

A. B. DICK.  
SHEET SEPARATING APPARATUS.  
APPLICATION FILED JULY 6, 1905.

2 SHEETS-SHEET 1.

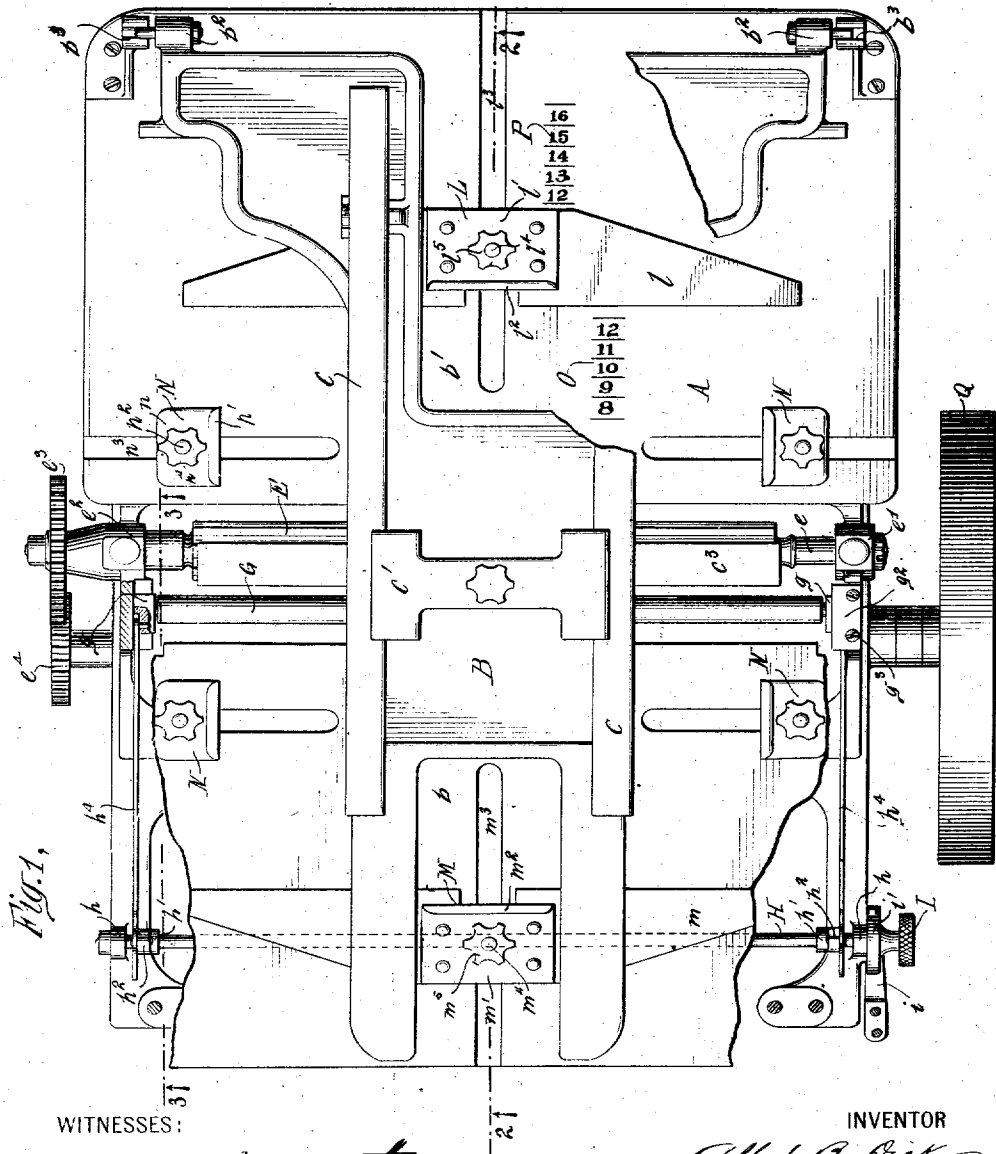


Fig. 1.

WITNESSES:  
*Otto G. Smith*  
*L. Nork*

INVENTOR  
*Albert B. Dick*  
BY  
*J. Edwards*  
ATTORNEY

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2 SHEETS—SHEET 2.

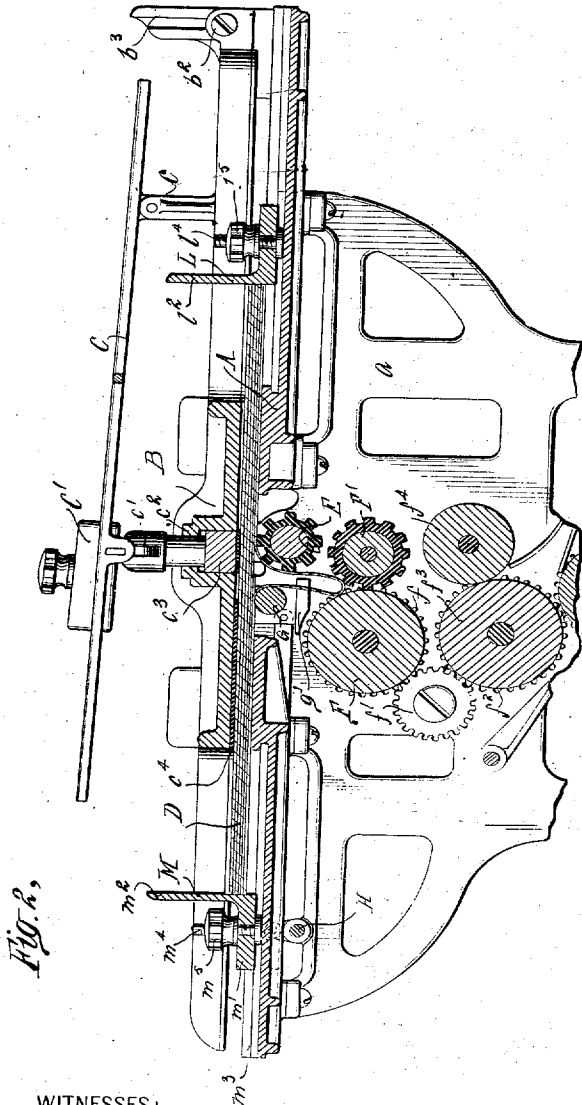


Fig. 2.

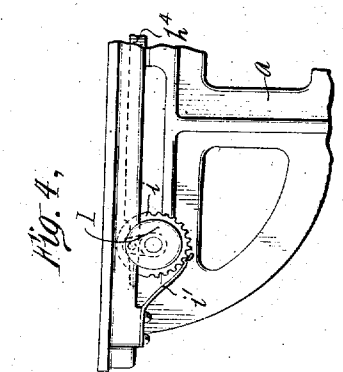


Fig. 4.

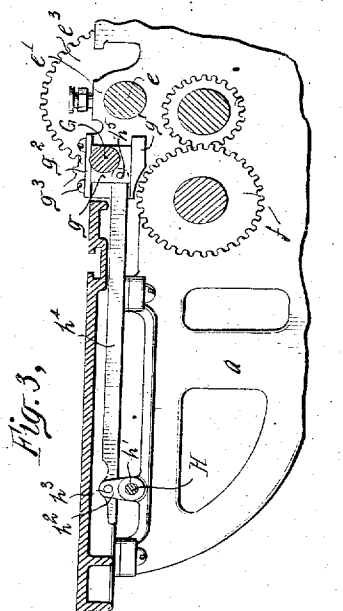


Fig. 3.

WITNESSES:

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# UNITED STATES PATENT OFFICE.

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

## SHEET-SEPARATING APPARATUS.

No. 823,936.

Specification of Letters Patent.

Patented June 19, 1906.

Application filed July 6, 1905. Serial No. 268,452.

*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 a certain new and useful Improvement in Sheet-Separating Apparatus, of which the following is a description.

The object of the present invention is to provide efficient and durable mechanism co-acting, preferably, with the under side of a sheet pile for successively separating sheets therefrom for subsequent treatment in folding, duplicating, or printing devices or the like.

A further object is to provide sheet-separating apparatus having maximum latitude with regard both to the character and size of the sheets to be operated upon.

In carrying out the invention I employ a suitable bed having an opening intermediate of its ends, in which operates a separator-roll coacting successively with the lowermost sheets of the pile and an idler-roll adjacent to such separator-roll, the sheets separated being passed between such idler and separator rolls. The separator-roll operates in a substantially fixed position, while the idler-roll is adjustable relatively thereto, so as to increase or diminish the space between the periphery thereof and that of said separator-roll, thereby making it possible to reliably feed sheets of paper or other material of widely-different character or quality. Said bed is provided with means such as a suitable scale or graduation and coacting therewith a finder-gage movable relatively to such means in order to enable the sheet pile to be properly positioned upon said bed. Coacting with said sheet pile and with said finder-gage are an end guide and side guides movable into proximity to the edges of the sheet pile, so as to firmly hold the same and conduce to reliable separating of the sheets from the under side of said pile. By varying the arrangement of the sheet pile upon said bed the sheets are separated therefrom by buckling the same intermediate of their ends and at any desired point. When, therefore, the separating apparatus is used in conjunction with folding mechanism, the sheets may be separated from the under side of the pile in such manner as to be subsequently folded into thirds or first folded in half and then into quarters.

Further objects and advantages of the invention will be made apparent during the description of the mechanism.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of sheet-separating apparatus employing my invention, certain parts being broken away. Fig. 2 is a central vertical section, certain parts being shown in full lines. Fig. 3 is a sectional view taken at about the line 3 3, Fig. 1, and Fig. 4 is a detail view illustrating a portion of the idler-roll-adjusting mechanism.

Referring to the drawings, in which similar letters denote corresponding parts, A designates the bed, adapted to receive the sheet pile, said bed being suitably supported—as, for instance, by means of side frames *a*, which may, if desired, form part of the mechanism in connection with which the separating apparatus is employed—as, for instance, that of a folding-machine. Overlying said bed is a pressure device, comprising a casting B, having openings *b b'* therein, said casting being pivoted at its rearward end *b<sup>2</sup>* in upwardly-projecting ears *b<sup>3</sup>*, secured to the bed A. Overlying said casting are ways C C, pivoted at *c* upon ears extending upwardly from said casting, said ways resting also upon a yoke carried by the vertically-movable pin *c'*, projecting through a rib *c<sup>2</sup>*, formed upon said casting and secured to a pressure-bar *c<sup>3</sup>*, arranged directly over the separator-roll, presently to be described. On said ways C operates an adjustable (sliding) weight C'. The under surface of the casting B is preferably provided with a facing *c<sup>4</sup>*, of rubber or other suitable elastic material. The said pressure device may be swung upon the pivotal points *b<sup>2</sup>* in order to place the sheet pile D in position on the bed A.

As shown most clearly in Fig. 2, the bed A is provided at a point intermediate of its ends with an opening, and in this opening operate the separator-roll E and idler-roll G. Said separator-roll is provided with a fluted or corrugated periphery, preferably of rubber, and both ends of its shaft *e* are mounted in the frame of the apparatus—as, for instance, in the side members *a*, as shown at *e' e<sup>2</sup>*. The shaft *e* of said separator-roll is also preferably provided with a pinion *e<sup>3</sup>*, which meshes with a pinion *e<sup>4</sup>* on the shaft of a feed-roll F,

which shaft is also provided with a pinion  $f$ , meshing with a corresponding pinion on the shaft of another feed-roll  $F'$ , the surface whereof is preferably fluted or corrugated and of rubber or other suitable elastic material. Where the separator apparatus is employed in connection with a folding-machine, as indicated in Fig. 2 of the drawings, the pinion  $f$  may mesh with an idler-pinion  $f''$ , which in turn meshes with a pinion  $f^2$  on the shaft of a folding-roll  $f^3$ , and the pinion  $f^2$  may mesh with a corresponding pinion on the shaft of a coating folding-roll  $f^4$ , so that the path of movement of a sheet separated from the pile shall be from said separator-roll E, between the feed-rolls  $F$   $F'$ , and thence between the folding-rolls  $f^3$   $f^4$ .

The idler-roll G, arranged parallel with the separator-roll E, is here shown as journaled at each end in bearing-blocks  $g$   $g$ , these blocks being movably supported in any suitable manner—as, for instance, upon shelves  $g'$ , projecting inwardly from the internal faces of the members  $a$  of the frame and held in position upon such shelves by straps  $g^2$ , here shown as secured by screws  $g^3$  to the upper edge of said side members  $a$ .

H designates a shaft, here shown as journaled adjacent to each end in ears  $h$ , which may be formed integral with the side members  $a$  of the frame. Adjacent to each end said shaft is provided with a collar  $h'$  and crank  $h^2$ , and pivotally secured to each of said cranks, as at  $h^3$ , is one end of a connecting-arm  $h^4$ , the other end whereof is pivoted, as at  $h^5$ , to one of the bearing-blocks  $g$ , in which the idler-roll G is journaled. Said shaft H is provided with actuating means, and such means are here shown as comprising a knurled disk I, secured to or formed integral with another disk  $i$ , having a milled or serrated periphery, with which coacts one end of a spring  $i'$ , the other end whereof is secured to the machine-frame. As will readily be understood, the revolvable movement of the disk I and the consequent movement of the shaft H, the cranks  $h^2$ , the connecting-arms  $h^4$ , the blocks  $g$ , and idler-roll G is effected by overcoming the stress of the spring  $i'$  and its coaction with the milled or toothed periphery of the disk  $i$ , thereby making delicate adjustment of said idler-roll possible and guarding against throwing the same out of predetermined position by the jar of the machine.

The utility of the adjustable feature of the idler-roll G relatively to the separator-roll E resides chiefly in the adaptability of the machine for use with sheets of widely-varying quality or character. Where paper of substantial weight and stiffness is being separated, it is possible to maintain the two rolls in question a substantial distance apart, the stiffness of the paper being sufficient to carry the bight or fold thereof downward under the

action of the roll E until gripped by the feed-rolls  $F$   $F'$ . Where, however, a very much thinner material is to be separated or material which has been previously dampened, the best results can only be obtained by moving the idler-roll into closer relation to the separator-roll E.

Turning now to the bed A of the apparatus, the surface of this is preferably fluted or provided with longitudinal depressions in order to assure intimate contact of the under side of the sheet pile therewith. Such fluting or corrugating, however, being known in the art, is not illustrated in the drawings. Said bed is provided with two end guides or gages L M (the former of which I term for convenience the "finder-gage") and two side guides N on either side of the space to be occupied by the sheet pile. The guides N may be substantially the same in construction, each comprising two members  $n$   $n'$  at right angles, the member  $n'$  being perpendicular to the bed A and the member  $n$  being perforated to receive a bolt  $n^2$ , the head whereof operates in a lateral slot  $n^3$  in the bed A, an adjusting-nut  $n^4$  being employed to bind the guide at any position to which the same has been moved throughout the length of its lateral slot  $n^3$ . The guides or gages L M may also be substantially the same in construction, each comprising the flat plate  $l$   $m$ , secured to the horizontal member  $l'$   $m'$ , which has perpendicular extension  $l^2$   $m^2$ . Said guides or gages L M overlie longitudinal slots  $l^3$   $m^3$ , in which operate the heads of adjusting-bolts  $l^4$   $m^4$ , the guides being locked in position by means of nuts  $l^5$   $m^5$ .

The guide or gage L is termed the "finder-gage" for the reason that it coacts with a suitable scale or graduation on the upper surface of the bed A, indicating the point to which the same is to be moved for coaction with a sheet pile of certain longitudinal dimensions. In the present instance I have shown such scale or graduation as comprising two series of figures O P, the scale O being graduated from "8" to "12," inclusive, and the scale P being graduated from "12" to "16," inclusive, thereby giving the machine the capacity of handling sheets from eight to sixteen inches in length.

The operation of the machine can perhaps best be explained in connection with a description of the separating of sheets of, say, ten inches in length and then of sheets of, say, fourteen inches in length. In either case the finder-gage L is moved so that the inner edge of the plate  $l$  thereof shall lie at the proper graduation of the scale. Thus for separating paper approximately ten inches in length said finder-gage will be moved to the indication for that length on the scale O. The sheet pile may then be laid on the bed, one edge being against the perpendicular member  $l^2$  of said finder-gage, 130

the guide or gage M being then moved up into contact with the other edge of said pile. The side guides N may then be moved into contact with the side edges of said pile and the pressure device thrown upon its hinges

5 to operative position, in which it is shown in Figs. 1 and 2. If now power be applied, (in any suitable manner—as, for instance, by a belt-wheel Q,) the rotation of the separator-  
10 roll E in the direction of the arrow adjacent to said roll in Fig. 2 will tend to press the lowermost sheet of the pile backward against the guide or gage M. Since, however, such movement is precluded, it will cause said  
15 sheet to buckle and pass downward between said separator-roll and the idler-roll G until the same is grasped between the feed-rolls F F', which, operating simultaneously with the separator-roll E, carry said sheet farther  
20 downward, the buckle or fold therein in advance, until such sheet is grasped by the apparatus by which it is to be further acted upon. For instance, where such apparatus  
25 comprises folding mechanism the sheet may be fed forward between two rolls, such as the rolls  $f^3 f^4$ , and thence to the folding device. In this operation the buckle or fold illustrated in Fig. 2 is located at about one-third  
30 of the distance from the finder-gage L to the guide or gage M, and the sheet is separated and fed from the under side of the pile in two parallel portions, one portion comprising a  
35 third of the sheet and the other portion comprising the remaining two-thirds. If, now, it be desired to separate sheets of greater  
40 size—as, for instance, of fourteen inches in length—the operation just described is repeated, save that the finder-gage is moved so as to indicate the graduation corresponding to said length "14," whereupon the separator-roll E will buckle or fold the lowermost  
45 sheet at substantially its center, and this central fold will be passed downward between said separator-roll E and the idler-roll G until grasped by the feed-rolls F F' and passed therefrom to other apparatus—such, for instance, as the rolls  $f^3 f^4$ . In so far, therefore, as this invention relates to separating  
50 mechanism only the essential difference in the separation of sheets of one length and sheets of a substantially greater length concerns the point at which the same are buckled or folded preliminarily to withdrawal from the under side of the pile. It may also  
55 be here repeated that prior to the separating operation the idler-roll G is adjusted relatively to the separator-roll E in manner above described in order to assure reliable separation.

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

1. In sheet-separating apparatus, the combination of a support for a sheet pile, a mov-

able separator and a part parallel thereto co-  
65 acting with a pile of sheets on said support intermediate the edges of said sheets, means for operating said separator to buckle the  
70 sheets successively between it and said part and pass said sheets in buckled form between them, and means for adjusting said part relatively to said separator, substantially as set forth.

2. In sheet-separating apparatus, the combination of a support for a sheet pile, a rota-  
75 ble separator and a pivoted roller mounted in an opening in said support and coacting with the under side of a pile on said support intermediate of the edges thereof, means for  
80 operating said separator to buckle the sheets successively between it and said roller and pass said sheets in buckled form between them, and means for adjusting said roller relatively to said separator, substantially as set forth.

3. In sheet-separating apparatus, the combination of a support for a sheet pile, a rota-  
85 ble separator and an idler-roll mounted in an opening in said support and coacting with the under side of a sheet pile on said support intermediate of the edges thereof, means for  
90 operating said separator to buckle the sheets successively between it and said roll and pass said sheets in buckled form between them; movably-mounted bearings for said roll, an  
95 adjusting device, connections between the same and said bearings and means for operating said device, substantially as set forth.

4. In sheet-separating apparatus, the combination with means for supporting a sheet  
100 pile, and a separator-roll coacting with one side thereof, of an idler-roll parallel with said separator-roll and mounted in movable bearings, a shaft and means for rotating the same, and a connection between said shaft and the  
105 bearings of said idler-roll, substantially as set forth.

5. In sheet-separating apparatus, the combination with a bed having an opening inter-  
110 mediate of its ends and adapted to receive and support a sheet pile, of a pressure device overlying said bed and adapted to coact with said sheet pile, a separator-roll and an idler-roll operating in the opening in said bed and  
115 coacting with the under side of said sheet pile to pass a sheet downwardly therefrom between said separator-roll and said idler-roll, movable supports for said idler-roll, a shaft-support adjacent to said bed and having means for operating the same, cranks  
120 mounted upon said shaft, and connecting-arms intermediate of said cranks and said movable supports, substantially as set forth.

6. In sheet-separating apparatus, the combination of a support for a sheet pile having  
125 slots therein and graduations adjacent to said slots, gages movable in said slots, means for securing said gages in any adjusted posi-

tion, a rotatable separator and a pivoted roller mounted in an opening in said support and coacting with the under side of a pile on said support intermediate of the edges thereof, means for operating said separator to buckle the sheets successively between it and said roller and pass said sheets in buckled form between them, and means for adjusting

said roller relatively to said separator, substantially as set forth.

This specification signed and witnessed this 29th day of June, 1905.

ALBERT B. DICK.

Witnesses:

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

Correction in Letters Patent No. 823,936.

It is hereby certified that in Letters Patent No. 823,936, granted June 19, 1906, upon the application of Albert B. Dick, of Lake Forest, Illinois, for an improvement in "Sheet-Separating Apparatus," an error occurs in the printed specification requiring correction, as follows: In line 119, page 3, the compound word "shaft-support" should read *shaft supported*; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 10th day of July, A. D., 1906.

[SEAL.]

E. B. MOORE,

*Acting Commissioner of Patents.*

tion, a rotatable separator and a pivoted roller mounted in an opening in said support and coacting with the under side of a pile on said support intermediate of the edges thereof, means for operating said separator to buckle the sheets successively between it and said roller and pass said sheets in buckled form between them, and means for adjusting

said roller relatively to said separator, substantially as set forth.

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