No. 867,315. PATENTED OCT. 1, 1907.

D. M. SOMERS.

APPARATUS FOR OPENING PACKS OF PLATES.

APPLICATION FILED JUNE 9, 1905.

2 SHEETS—SHEET 1.

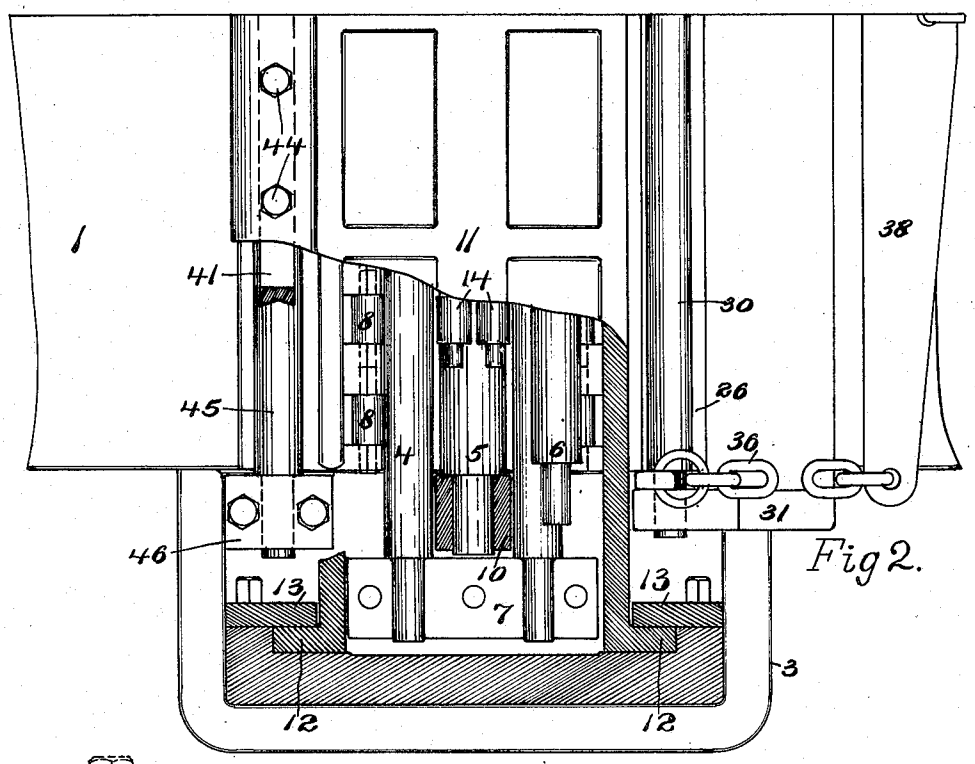
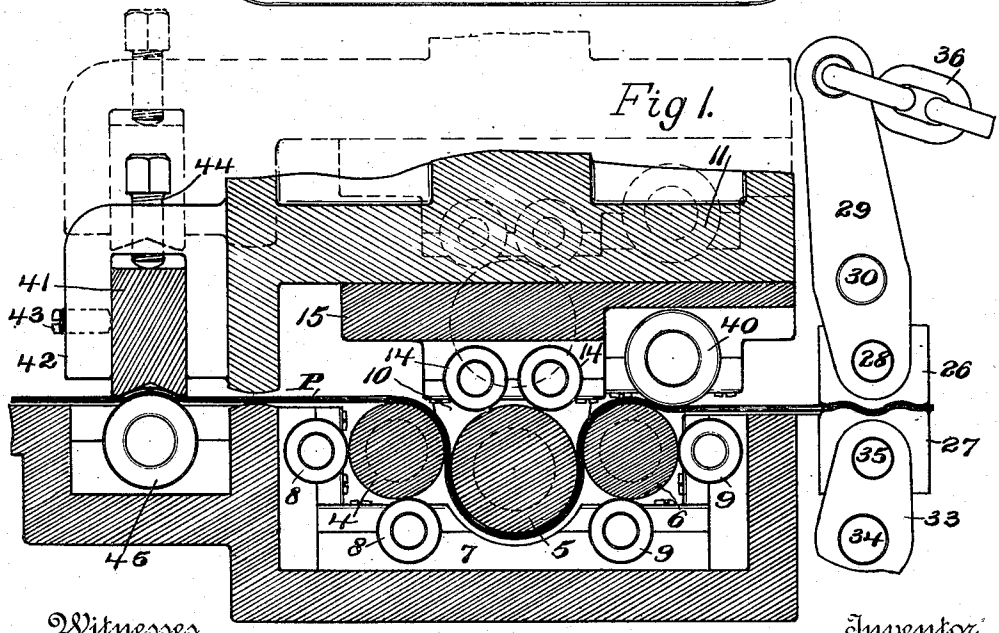


Fig 2.

Fig 1.



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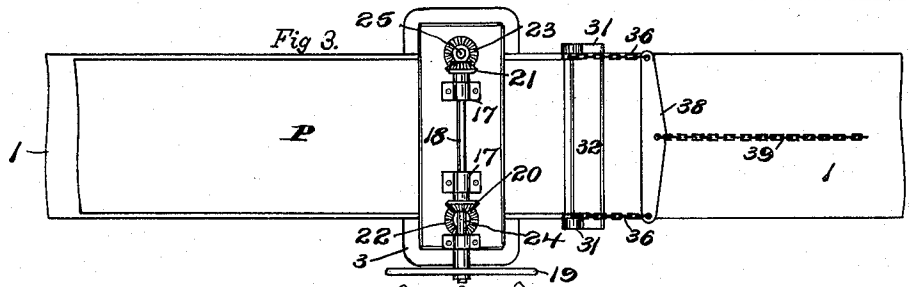
D. M. SOMERS.

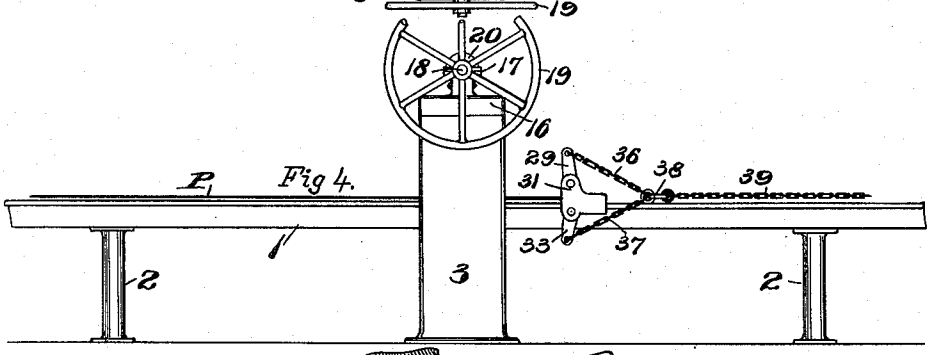
APPARATUS FOR OPENING PACKS OF PLATES.

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2 SHEETS—SHEET 2.

Fig 3.





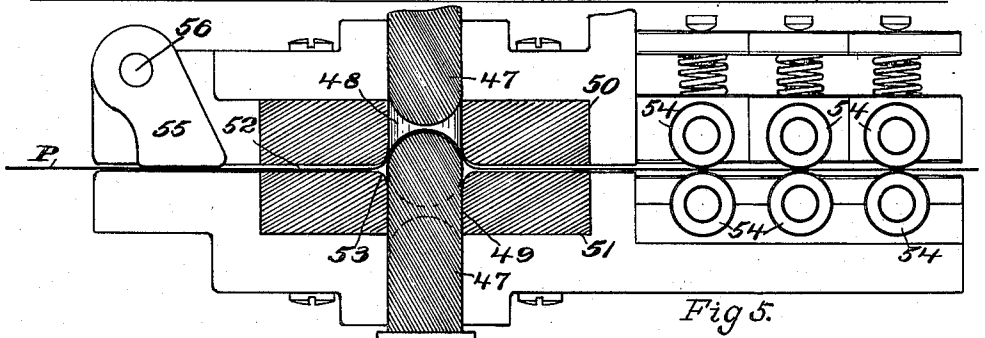
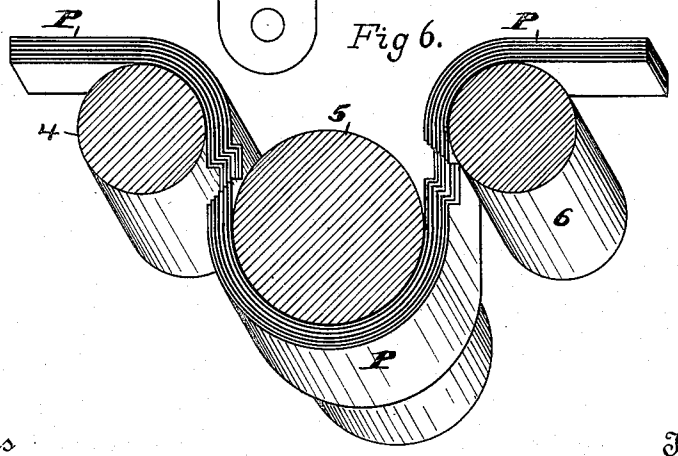


Fig 5.

Fig 6.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR OPENING PACKS OF PLATES.

No. 867,315. Specification of Letters Patent. Patented Oct. 1, 1907.

Application filed June 9, 1905. Serial No. 264,427.

To all whom it may concern:

Be it known that I, DANIEL M. SOMERS, a citizen of the United States, residing at New York, county of Kings, and State of New York, have invented certain new and useful Improvements in Apparatus for Opening Packs of Plates, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to an improved apparatus for opening packs of plates.

After a pack of plates has been subjected to the action of hot rolls, the sheets of the pack adhere to each other strongly, and when it is desired to use the separate sheets, each sheet is removed from the pack by stripping it back from the pack by hand. This is a laborious operation, the labor increasing very considerably, of course, as the size of the sheets in the pack increases.

It is the object of this invention to produce an apparatus which will open, strip or separate the sheets of a pack sufficiently so that each sheet may be lifted or easily pulled away from the other sheets of the pack without the necessity of performing the stripping operation now essential.

A further object of the invention is to produce a machine for opening packs of plates which shall be simple as to its details of construction, and effective in operation, and which can be operated by unskilled labor and at small cost.

With these and other objects in view, the invention consists in certain constructions and in certain parts, improvements and combinations as will be hereinafter fully described and then specifically pointed out in the claims.

Referring to the drawings—Figure 1 illustrates, in vertical section, certain of the operating parts of a machine embodying the invention. Fig. 2 is a plan view of the construction shown in Fig. 1, certain parts of the construction being broken away, this view, however, showing only one half of the machine. Figs. 3 and 4 illustrate in plan and side elevation, respectively, a machine embodying the invention, these views being on a smaller scale than Figs. 1 and 2. Fig. 5 is a view, partly in section and partly in elevation, illustrating a modification; and Fig. 6 is a diagrammatic view.

Referring to the drawings, which illustrate one embodiment of the invention, 1 indicates a table or platform along which the packs of sheets are fed, this table being supported on standards 2, or in any other suitable manner. Standards 3 are located at suitable points alongside the table, these standards serving to support the pack opening means.

The pack opening means will include a flexing mechanism which may be widely varied in its construction. In what is considered as the best construction, the flexing mechanism will include a plurality of members, and to facilitate the operation, these members will be rolls. In the construction shown in Figs. 1 to 4 inclusive, the flexing mechanism includes three rolls, 4, 5 and 6, the rolls 4 and 6 being journaled in boxes 7 supported in the standards 3. The rolls 4 and 6 are preferably supported or backed up by friction rolls 8, 9, these rolls being mounted in any usual manner. In the best constructions, where three rolls such as have been described, are employed, one of the rolls is made movable with respect to the others, so as to permit the ready insertion of a pack of plates into the rolls. In the construction shown in Figs. 1 to 4, the roll 5 is the movable roll, this roll being carried in boxes 10, these boxes being supported on a cross head 11 which is movably mounted in the standards 3. In the construction illustrated in Figs. 1 to 4, the cross head is provided with guiding flanges 12 moving in ways formed partly in the standards and partly by plates 13 bolted to the standards. In the best constructions, this roll 5 will be backed up by friction rolls 14 which are mounted in a plate or supplemental head 15 secured in any suitable manner to the under side of the cross head 11.

The cross head may be given the movements to carry the roll 5 towards and away from the rolls 4 and 6 by any suitable means. In the construction shown, the standards 3 support a cap plate 16 which is provided with bearings 17 in which is mounted a shaft 18. This shaft is provided with any suitable operating means, as, for instance, a hand wheel 19, and carries two beveled gear 20, 21. These bevel gears 20, 21 engage with bevel gears 22, 23 respectively, these gears being mounted on screw shafts 24, 25 journaled in the cap plate. The ends of these shafts engage the cross head 11 in the usual manner. It is obvious that by turning the hand wheel in one direction or the other, the roll 5 may be moved toward and away from the rolls 4, 6, and when it is moved away from these rolls, a pack of plates may be readily inserted between the rolls 4, 6 and the roll 5. After the pack of plates has been inserted between the rolls, the roll 5 is lowered into the position shown in Fig. 1, this causing the pack of plates, indicated at P, to take the position shown in that figure.

Means are provided for advancing the packs through the flexing members. While these means may be varied in construction, in the best construction, they will be of such a character as to positively seize and firmly hold the sheets at the end of the pack. In construction illustrated in Figs. 1 to 4, there is provided a pair of gripper jaws, 26, 27, the upper jaw 26 being pivoted by pins 28 to a pair of levers 29. These levers 29 are supported on a rod 30 which is carried in a slide comprising a pair of side pieces 31 connected by a web 32. These side pieces move on the table 1, the edges of the table forming guides therefor. The side pieces 31 and the cross web 32 may be conveniently formed as a single casting. The jaw 27 is carried by a pair of levers 33 pivoted on studs 34 which extend into the

side pieces 31, the jaw being connected to the levers by pins 35. The levers 29, 33 may be operated to cause the jaws to receive the sheet in any desired manner. As shown, chains 36, 37 are employed for thes purpose, these chains being connected to a swingletree 38 which may be operated in any suitable manner, as, for instance, by a chain 39. The pivotal centers 30, 34 of the levers 29 are so located as to cause the levers and jaws to have a toggle action as they close down upon the plates, so that they grip the plates very firmly. If desired, the acting faces of the jaws may be corrugated slightly, as indicated in Fig. 1, to increase the gripping action of the jaws.

After a pack of plates has been positioned between the flexing members in the manner described, and the grippers have been caused to seize the plates at the end of the pack, the grippers are drawn forward by the chain 39, thus drawing the pack of plates through the rolls. The flexing of the plates due to the fact that they are drawn in a sinuous course through the rolls causes them to slip or slide on each other. The action will be clearly understood by reference to the diagram, Fig. 6, in which the plates are notched out to show their relative positions as they are passing through the flexing members. As the pack passes from the member 4 to and around the member 5, the path of travel of each upper sheet of the pack will be less in length than the path of travel of the sheet underneath it. This will cause a slip of each sheet with respect to the one above it, as is indicated by the notching of the plates referred to, the notch itself presenting a fanned out condition. As the pack passes from the member 5 to the member 6, however, the conditions are reversed. During this part of the travel of the pack, the upper sheets of the pack have the longer paths and the lower or under sheets of the pack have the shorter paths. This causes each plate to slip on the plate underneath it. As the forward end of the plates is firmly held by the grippers, the action of the flexing members is to produce what may be termed a wave motion from the front end of the pack toward the rear end as the pack is carried on through the flexing members. This movement causes the plates, as has been described, to slip and slide on each other, and effectually breaks up the adherence of the plates, so that after a pack of plates has been passed through the apparatus, each plate of the pack may be readily removed without the necessity of any stripping action.

In the best constructions, means will be employed for straightening out the pack after it has passed through the flexing members. While this straightening means may be of any suitable description, in the construction shown in Figs. 1 to 4, it consists of a roll 40 mounted in suitable bearings supported on the supplemental head 15. This roll may be conveniently located so as to coact with the roll 6 in performing the straightening function.

In the best constructions, tension devices will be employed to make sure that sufficient force is exerted by the advancing means upon the pack to cause the flexing members to do their work properly. While this tensioning means may be of any suitable description, in the construction shown in Figs. 1 to 4, it comprises a cross bar 41 mounted in a slotted bracket 42 extending from the head 11. This bar is held in position in any suitable manner, as by screws 43, and adjusted by screws 44. Coöperating with this bar is a roll 45 suitably supported in the frame, one of the bearings for this roll being shown in Fig. 2 and marked 46. Increased tensioning action may be obtained by making the bracket 42 with angular operating faces, as indicated in Fig. 1.

Fig. 5 illustrates a modified construction embodying the invention. In the construction shown in this figure, the flexure of the plates is produced by a vertically moving cross head 47 having a slot through which the pack passes. This cross-head is given vertical movements, as indicated in dotted lines, by any suitable mechanism, not shown. This cross head moves in openings 48, 49 in blocks or plates 50, 51, these blocks or plates being so disposed as to provide a channel 52 between them through which the pack passes. The plates will be chamfered off, as indicated at 53, at the junction of the longitudinal and vertical passages, so as to prevent any sharp bend in the plates. In the form of apparatus shown in this figure, the plates are advanced by a series of drawing rolls 54 of usual construction. As the pack is advanced by the drawing rolls, the cross head 47 is moved from the position shown in full lines to the position shown in dotted lines and back again, this movement flexing the plates of the pack first in one direction and then in the other, thus producing the slipping and sliding action necessary to open or separate the plates. With the form of apparatus just described, there may be employed means for preventing the plates from being pushed backwards as the cross head moves. While these means may be of any suitable description, an effective device for this purpose consists of a pawl 55 pivoted at 56, this pawl being of a character ordinarily used for preventing back feed.

While the constructions above described, and particularly the construction described and illustrated in Figs. 1 to 4, are regarded as efficient means for carrying the invention into effect, it is to be understood that the invention may be embodied in mechanisms which vary widely from those hereinbefore described. The invention is not, therefore, to be limited to the specific constructions hereinbefore set forth.

What is claimed is:—

1. In an apparatus for opening packs of plates, the combination with a flexing mechanism, of means for firmly holding the end of a pack and drawing the pack through the flexing mechanism.

2. In an apparatus for opening packs of plates, the combination with a flexing mechanism, of means for firmly holding the end of the pack and drawing the pack through said mechanism, and straightening means located between the drawing means and the flexing mechanism.

3. In an apparatus for opening packs of plates, the combination with a flexing mechanism, of means for firmly holding and drawing the packs therethrough, and a tension device.

4. In an apparatus for opening packs of plates, the combination with a flexing mechanism, of means for firmly holding the end of the pack and drawing the pack through the flexing mechanism, straightening means located between the drawing means and the flexing mechanism, and means for applying tension to the pack.

5. In an apparatus for opening packs of plates, the combination with a flexing mechanism, of a gripper, means for operating the gripper to seize the forward end of a pack and for drawing the pack through the flexing mechanism.

6. In an apparatus for opening packs of plates, the combination with a flexing mechanism, of a gripper, means for operating the gripper to seize the forward end of a pack and for drawing the pack through the flexing mechanism, and a staightening device between the gripper and the flexing mechanism.

7. In an apparatus for opening packs of plates, the combination with a flexing mechanism, of a gripper, means for operating the gripper to seize the forward end of a pack and for drawing the pack through the flexing mechanism, a straightening device between the gripper and the flexing mechanism, and tensioning means for the pack.

In testimony whereof, I have hereunto set my hand, in the presence of two subscribing witnesses.

DANIEL M. SOMERS.

Witnesses:
A. WHITE,
G. GALIANI.