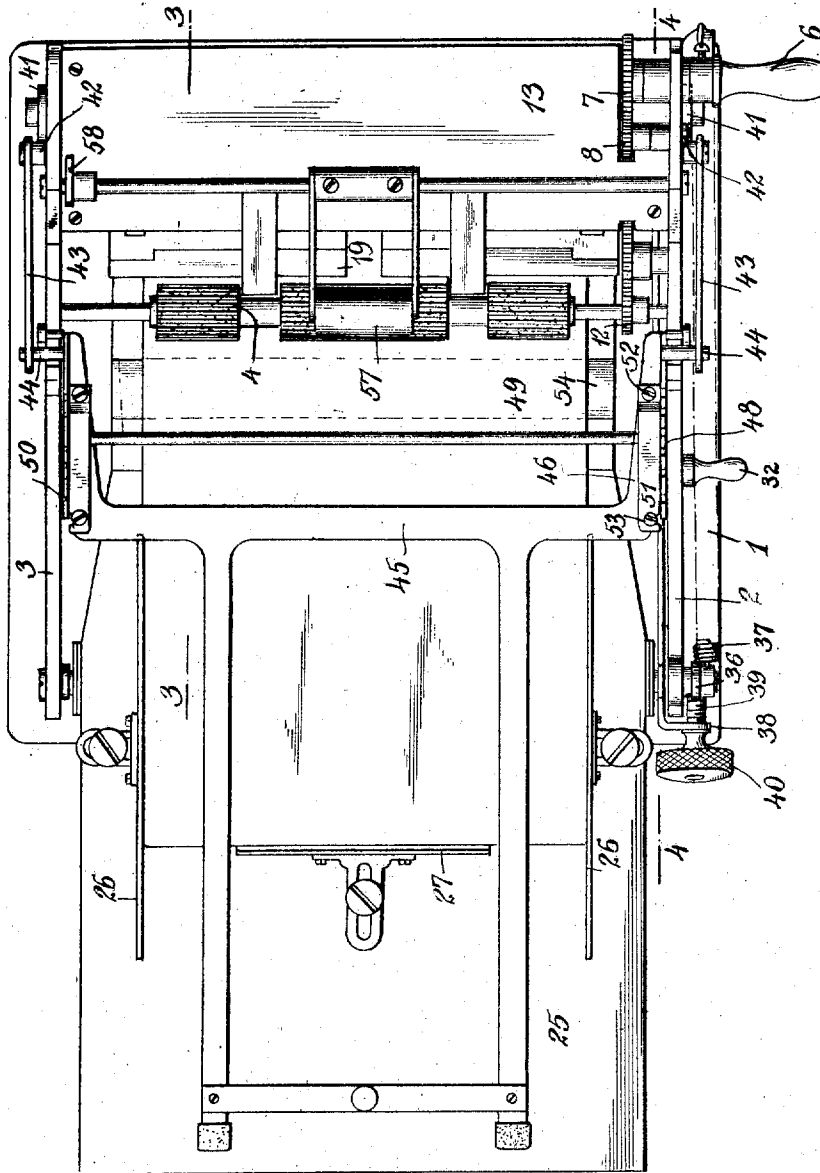


A. B. DICK.
SHEET FEEDING APPARATUS.
APPLICATION FILED JAN. 4, 1911.

1,054,637.

Patented Feb. 25, 1913.

2 SHEETS—SHEET 1.



WITNESSES:

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Fig. 1,

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Albert B. Dick

BY

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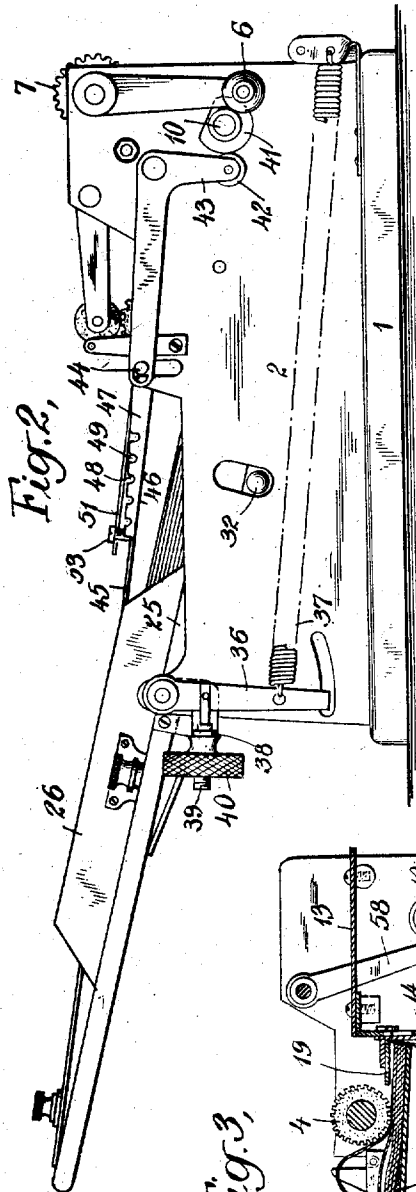


Fig. 2,

Fig. 4,

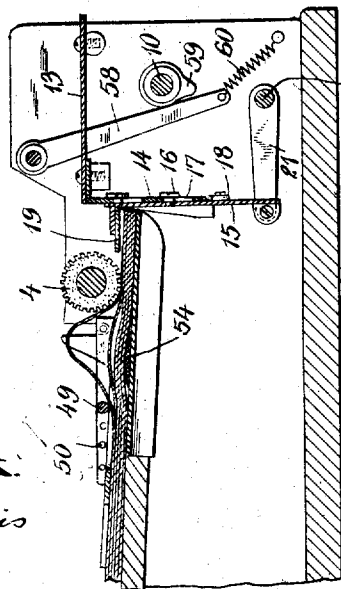
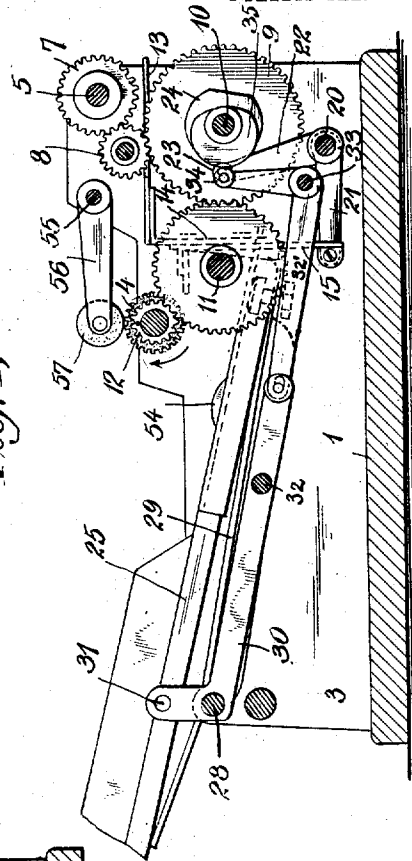


Fig. 3,

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ALBERT B. DICK, OF LAKE FOREST, ILLINOIS, ASSIGNOR TO A. B. DICK COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

SHEET-FEEDING APPARATUS.

1,054,637.

Specification of Letters Patent.

Patented Feb. 25, 1913.

Application filed January 4, 1911. Serial No. 600,688.

To all whom it may concern:

Be it known that I, ALBERT B. DICK, a citizen of the United States, residing at Lake Forest, in the county of Lake and State of Illinois, have invented certain new and useful Improvements in Sheet-Feeding Apparatus, of which the following is a specification.

This invention relates to apparatus for feeding sheets successively from a pile to any suitable mechanism which is to operate upon the sheets, such for instance as a printing or folding machine.

The object of the invention is to effect certain improvements in the construction of apparatus of this character whereby it is made more reliable and efficient in its operation and can be used in feeding paper of varying weights.

The invention involves sheet feeding apparatus of the type in which one sheet of a pile is buckled to detach it from the other sheets and when so detached is fed from the pile.

One feature of the invention resides in the provision of means whereby all the sheets of the pile are given an initial buckle, so that the mechanism for buckling one sheet at a time may operate more readily and with greater reliability.

Another feature of the invention resides in the provision of means whereby the extent of the sheet which will be buckled may be determined and whereby these determining devices may be adjusted to vary the area of the sheet which will be subjected to the buckling, this construction being of particular utility in adapting the machine for use with paper of varying weights.

Another feature of the invention resides in the provision of means for guarding against the feeding of two or more sheets at a time, this being such that if the buckling devices buckle more than one sheet, the second sheet will be held against withdrawal from the pile and will thereafter be caused to assume its initial position upon the pile.

The preferred embodiment of my invention is illustrated in the accompanying drawings in which—

Figure 1 is a plan view of the machine; Fig. 2 is a side elevation of the same; Fig. 3 is a vertical section on line 3—3 of Fig. 1, and Fig. 4 is a similar section on line 4—4 of Fig. 1.

Referring to these drawings, the machine consists of a base 1 upon which are erected side-frames 2 and 3 between which most of the parts of the machine are mounted. A sheet-feeding roller 4 is mounted for rotation in bearings formed in the side-frames, this roller consisting preferably of sections of rubber corrugated in the direction of their length mounted upon a suitable supporting shaft.

Rotating in a bearing in the side-frame 2 is a shaft 5 upon the outer end of which is mounted an operating handle 6. On the inner end of shaft 5 is a gear 7 meshing with an idler gear 8, which meshes with a gear 9 mounted upon a shaft 10 which is rotatable in bearings formed in the side-frames. Gear 9 meshes with a gear 11 carried by a stub shaft on the side-frame 2, which gear meshes with a pinion 12 on the shaft 4. Thus by turning the handle 6 the sheet-feeding roller 4 will be continuously rotated, but it is to be understood that any other form of driving mechanism may be employed as desired.

Extending between the side-frames is a plate 13 from the forward edge of which depends a vertical wall 14. A vertically movable stop plate 15 is mounted upon the wall 14 so as to be movable thereon, and for this purpose is provided with screws 16 extending through vertical slots 17 in the wall 14. A spring or springs 18 are arranged to act upon the movable stop plate 15 so as to raise that plate when such raising movement is permitted by the parts hereinafter described. The upper edge of plate 15 is provided with a forwardly extending lip or flange 19.

Extending between the side-frames and journaled in bearings therein is a rock shaft 20 and secured to each end of this shaft is an arm 21. The outer ends of these arms are pivotally connected to the vertically movable wall 15 near the lower edge of the latter. Also secured to shaft 20 adjacent to the side-frame 2 is an arm 22 the upper end of which carries a roller 23 which rides upon the periphery of the cam 24 secured upon shaft 10, so that as handle 6 is turned the stop plate 15 will be moved vertically in accordance with the contour of the cam 24.

The support for the sheet pile is shown at 25 and is provided with suitable side guides 26 and an end guide 27. This sup-

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port 25 is mounted upon a rocking frame consisting of a rod 28, a strip 29 secured thereon and means at the ends of rod 28 for pivotally mounting the rod upon the side frames of the machine. Adjacent to the side-frame 2 rod 28 is secured to a lever 30 pivotally mounted at 31 upon the side-frame 2. At the opposite side of machine the end of rod 28 is secured to an arm which is pivotally mounted upon the side-frame 3 upon the axis 31. The support 25 is provided with claws straddling the rod 28 and rests upon the ends of the strip 29 so that it is rocked when rod 28 is rocked. On lever 30 is a handle 32 projecting through a slot in the side-frame 2 whereby the support 25 may be manually rocked, as for instance, to depress the end thereof to facilitate positioning a new sheet pile. At its free end the lever 30 is connected by a pin and slot connection to one end of the bell-crank lever 32' pivotally mounted at 33 upon the side-frame 2 and having at its opposite end a roller 34 bearing upon the periphery of the cam 35 which is secured upon the shaft 10 adjacent to the cam 24. The pivot 31 for the lever 30 is extended through the side-frame 2 and forms a pivotal support for an arm 36 which is connected to one end of the spiral spring 37 the opposite end of which is connected to an abutment on the base of the machine. The lever 30 is provided with an angular extension 38 (Figs. 1 and 2), in which is an opening to receive a screw 39, the end of which is secured to the arm 36. On the screw 39 is a thumb nut 40. Thus by turning the thumb nut 40 the arm 36 may be moved toward or away from the extension 38 extending or contracting the spring 37, so that the tension of the spring upon the carriage or paper support 25 will be adjusted so as to increase or diminish the tension tending to raise the edge of the support 25 underlying the feeding roller 4.

The ends of the shaft 10 are extended through their bearings in the side-frames 2 and 3 and have cams 41 secured thereto. With each of these cams co-acts a roller 42 carried by a bell-crank lever 43 pivotally mounted upon the side frame of the machine. The opposite ends of these bell-cranks are slotted to receive trunnions 44 upon a presser-plate 45 which normally rests upon the top of the sheet pile to cause the sheets to lie flat thereon. The trunnions 44 are formed upon arms 46 extending forwardly from the plate 45 at opposite sides of the pile of sheets. These arms 46 have integral upwardly extending flanges 47; the flange on one of these arms is provided with a series of openings 50 and the flange on the other arm is provided with a series of notches which are spaced to correspond with the openings 50, and a rod 49 is adapted to

extend between the arms 46 and to have one end thereof received in one of the openings 50 and the other end in one of the notches 48. To retain this end of the rod in notch 48 a strip 51 is provided pivotally mounted upon arm 46 at 52 and adapted to extend over rod 49 and into co-action with a stud 53.

Mounted upon the upper surface of the feed board, or support 25, is a strip 54 the upper surface of which is arched as shown in Fig. 4. This strip extends entirely across the feed board, or support 25, as indicated in Fig. 1, and the pile of sheets overlies it.

Extending between the side frames of the machine is a rocking shaft 55, upon which are arms 56 supporting a roller 57 lying directly above the sheet feeding roller 4. At one end of shaft 55 is a downwardly extending arm 58 adapted to co-act with a cam 59 secured upon the shaft 10. A spring 60 holds arm 58 in contact with cam 59.

The operation of the machine as thus constructed will now be described.

By depressing the inner end of the feed board or support 25 by means of the handle 32 a pile of sheets may be mounted upon the feed board with the forward edge of the pile bearing against the stop plate 15. Releasing handle 32, spring 37 will rock the feed board until the top sheet of the pile is carried into engagement either with the lip or flange 19, or with the roller 4. The tension with which this edge of the sheet pile may be pressed upwardly thus can be adjusted as desired by turning nut 40. By reason of the presence of the strip 54 the pile of sheets will be given a slight initial buckle since near the edge of the pile the sheets will be pressed down upon the feed board by the flange 19 and roller 4, and upon the opposite side of strip 54 the sheets will be held down upon the feed board by the rod 49 and plate 45. By turning the handle 6 the roller 4 will be rotated in the direction of the arrow on Fig. 4 and the rubber of the roller will grip the top sheet of the pile and withdraw the edge of that sheet from under the lip 19, buckling the sheet in rear of roller 4, and between that roller and the rod 49 in the manner indicated in Fig. 3. This buckling operation is greatly facilitated by the strip 54 for the reason that the sheets are already given an initial buckle before being operated upon by the roller 4. The continued rotation of roller 4 moves the sheet until its edge passes from under the roller and is carried around with the roller until it passes over the upper surface of the roller and between it and the roller 57. These two rollers are then rotated to feed the sheet forward the desired distance whereupon the roller 57 is raised by cam 59 and the sheet is taken up by other mechanism not shown.

Just as the sheet begins to move between the rollers 4 and 37, the cams 41 act upon the bell-cranks 43 to raise the plate 45 and rod 49, so that these parts will not resist the forwarding movement of the sheet. By reference to Fig. 3 it will be noted that while the edge of the sheet is moving upwardly from the lower surface of roller 4 to the upper surface thereof, the roller is in contact with and is acting upon the second sheet of the pile, tending to buckle that sheet as it did the first one. This might lead to the feeding of two sheets together if means were not provided for preventing this. Such movement of the second sheet is precluded by flange 19 on the stop plate 15. After rotation of roller 4 sufficient to insure the requisite buckling of the top sheet, the cam 24 operates to lower plate 15 until the flange 19 comes down upon the sheet pile, gripping the forward edge of the second sheet of the pile and thus preventing that sheet from being further buckled by the rotation of roller 4. The edge of the second sheet is thus held, due to the downward pressure of the flange 19, and the upward pressure of the underlying edge of the feed board 25. During further rotation of the roller 4, cam 35 will operate through the bell-crank 32' to depress the forward edge of the support for the sheet pile against the tension of spring 37, so that the paper upon the support 25 will be carried out of engagement with roller 4. Flange 19, however, does not move downwardly with the underlying edge of the support 25 through the full movement of the support 25, due to the shape of the cams 35 and 24; as a result of this, after the sheet pile has been carried out of engagement with roller 4, the sheet whose edge is held by flange 19 is released, and if this sheet has been partially buckled, as indicated in Fig. 3, it will immediately drop to its initial position bearing at all points thereon upon the sheet underlying it. It will thus be seen that each operation of the machine consists in buckling the top sheet, partially buckling the second sheet, gripping the second sheet to prevent its withdrawal from the machine, feeding the top sheet from the pile, and after the pile has been moved out of contact with the roller, releasing the second sheet so as to allow it to flatten out and assume its initial position ready to be fed from the machine at the next operation thereof. The provision for adjustment of the position of the rod 49 aids materially in adapting the machine for use with paper differing in weight, for this rod 49 serves as a means for determining the extent of the sheet which will be buckled. It will be seen that the buckling of the top sheet takes place between the roller 4 and the rod 49. With very light paper, the area of the sheet which should be subjected to the buckling operation should

be small and rod 49 would therefore be placed close to the roller 4. For heavier paper the rod should be placed further back so that the curve of the buckled portion of the sheet would be of much greater radius. 70

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

1. The combination of a pivoted support for a sheet pile, a sheet-feeding roller overlying one end of the support and adapted to coact with the top sheet of the pile, means for rotating said roller on its axis to buckle the top sheet of the pile at one end thereof and carry said end over the roller, a forwarding roller coacting with the upper surface of said roller, means for rocking said support at regular intervals in the rotation of the sheet-feeding roller, a member extending across the top of the sheet pile and adapted to contact therewith to determine the extent of the buckle of the top sheet, means for adjusting the position of said member toward and away from the sheet-feeding roller, and means for moving said member to carry it into and out of contact with the top of the pile at regular intervals in the rotation of said sheet-feeding roller, substantially as set forth. 85

2. The combination of a pivoted support for a sheet-pile, means for giving an initial buckle to all the sheets of a pile on said support, a sheet-feeding roller, means for rocking said support to carry the top sheet of the pile into engagement with said roller, means for rotating said roller to buckle the top sheet of the pile and feed it from the support, a member bearing upon the sheet-pile to determine the extent of the sheet to be buckled by said roller, and means for supporting said member in various positions of adjustment toward and away from the roller, substantially as set forth. 105

3. The combination of a pivoted support for a sheet-pile, means for rocking the same, means for giving an initial buckle to all the sheets of a pile on said support, means for successively buckling the top sheet of the pile and feeding it from the support, a member bearing upon the top of the pile and determining the extent of the sheet to be buckled, means for supporting said member in various positions of adjustment, and means for raising said member each time a sheet is fed from the support, substantially as set forth. 115

4. The combination of a support for a sheet-pile, a sheet-feeding roller coacting with the top of the pile adjacent to one end thereof, means for turning said roller on its axis in contact with the top sheet of the pile to buckle it and feed it over the feeder, a movable holding device, means for moving the same into contact with the second sheet of the pile adjacent to said end while the 130

roller is operating on the top sheet to hold the second sheet from being buckled by the roller, and means for releasing the second sheet to allow it to flatten on the pile, substantially as set forth.

5. The combination of a support for a sheet-pile, a roller coacting with the top of the pile on said support adjacent to one edge of the pile, means for rotating the roller on its axis to buckle the top sheet of the pile adjacent to one edge thereof and feed said edge over the roller, means for gripping said edge and forwarding the sheet, a movable holding device, means for moving the same into contact with the second sheet of the pile adjacent to said edge while the roller is operating upon the top sheet to hold the second sheet from being buckled by the roller, and means for releasing the second sheet to allow it to flatten on the pile, substantially as set forth.

6. The combination of a pivoted support for a sheet-pile, a sheet-feeding roller coacting with one end of the pile on said support, means for rotating said roller on its axis to buckle a sheet and then feed its end over the roller, means for gripping said end of the sheet and forwarding the sheet, a stop member, means for moving the stop member into engagement with said end of the

sheet pile when the latter is in coaction with the roller to grip and hold the second sheet, and means for rocking said support to carry the pile thereon out of contact with the roller and said stop member, substantially as set forth.

7. The combination of a pivoted support for a sheet-pile, a sheet-feeding roller coacting with one end of the pile on said support, means for rotating said roller on its axis to buckle a sheet and then feed its end over the roller, means for gripping said end of the sheet and forwarding the sheet, a stop member, means for moving the stop member into engagement with said end of the sheet pile when the latter is in connection with the roller to grip and hold the second sheet, means for moving said stop member and said support together to carry the pile on the support out of contact with said roller, and means for moving said support independently of the stop member to carry the pile on the support out of contact with said stop member, substantially as set forth.

This specification signed and witnessed this 29th day of December, 1910.

ALBERT B. DICK.

Witnesses:

M. H. BURKART,
W. G. ARNOLD.

Corrections in Letters Patent No. 1,054,637.

It is hereby certified that in Letters Patent No. 1,054,637, granted February 25, 1913, upon the application of Albert B. Dick, of Lake Forest, Illinois, for an improvement in "Sheet-Feeding Apparatus," errors appear in the printed specification requiring correction as follows: Page 3, line 126, for the word "stop" read *top*; and page 4, line 46, for the word "connection" read *coaction*; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 1st day of April, A. D., 1913.

[SEAL.]

C. C. BILLINGS,

Acting Commissioner of Patents.

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7. The combination of a pivoted support for a sheet-pile, a sheet-feeding roller coacting with one end of the pile on said support, means for rotating said roller on its axis to buckle a sheet and then feed its end over the roller, means for gripping said end of the sheet and forwarding the sheet, a stop member, means for moving the stop member into engagement with said end of the sheet pile when the latter is in connection with the roller to grip and hold the second sheet, means for moving said stop member and said support together to carry the pile on the support out of contact with said roller, and means for moving said support independently of the stop member to carry the pile on the support out of contact with said stop member, substantially as set forth.

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