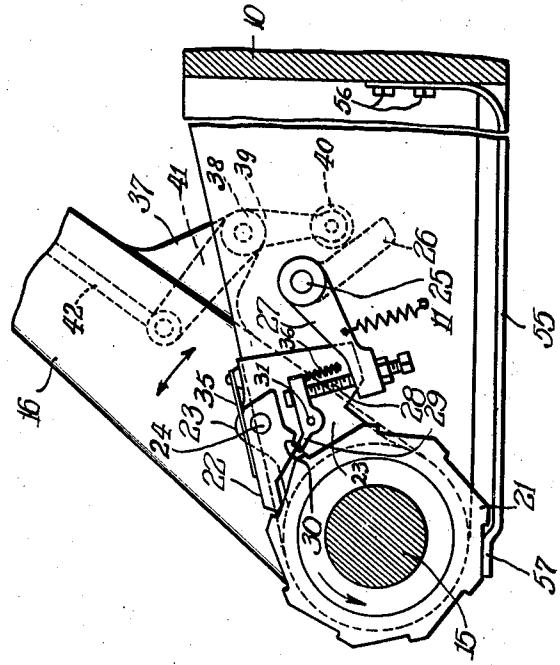


Fig. 3.



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2,300,657

FEEDER PILE CONTROL

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Application December 18, 1940, Serial No. 370,620

3 Claims. (Cl. 271—62)

This invention pertains to feeder pile controlling mechanism and it more particularly concerns that class of sheet feeding devices in which separated sheets are fed in succession from a pile of sheets to a registering or sheet transfer table.

A printing press which includes sheet feeding mechanism of the class referred to is illustrated and described, for example, in U. S. Letters Patent No. 1,567,177, issued to E. Cheshire, December 29, 1925, which type of press is generally known in the trade as the vertical press. According to the disclosure of said patent, the sheets are separated from the feeder pile by means of air blasts and separator shoes and, thereupon, the sheets are forwarded and deposited onto a transfer table by means of oscillating feeder arms. The feeding motion upwardly and toward the sheet separating means is imparted to the feeder pile support by means of a ratchet mechanism which is intermittently actuated by the oscillating feeder arms. The blower tubes, whereby the uppermost sheets on the pile are fluffed in order to facilitate their separation from the pile, are arranged along the forward edge of the pile, preferably one adjacent each of the corners and one blower tube intermediate such corners.

In the operation of the Cheshire pile control, where there is no provision made for positively holding the feed ratchet in the position to which it is being advanced intermittently in order to maintain the top of the pile at the required level with relation to the sheet separating members, it frequently happens that the ratchet mechanism fails to perform its intended function. Consequently, the feeder pile table remains in the same position instead of being raised intermittently, and eventually the top of the pile assumes such a low level that the sheet separating and forwarding means cannot reach the top sheet and, therefore, the sheets remain on the pile. Such a condition, which prevails mostly when the feeder pile table is loaded to its capacity with maximum size sheet, should of course be avoided.

Furthermore, in said Cheshire arrangement, not any of the blower tubes, whereby the sheets are fluffed, can be adjusted while the press is in operation. The desirability of means whereby such adjustment can be accomplished, therefore, also is evident.

The object of my present invention primarily is to provide improved mechanism whereby the feeder pile actuating means is more positively controlled than in earlier arrangements such as disclosed, for example, in said Cheshire patent.

Another salient object of my invention resides in the provision of means whereby at least one of the blower tubes, by means of which the sheets on the pile are fluffed, may be readily adjusted with relation to the top of a pile and while the press is in operation.

Other objects of importance shall be set forth herein and become apparent from the following description, appended claims, and accompanying drawings, in which drawings:

Figure 1 is a fragmentary front elevation depicting the feeder end of a vertical printing press and showing the feeder pile control, inclusive of the means whereby a blower tube can be adjusted while the press is running;

Figure 2 illustrates the same parts but in fragmentary side elevation;

Figure 3 represents a sectional view at an enlarged scale of the ratchet mechanism taken along line III—III of Figure 1, and

Figure 4 is a view similar to Figure 3 but showing the parts in different positions.

Dealing first with that part of the mechanism which controls the height of the feeder pile support, and having reference to Figure 1, the feeder frame 10 is provided with brackets 11 and 12, the outer ends of which are bored in order to provide bearings 13 and 14 in which is journaled the feeder arm rock shaft 15.

This shaft is located intermediate the press proper and the feeder and, at its free ends, it carries oscillatory feeder arms 16 and 17 which may be actuated by any suitable means, such as a cam driven by the power means of the press. Said two arms are rigidly clamped to the shaft 15 so that the shaft, during the oscillatory movement of the arms, will be rocked about its axis.

A feeder ratchet sleeve 18 is arranged on the shaft 15 so that it can freely rotate thereon, and one end of the sleeve carries a bevel pinion 19 which meshes with a complementary bevel pinion 20. To the other end of the sleeve 18 is secured a ratchet wheel 21 with which, as more clearly illustrated in Figure 3, a pawl 22 cooperates in order to intermittently engage the teeth of the ratchet and to thereby rotate it during the rocking movement of the shaft 15 in the counterclockwise direction occasioned by the oscillatory movement of said feeder arms in that direction.

Referring specifically to Figures 3 and 4, it will be seen that the pawl 22 is pivoted to a bracket 23 at 24, which bracket is rigidly mounted on the shaft 15 in order to rock with it. A rock shaft 25 is journaled in the bracket 11 and carries at its outer end a lever arm 26 and at its inner end a locking latch actuating lever 27. The latter has

threaded into its free end a set screw 28 which intermittently engages a latch 29 also pivotally mounted on the bracket 23 and provided for the purpose of locking the pawl 22 against engagement with the teeth of the ratchet wheel 21 when upward movement of the feeder pile support is not required. For that purpose, a notch 30 is formed in the pawl.

In the position of the parts illustrated in Figure 3, the set screw 28 has engaged the latch 29 and has swung it about its pivot 31 and out of its locking relation with the notch 30 of the pawl 22, so that the latter is free to drop into a tooth space of the ratchet 21, and upon the subsequent oscillatory movement of the arm 16 in the counterclockwise direction the pawl engages a tooth and advances the wheel 21 in the same direction through an angle corresponding with the extent of oscillatory movement of said feeder arm.

The pawl 22 is urged toward the ratchet wheel, preferably by means of a leaf spring 35 which may be secured to bracket 23 in any suitable manner, and the latch 29 is held in locking relation with the notch 30, preferably by means of a tension coil spring 36, as shown in Figure 4.

To a boss 37, provided on the feeder arm 16, is pivoted a bell crank lever 38, the arm 39 of which preferably carries a roller 40 which is adapted to move into engagement with the lever arm 26 at the end of an oscillatory movement of the arm 16 in the clockwise direction to thereby disengage the latch 29 from the pawl 22, as shown in Figure 3, in the event that the feeder pile has to be raised for the purpose of maintaining its required level. To the arm 41 of the bell crank lever 38 is linked a connecting rod 42, the outer end of which is pivoted to an arm on the separator frame member 43, which is mounted to rock about its pivots arranged in the free ends of the feeder arms 16 and 17, and carries the suction shoes 44 for separating the sheets.

Reverting to Figure 2, the bevel pinion 20 is secured to the outer end of a drive shaft 45 which is journaled in bearing brackets 46 and 47 and the inner end of which shaft carries a worm 48. The latter meshes with a worm wheel 49 carried by a stud 50 which is journaled in the bracket 47 and has also provided thereon a pinion 51 which meshes with a vertically arranged rack bar 52, the upper end of which carries the feeder pile supporting table 53 on which the pile of sheets 54 rests.

Preferably, as indicated in Figure 1, two rack bars 52 are provided, and consequently the stud 50, see Figure 2, carries a pinion 51 at each of its ends to mesh with the respective rack bar.

The mechanism so far described functions as follows: Assuming that the feeding condition is such that the pile 54 requires to be raised, the arm 39, see Figure 3, is permitted to move down sufficiently far to engage the arm 26 and pivot the lever 27 in the clockwise direction and thereby to cause the latch 29 to free the pawl 22 at the end of the stroke of the arm 16 in the clockwise direction. Consequently, the pawl engages a tooth of the ratchet wheel 21 so that during the stroke of the arm 16 in the counterclockwise direction said wheel and therewith the sleeve 18 and the bevel pinion 19, see Figure 1, are imparted a rotary motion through a predetermined angle in the counterclockwise direction, as viewed in Figure 3.

Accordingly, the bevel pinion 20 and the worm 48 are rotated in the clockwise direction, the worm transmitting rotary motion to the worm wheel 49 and pinion 51 in the same direction, thereby raising the table 53 to a slight extent through the intermediary of the rack bar 52, see Figure 2.

For the purpose of rigidly holding the ratchet wheel 21 in the position to which it has been moved by the pawl 22, during a feeding motion of the ratchet mechanism, I provide a leaf spring 55 of substantial thickness which is preferably secured to the feeder frame 10 by means of bolts 56, and which spring is so formed at its free end 57 that it shall engage a tooth space and stop against an adjacent tooth to thereby prevent any unintended rotary motion.

As will be readily understood, the upward movement of the pile table 53 is dependent on the position of the suction separator shoes 44 which, as illustrated in Figure 2, are mounted on the frame member 43 to rock therewith up and down about pivotal axis 43'. In that position the shoes 44 have reached the top of the pile 54 and are about to grip the uppermost sheet in order to remove it from the pile and transfer it to the press.

The arrangement shown is conventional and corresponds in principle to the mechanism commonly used on the vertical type of printing presses.

The frame member 43 is rocked through the intermediary of the rod 42 by cam or any other suitable means not shown, and the dipping movement of said member and therewith of the separator shoes 44 is limited to a predetermined extent in any desirable manner. Preferably on the connecting rod 42 is provided an adjustable collar 58 against which bears a coil spring 59 which surrounds the rod 42 and is arranged to urge the latter upwardly to thereby move the separator shoes 44 downwardly toward the top of the pile 54.

The position of the parts depicted in Figure 4 corresponds with the position of the separator shoes 44 as shown in Figure 2, namely, the top of the pile is at its proper level and therefore the pawl 22 will clear the teeth of the ratchet wheel 21 during the oscillatory movement of the arms 16 and consequently no movement will be imparted to the pile table.

However, after a certain number of sheets have been removed from the pile 54, so that the separator shoes 44 during their dipping motion reach a predetermined lowest position, then the parts of the ratchet mechanism will assume the positions illustrated in Figure 3, which position is initiated, as explained above, by a movement of the bell crank lever 38 in the clockwise direction, thereby depressing the arm 26 of the lever 27 and consequently disengaging the latch 29 from the notch 30 of the pawl 22. Upon the oscillatory movement of the arm 16 in the counterclockwise direction the pawl 22 engages a tooth of the ratchet wheel 21 and will rotate the latter to thereby raise the pile table 53 through the means described herein with reference to Figure 2.

I will now proceed to describe the means whereby convenient adjustment of one or more of the blower tubes can be accomplished while the press is running. For the purpose of simplicity, I have illustrated such means as applied to one blower tube only.

The tube 60 which carries at its upper end a blower nozzle 61, is slidably supported within a bore formed in the bracket 62. It is held against

rotation within said bore by means of a screw **63** threaded into the bracket **62** and its inner end is formed with a pin **64** which extends into a longitudinal slot **65** cut into the wall of the tube **60**. The inner end **66** of said tube is threaded into a worm wheel **67** which is free to rotate within a bearing slot provided in the bracket **62**.

In order to rotate said wheel, I provide a worm **68** to mesh with it and also housed within the bracket **62**, and which worm is carired at the inner end of a blower tube adjusting shaft **69** which is journaled in the brackets **62** and **70** and has secured to its outer, free end a hand wheel **71**.

It will be apparent therefore, that by turning the handwheel **71**, which is located at a point beyond the field of any operating parts, such as the oscillatory arm **17**, the blower tube **60** can be conveniently adjusted, either up or down while the press is in operation.

Obviously, the objects of my invention could be accomplished by mechanism differing in construction and function from the devices illustrated and described herein; therefore, it is my intention to cover any such modifications that will come within the scope and interpretation of the appended claims.

I claim:

1. In feeder pile controlling mechanism for printing presses, a vertically movable feeder pile support for the sheets to be printed, a drive for imparting movement to said support, whereby the same may be elevated, oscillating sheet carrying members for conveying sheets from said support to the press, means including ratchet mechanism interposed between the sheet carrying members and said drive and adapted to operate said drive as a result of oscillation of the members in one direction to intermittently elevate said support, control means having operation to render the mechanism ineffective when the top sheets on the feeder pile support are at a predetermined level, whereby continued oscillation of the sheet carrying members does not effect elevating movement of said support, and other means yieldingly holding the drive against actuation to thereby secure said support against any unintended movement.

2. In feeder pile controlling mechanism for printing presses, a vertically movable feeder pile support for the sheets to be printed, a drive for imparting movement to said support whereby the same may be elevated, oscillating sheet carrying members having suction shoes for conveying sheets from said support to the press, means for intermittently operating said drive to elevate the support including a ratchet on the drive and a pawl for the ratchet having oscillation with the sheet carrying members, a latch for rendering the pawl ineffective, and control means for said latch carried by the sheet conveying members and having association with said suction shoes, said control means actuating the latch to render the pawl ineffective when the top sheets on the feeder pile support are at a predetermined level.

3. In a feeder pile controlling mechanism for printing presses, a vertically movable feeder pile support for the sheets to be printed, a drive for imparting movement to said support whereby the same may be elevated, sheet separating means, air blast means for fluffng the uppermost sheets in order to facilitate removal of sheets from the pile by said separating means, oscillating sheet carrying members for conveying sheets from said support to the press, means including ratchet mechanism interposed between the sheet carrying members and said drive and adapted to operate said drive as a result of oscillation of the members in one direction to intermittently elevate said support, control means for said ratchet mechanism having operation to render the same ineffective when the top sheets on the feeder pile support are at a predetermined level, whereby the uppermost sheets of said pile on the support can be maintained in substantial alignment with said air blast means, and other means for adjusting the position of said air blast means while the press is in operation.

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