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SHEET FEEDER.

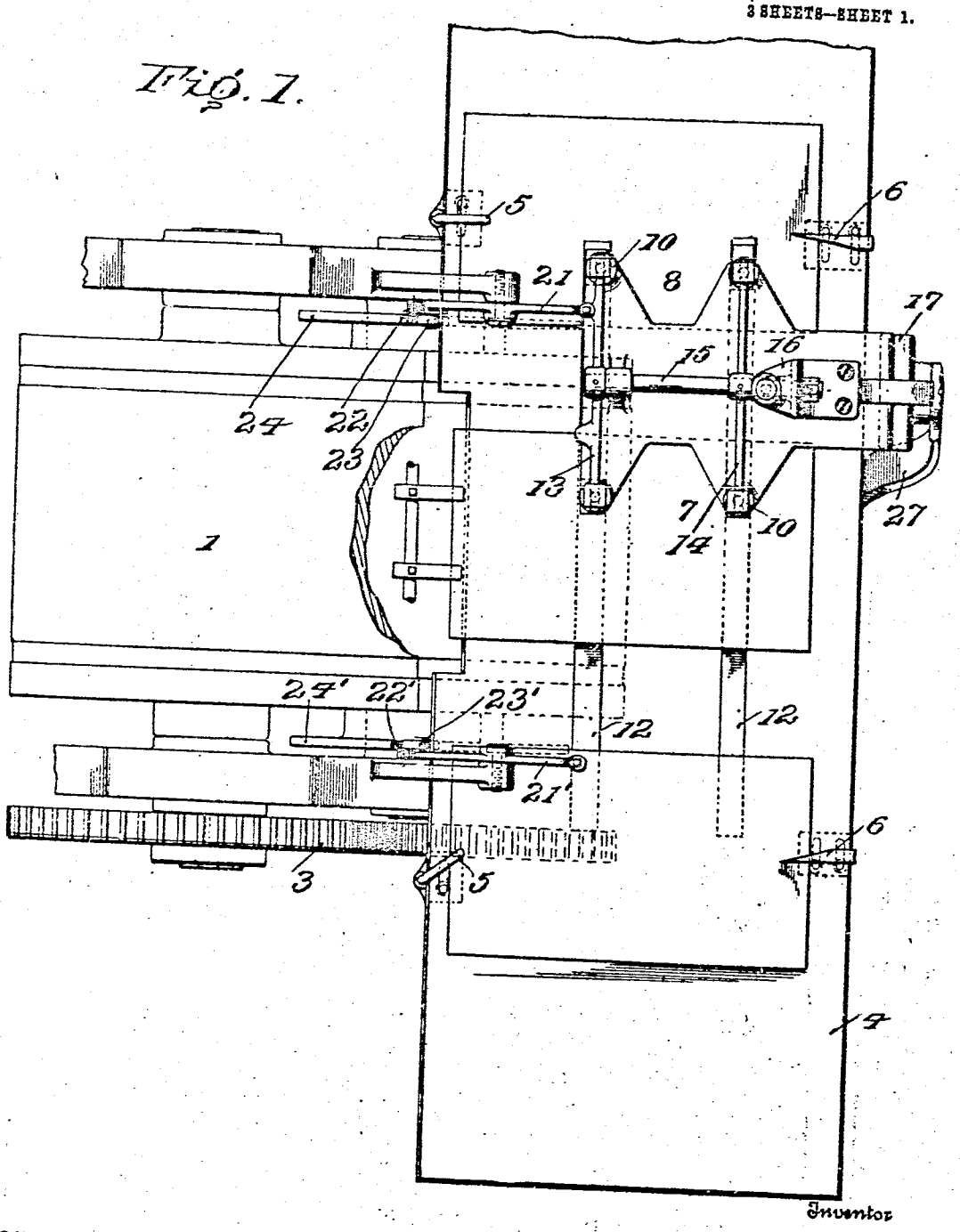
APPLICATION FILED JAN. 13, 1909.

951,973.

Patented Mar. 15, 1910.

3 SHEETS—SHEET 1.

Fig. 1.

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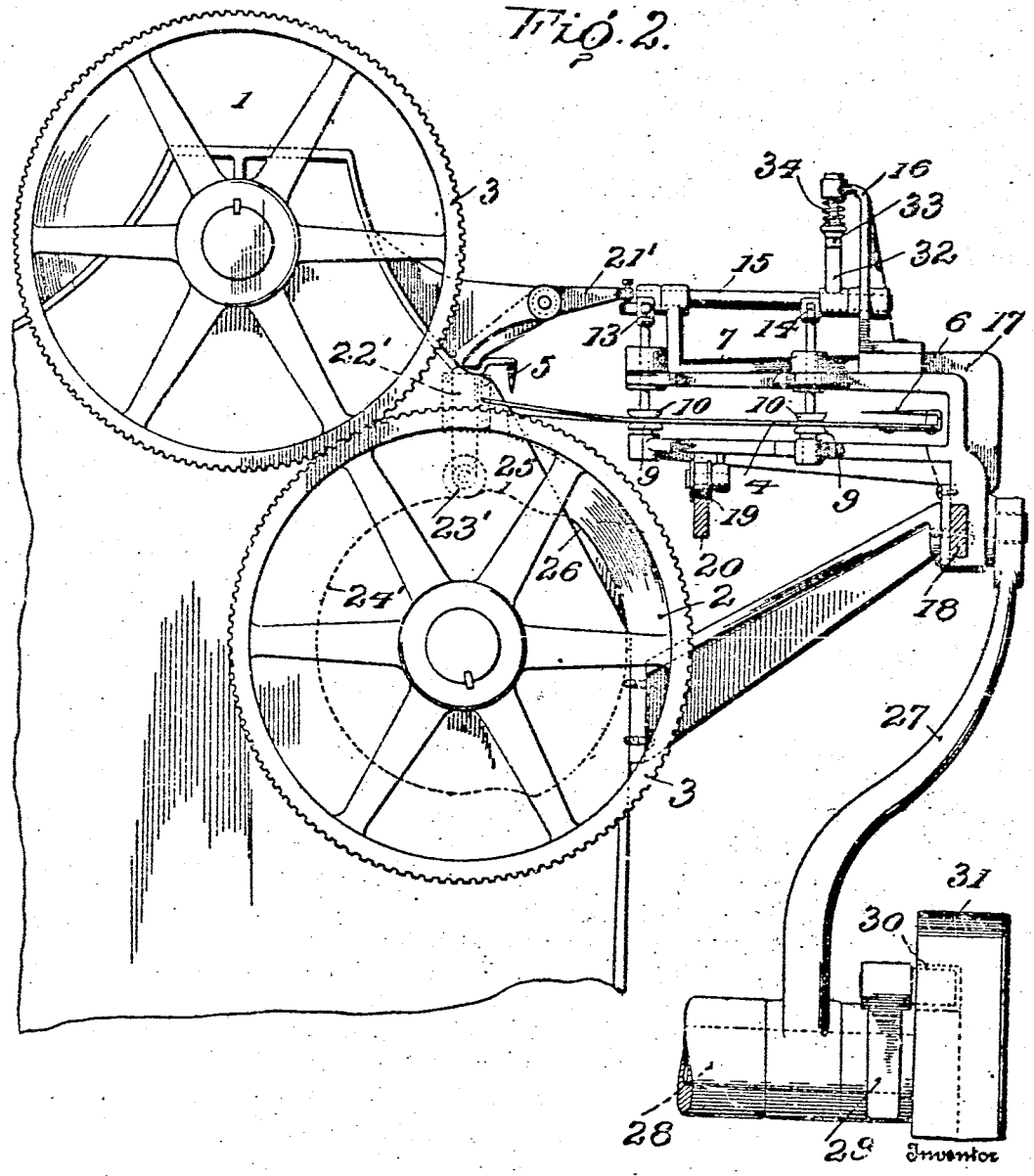
3 SHEETS—SHEET 2.

Fig. 2.

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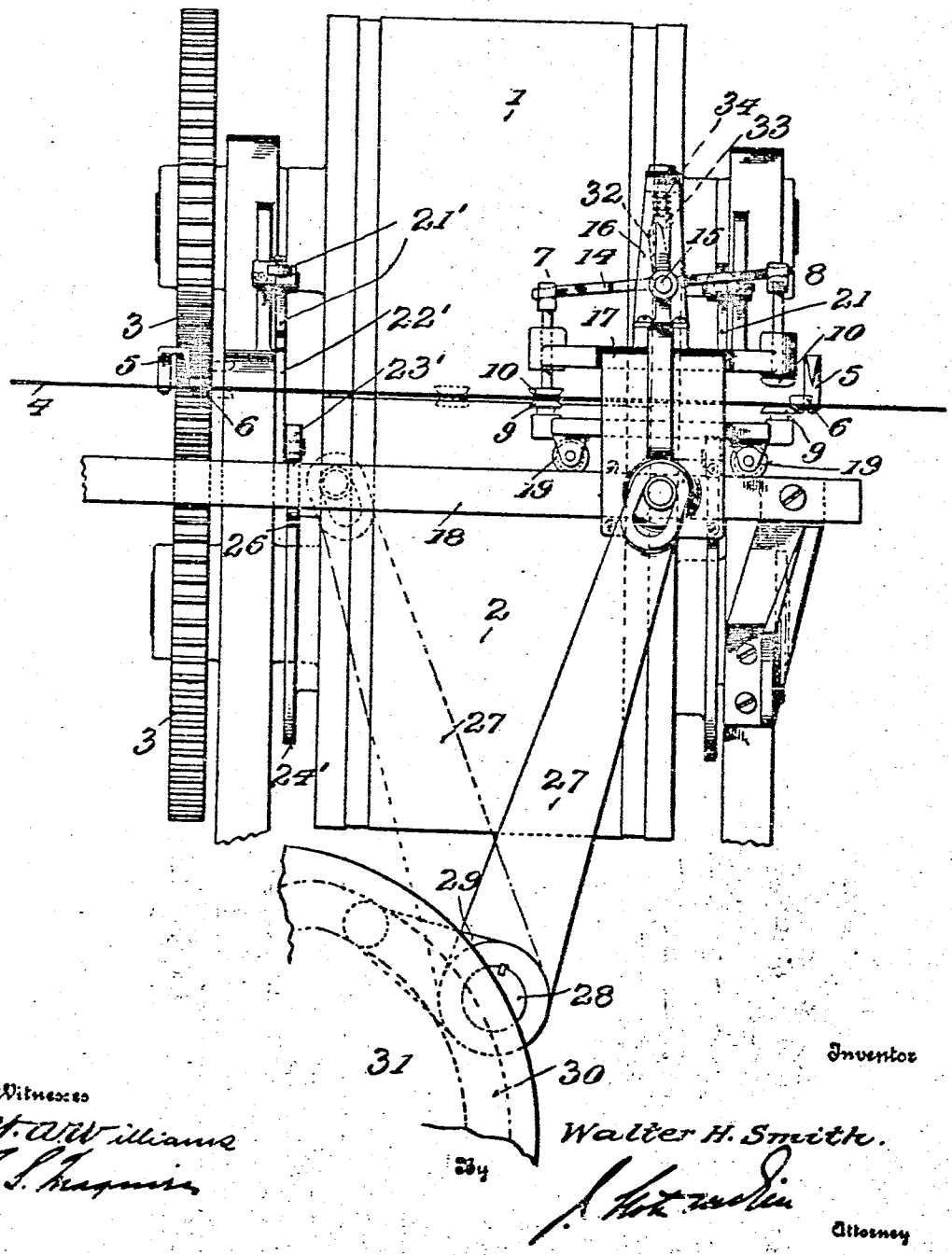
2 SHEETS—SHEET 3.

Fig. 3.

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# UNITED STATES PATENT OFFICE.

WALTER H. SMITH, OF NILES, OHIO, ASSIGNOR TO THE HARRIS AUTOMATIC PRESS COMPANY, OF NILES, OHIO, A CORPORATION OF OHIO.

## SHEET-FEEDER.

951,973. Specification of Letters Patent. Patented Mar. 15, 1910.

Application filed January 13, 1909. Serial No. 472,085.

*To all whom it may concern:*

Be it known that I, WALTER H. SMITH, of Niles, in the county of Trumbull and State of Ohio, have invented certain new and useful Improvements in Sheet-Feeders; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

In certain grades of printing it is necessary that the stock be accurately fed to perfect register. This is especially so where the stock has to be passed through the press more than once. The same requirement exists in feeding such stock to any kind of paper-handling machine. Since the edges are usually untrimmed the positioning of each sheet is dependent usually upon the centering or alining of two or more marks thereon with certain pointers or guides. This necessarily involves considerable time and in consequence the output of a machine to which stock is thus positioned before being fed is greatly limited.

The primary object of my invention is to provide simple and highly efficient means for increasing the output of a machine handling stock accurately set to register. Briefly stated, I accomplish this end by registering the stock at different places and then automatically transferring the stock successively, without change of its register, to an intermediate point where it may be taken up by the machine.

The invention will be hereinafter fully set forth and partially pointed out in the claims.

In the accompanying drawings, Figure 1 is a plan view, showing my improvement applied to a printing press. Fig. 2 is an end view. Fig. 3 is a front elevation.

I have shown my improvement as applied to a printing press, but it may be employed in connection with any paper-handling machine, such as folders, cutters, collators, etc. The plate cylinder is designated 1, the impression cylinder 2, and the intermeshing gear wheels 3.

4 designates the feed-table which is arranged transversely of the line of feed to the press cylinders. The feed table is provided near its opposite ends with indicating pointers 5 and straight edge guides 6 by means of which the stock is positioned by two operators in relation to certain marks or points thereon so as to insure absolute uniformity in register regardless of the number of times the stock may be fed to the paper-handling machine. On account of the time required to thus accurately position the stock I provide two different points for this purpose, the stock being taken alternately from each point and transferred to a common intermediate point where it may be taken up by the press cylinder. The pointers 5 and guides 6 may be adjusted to suit different conditions. The means employed to transfer the stock to a second position is characterized by the fact that the transferred sheet is first released and after it has been removed by the machine to which it is thus positioned a second sheet previously set to gage is then taken up and transferred, a third sheet in the meantime being set to perfect register and ready to be transferred when the second sheet has been removed.

The stock transferrer is shown as composed of two sets of grippers 7 and 8, each set consisting of two pairs, and each pair in turn comprises a lower gripping member 9 and an upper vertically-movable gripping member 10. The gripping members 9 are in direct line with, or partly project through, longitudinal slots 12 of the feed table, which latter, by the way, is preferably composed of thin metal. Any suitable means may be employed for actuating the movable gripping members. Such members of the two sets are shown as connected together by rocker-arms 13, 14, upon which the rods of said movable gripping members are mounted. These rocker-arms are fast on a common shaft 15 having its bearings in a bracket 16 of a carriage 17, which latter is composed of upper and lower portions extending, respectively, above and below the feed-table, and supported by a slide-bar 18 and rollers 19 movable on a track 20, said track and slide-bar being secured in any suitable manner to the main frame of the machine. The gripping members 9 are supported by the lower portion of the carriage while the upper portion thereof has guide openings for the rods of gripping members 10. The movable gripper members are connected together so that after one set has been moved to release a transferred sheet,

by the same agency the other set of grippers will be caused to grip a second sheet previously set to register. The rocker-arm 13 is designed to be engaged by a lever 21 which is actuated by the upward movement of a rod 22 carrying at its lower end a roller 23 which is engaged by a cam 24 carried by the impression cylinder. This cam has two raised portions 25 and 26, the former of lesser length than the latter, so that when the roller is engaged first by the raised portion, 25, the grippers will be rocked sufficiently to release the sheet which has been positioned centrally in line with the impression cylinder and permit its withdrawal by the grippers of the impression cylinder, but when the greater of the two raised portions, 26, engages such roller the other set of grippers will be caused to engage a new sheet set to register on the feed-table. By thus deferring this engagement additional time is allowed for the operator to place the stock to register. After the grippers are closed against a sheet previously set to register the carriage is shifted longitudinally to transfer such sheet to the central position and take up a second sheet at the other end of the table. This shifting may be accomplished by any suitable means, but that shown comprises an arm 27 mounted on a shaft 28 carrying a short arm 29 the end of which extends into a cam-groove 30 of a driven wheel 31, said arm 27 being slotted at its upper end to engage a pin of the carriage. When the latter is shifted it will carry a sheet exactly as it was when set to register, and without any deflection will position such sheet directly in the line of feed to the press or other machine. After the carriage is shifted, the rocker-arm 13 is engaged by a second lever 21′ the counterpart of lever 21, which lever 21′ is actuated by means exactly similar to that before described, and for this reason its parts are designated by corresponding reference numerals prime to those heretofore employed. First the grippers are actuated sufficiently to release the transferred sheet, and by the time such sheet is taken up by the cylinder, the grippers are again actuated to close against a sheet positioned to register at the end of the feed-table to which the carriage has been shifted. Thus ample time is allowed for each operator to carefully and accurately position each sheet before the same is engaged by the grippers. It is then transferred without loss of time. In this way the speed of the press, and hence its output, may be greatly increased, and yet each sheet once accurately adjusted to proper register retains its proper position even after being transferred.

To insure quick and accurate movements of the grippers both in opening and closing I mount on shaft 15 a finger 32 which acts against a beveled plunger 33 vertically-movable in an arm of bracket 16, such plunger being normally held in its lowered position by a spring 34. When the rocker-arm 13 is actuated by either of the levers 21 or 21′ to close and open the grippers the plunger will be readily raised sufficiently to allow the finger 32 to pass the point thereof, whereupon the latter descends and the reverse side of the bevel of the plunger forces the grippers of the two sets in opposite directions with a quick spring-like action. This arrangement permits the movable members of each set of grippers to be slightly raised to release a sheet without closing the other set of grippers, the latter action being caused only when the rocker-arms make a complete stroke by the engagement of the greater of the two raised portions of the cams with the roller of the lever-actuating rod.

It should be stated that if it were not for the necessity of maintaining a clear space in front of the impression cylinder a single cam on the impression-cylinder would suffice, but in that event the two levers 21 and 21′ would have to be mounted on a common shaft.

The operation although made clear by what has been said may be briefly summarized as follows:—Assuming that the carriage is at the right, as shown in Fig. 3, and that stock is being placed, one sheet at a time, at each end of the feed-table, and accurately registered by the overhanging pointer and guide, when through the raised portion 26 of the cam the lever 21 is actuated the rocker arm 13 is turned sufficiently to overcome the tension of the plunger-spring and the sheet is seized by the grippers of set 8. Thereupon the carriage is quickly shifted toward the left, and when through the raised portion 25′ of the cam the lever 21′ is actuated the grippers of the set 8 are opened sufficiently to release the transferred sheet and permit it to be taken up by the machine to which it has been positioned without change of register. When the raised portion 26′ effects the further actuation of lever 21′ the grippers of set 7 will take up the previously registered sheet at the left hand end of the feed-table, and the carriage being shifted to its original position will transfer the second sheet to the intermediate point and then the grippers 8 will take up the third sheet. Thus the machine transfers previously registered stock successively from opposite points to a common or intermediate point ready to be introduced into or taken up by a printing press or other paper-handling machine.

I claim as my invention:—

1. In combination, fixed means for supporting separate pieces of stock at a plurality of points, means at each point to

enable each piece of stock to be set to register, and means for successively engaging each piece of previously registered stock from above and below and transferring the same to a common point without changing the register thereof.

2. In combination, a fixed feed-table upon which separate pieces of stock are designed to be placed at different points, means at each point to enable the stock to be set to register, and means for successively engaging each piece of previously registered stock from above and below and transferring it to another point on the feed-table without changing the register thereof.

3. In combination with a paper-handling machine, a feed-table located transversely thereof and designed to support stock at or near its opposite ends, and means for engaging the stock from above and below and alternately transferring it from each end of the feed-table to an intermediate point to be taken up by said machine.

4. In combination with a plurality of supports for stock, a receiver to which the stock is designed to be transferred from said supports, upper and lower grippers for successively engaging the stock at each of the supports, means for shifting the position of the grippers to transfer the stock engaged thereby to said receiver, and means for releasing the grippers.

5. In combination with a feed-table upon which stock is designed to be placed at different points, two sets of grippers for engaging, respectively, the stock at opposite points, said grippers being composed of upper and lower members, means connecting the grippers of the two sets, means for shifting the positions of the grippers to transfer the stock engaged thereby, and means for successively operating the grippers to permit one set to release a transferred sheet and the other set to engage another sheet.

6. The combination with a feed table having a longitudinal slot and designed to support stock at its opposite ends, grippers comprising a movable member and a fixed member, one above and the other below the plane of the stock and both coinciding with said slot, means for reciprocating the grippers longitudinally of the feed table, and means for actuating the grippers at the end of each movement to release one sheet and engage another.

7. In combination with a feed-table having longitudinal slots and designed to support stock at its opposite ends, two sets of grippers, each set comprising a movable member and a fixed member, one above and the other below the feed-table and coincident with said slots, means for reciprocating the grippers longitudinally of the feed-table, and means for actuating the grippers at the end of each movement so that after one set of grippers has released a sheet the other set will engage another sheet.

8. In combination with a feed table, designed to support stock at different points, a reciprocating carriage, upper and lower grippers mounted on said carriage for taking up and transferring the stock alternately from said opposite points, and means for actuating the grippers at the end of each movement of said carriage.

9. In combination with a feed-table, designed to support stock at different points, a reciprocating carriage, two sets of grippers mounted on said carriage composed of upper and lower members, for taking up and transferring the stock alternately from said opposite points, and means for actuating the grippers at the end of movement of said carriage.

10. In combination with a feed table, designed to support stock at different points, a reciprocating carriage, upper and lower grippers mounted on said carriage for taking up and transferring the stock alternately from said opposite points, said grippers being, respectively, above and below the plane of the stock while supported on the feed table, and means for causing the grippers to release the sheet transferred by them and then engage another sheet following such release.

11. In combination with a feed-table, designed to support stock at different points, a reciprocating carriage, two sets of grippers mounted on said carriage composed of upper and lower members, for taking up and transferring the stock alternately from said opposite points, and means for first causing one set of grippers to release the sheet transferred by it and then causing the other set to engage another sheet.

12. In combination with a feed-table, designed to support stock at different points, a reciprocating carriage, two sets of grippers mounted on said carriage for taking up and transferring the stock alternately from said opposite points, said grippers being composed of fixed and movable members, means connecting the opposite movable members of the two sets, means for normally holding the members of one set out of engagement and the other set in engagement, and means for changing the positions of the movable members of both sets of grippers relative to their fixed members at the end of each movement of the carriage.

13. The combination with the feed-table having slots therein and supports for stock at or near its opposite ends, of a reciprocating carriage extending above and below said table, two sets of grippers composed each of movable and fixed members, said fixed members being beneath the table and coincident with said slots, rocker-arms connecting the opposite movable members of the two

sets of grippers, and means for engaging and actuating said rocker-arms at the ends of the travel of said carriage.

14. The combination with the feed-table having slots therein and supports for stock at or near its opposite ends, of a reciprocating carriage extending above and below said table, two sets of grippers composed each of movable and fixed members, said fixed members being beneath the table and coincident with said slots, rocker-arms connecting the opposite movable members of the two sets of grippers, levers for engaging and actuating said rocker-arms at the ends of the travel of said carriage, and means for actuating such levers to cause first the release of a sheet transferred by one set of grippers and then the engagement of the second set of grippers with another sheet.

15. The combination with the feed-table having slots therein and supports for stock at or near its opposite ends, of a reciprocating carriage extending above and below said table, two sets of grippers composed each of movable and fixed members, said fixed members being beneath the table and coincident with said slots, rocker-arms connecting the opposite movable members of the two sets of grippers, a shaft supporting said rocker-arms and mounted on said carriage, a finger carried by said shaft, a spring-impelled plunger with which said finger engages for holding said rocker-arms in either of their two positions, and means for turning said shaft at the termination of each movement of the carriage.

16. In combination with a paper-handling machine, and cams actuated thereby, of a feed-table upon which stock is designed to be placed at either side of the line of passage of stock to such machine, two sets of grippers for engaging, respectively, the stock at opposite ends of the table and transferring it to the line of passage to the machine, a carriage for reciprocating said grippers longitudinally of the feed-table, said grippers having movable members, rocker-arms connecting the opposite movable members, a shaft carrying said rocker-arms, levers for shifting said rocker-arms at the terminations of the movements of the carriage, and rods actuated by said cams for moving said levers.

In testimony whereof, I have signed this specification in the presence of two subscribing witnesses.

WALTER H. SMITH.

Witnesses:
RAYMOND A. BREEZE,
EUGENE WITHERSTAY.