

Jan. 12, 1965

J. H. SABASTEANSKI

3,165,209

SHEET SORTING TABLE

Filed Oct. 5, 1960

2 Sheets-Sheet 1

Fig. 1.

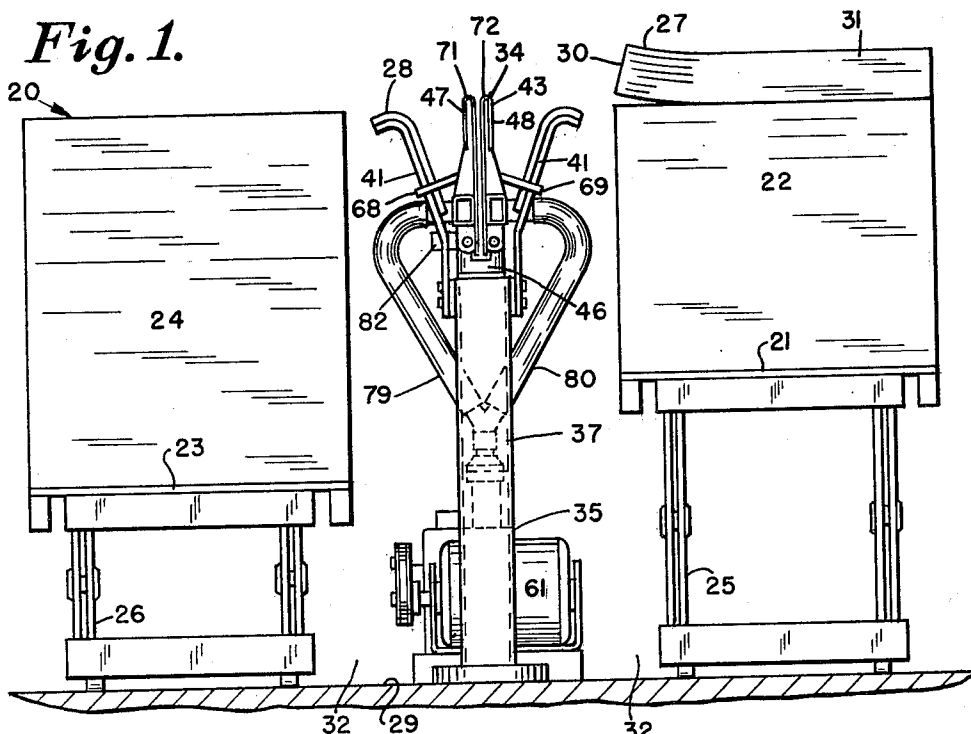
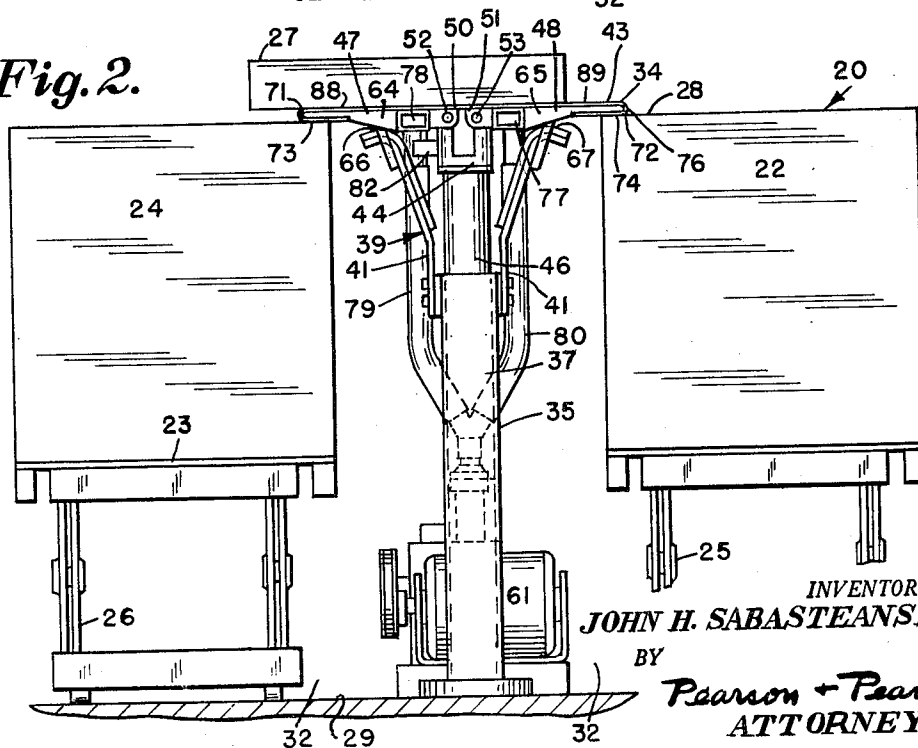


Fig. 2.



INVENTOR.

JOHN H. SABASTEANSKI

BY

Pearson + Pearson
ATTORNEYS

3,165,209

SHEET SORTING TABLE

Filed Oct. 5, 1960

2 Sheets-Sheet 2

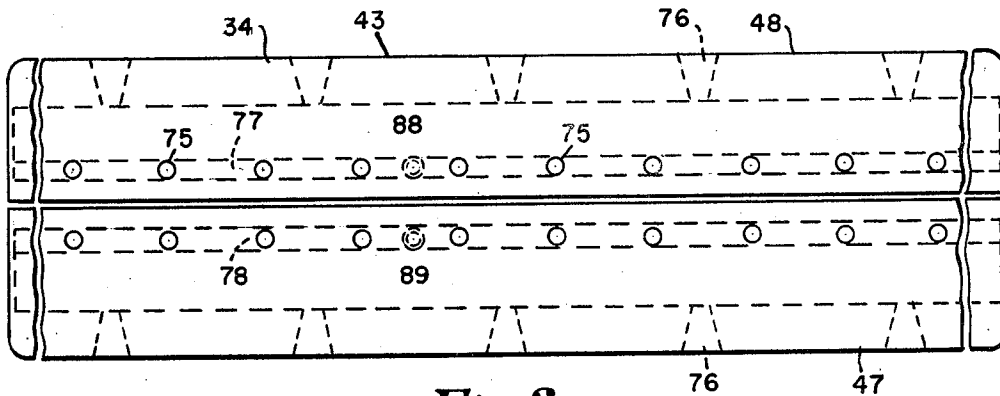


Fig. 3.

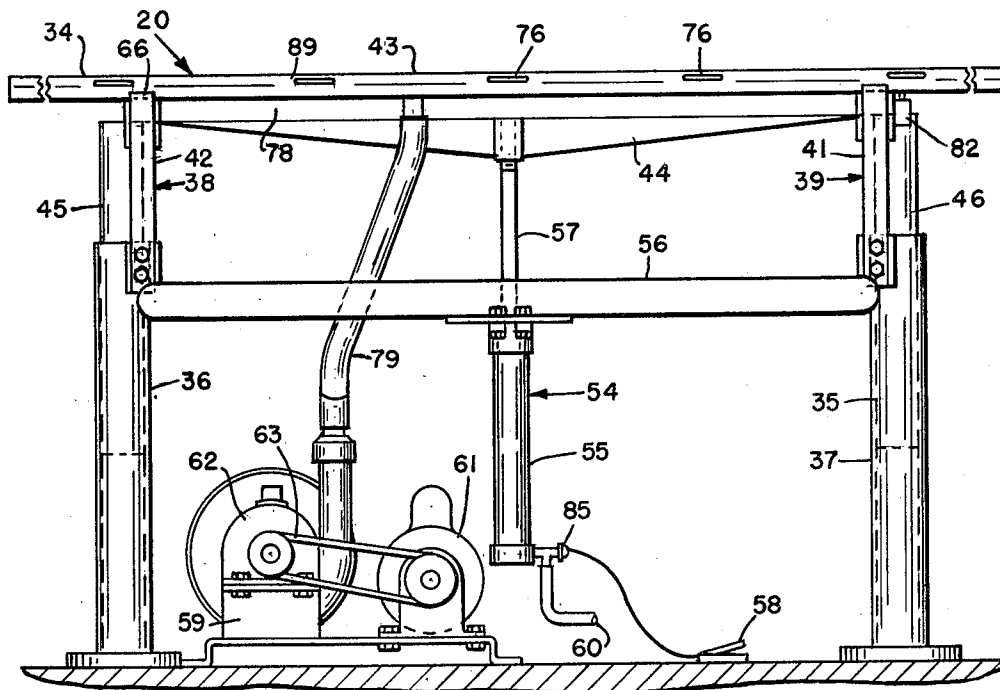


Fig. 4.

INVENTOR.
JOHN H. SABASTEANSKI
BY
Pearson + Pearson
ATTORNEYS

1

3,165,209

SHEET SORTING TABLE

John H. Sabasteanski, Portland, Maine, assignor to Southworth Machine Company, Portland, Maine, a corporation of Maine

Filed Oct. 5, 1960, Ser. No. 60,596

9 Claims. (Cl. 214-6)

This invention relates to an improved sorting apparatus for use in the sorting of sheets of paper or the like.

In paper mills, especially those which manufacture the higher grades of paper, it is usually the custom to hand sort each sheet to eliminate any defective sheets. The sheets may be of large area and the inspection process is difficult, time consuming and tedious. The unsorted sheets may be in a low stack on a table, or in a higher stack on a floor pallet, with the upper portion at a sorting level convenient for the operator. It is customary for the operator to lift the sheets individually by the various corners, which involves moving around the sheets, until a group of sheets have passed inspection. It is then necessary to move the inspected group, or pile, over onto the top of a stack of sorted sheets without, of course, disturbing the integrity of the pile or damaging the sheets.

In this invention the sorting apparatus includes a pair of spaced apart lift tables with a novel sorting table therebetween. The unsorted stack of sheets on one lift table can be progressively raised while the sorted stack on the other lift table can be progressively lowered as each successive pile of inspected sheets is slid across the sorting table from one stack to the other. The sorting table of the invention is provided with a foldable table top which retracts downwardly, to a level below sorting level, into the centre of the space between the stacks in which position it does not interfere with the movements of the operator in inspecting the sheets. When the foldable table top is raised to a horizontal, space bridging, position it exerts a downward clamping pressure on both of the stacks to preserve their integrity at the same time that it creates a cushion of air upon which the inspected pile is floated from one stack to the other.

The principal object of the invention is, therefore, to provide improved sorting apparatus whereby an operator can move freely between a pair of stacks for inspection of sheets and easily translate an entire pile of sheets from one stack to the other after inspection thereof.

Another object of the invention is to provide a pair of foldable leaves on a sorting table arranged to exert downward clamping pressure on a pair of adjacent stacks and arranged to release the clamping pressure by an upward movement away from the stacks.

A further object of the invention is to provide a foldable table top, on a sorting table, formed by a pair of pivoted leaves, each having pile floating air holes in the upper face and air nozzles in the outer edge for directing air streams under a pile of sheets being moved from one stack across the table to another stack.

Still another object of the invention is to provide a simple, rugged, sorting table having a self contained air pressure generator and folding, clamping and cushioning mechanism operated by air pressure whereby the table can be used in portions of a paper mill remote from air supply lines.

Other objects and advantages of the invention will be apparent from the claims, the description of the drawings and from the drawings in which

FIG. 1 is an end elevation of the sheet sorting apparatus of the invention with the sorting table in retracted position during sorting.

FIG. 2 is a view similar to FIG. 1 showing the table top unfolded to bridge the space between, and clamping,

2

the stacks while a sorted pile is floated from one stack to the other.

FIG. 3 is an enlarged plan view of the sorting table, and

FIG. 4 is a side elevation of the table shown in FIG. 3.

As shown in FIGURES 1 and 2 the sheet sorting apparatus 20 includes the first platform, or pallet, 21 for supporting a stack 22 of unsorted sheets, the second platform, or pallet 23 for supporting a stack 24 of sorted sheets and the power lift mechanism 25 and 26. The power lift mechanism 25 and 26 may be built into the floor in the form of hydraulic lifts, such as are often used in paper mills, or preferably are portable lift tables, such as are well known and commercially available from the Southworth Machine Company, of Portland, Maine. The sheets of paper, or the like, 27 in the unsorted stack 22 may be four by eight feet in area and the stack 22 may be four or five feet in height so long as a standing operator can see the top sheets of the stack for inspection purposes. A predetermined sorting level designated 28 may thus be established at about five feet above the level of the floor 29 or at such other level as may be desired by an operator. A corner 30 of a pile of sheets 31, is illustrated as upturned to signify that one or more operators have moved around the unsorted stack 22, including the space 32 between stacks 22 and 24, completed the inspection of each sheet in the pile and that the pile is ready for removal to the top of the sorted stack 24.

The sheet sorting apparatus 20 includes the sheet sorting table 34, which is narrow and elongated, and upstanding and positioned within the space 32 between stacks 22 and 24. The narrow, elongated, upstanding base 35, of table 34, preferably extends along the longitudinal centre line of the space 32 and is preferably less than one third the width of the space 32 in order to leave ample room for an operator to pass between the base and the stacks for inspecting sheets.

The base 35 as best shown in FIGURES 2 and 4 is a skeletonized tubular frame having hollow vertical posts 36 and 37 at each opposite end thereof. Two pairs, 38 and 39 of fulcrum elements are fixed to the base, each pair at an opposite end and each element 41 and 42 of each pair reaching up to proximate the sorting level 28 on one of the opposite sides of the base for a purpose to be explained hereinafter.

The table 34 is provided with a foldable table top 43, top 43 being at the sorting level 28 when in the horizontal position of FIG. 2, but foldable to a position below sorting level 28, as shown in FIG. 1, when inspection of the sheets 27 is being conducted. Preferably table top 43 is formed by an elongated, central member 44, extending along the longitudinal center line with a vertical guide 45 and 46 depending from each opposite end. Each guide 45 and 46 is telescopably slidable within one of the vertical posts 36 or 37 of the base 35 whereby the member 44 may be moved up and down relative to the base. The table top 43 also includes a pair of identical elongated leaves 47 and 48 each pivotally connected along its inner longitudinal edge 50 or 51 to the central member 44 as at 52 and 53.

Table top actuating means 54 is arranged to fold the leaves 47 and 48 between the horizontal position at sorting level, shown in FIG. 2 to the vertical position, below sorting level, shown in FIG. 1. Actuating means 54 is preferably a fluid pressure cylinder 55 depending from the central portion of the cross piece 56 of base 35 and a piston rod 57, connected to the central portion of member 44 so that fluid pressure in the cylinder moves the member 44 up and down vertically as desired. Preferably the fluid used is air, controlled by a suitable foot pedal 58 and supplied by the mill air pressure line 60, or by an air pressure generator not shown, but similar to

the generator 59, located within the base 35. Generator 59 may be of any well known type including an electric motor 61, centrifugal compressor 62 and drive belt 63 for applying relatively low pressure at relatively large volume such as eighty c.f.m.

It should be noted that the longitudinally extending, central portion 64 and 65 of each leaf 47 or 48 is supported by, but not secured to, the curved terminal tips such as 66 and 67 of the fixed fulcrum elements 41 and 42 at each end of the table. In addition each leaf includes the downwardly depending links such as 68 and 69, each of which encircles one of the fulcrum elements 41 or 42 and forms a movable fulcrum. Thus when the piston rod 57 is lowered, to thereby lower the inner longitudinal edge portions 50 and 51 of leaves 47 and 48, the fulcrumage of the tips 66 and 67 correspondingly raises the outer longitudinal edge portions 71 and 72 of the leaves away from the stacks 22 and 24. The outer longitudinal edge portions 71 and 72 may thus have their undersurfaces 73 and 74 resting on the adjacent edge of stacks 22 and 24 and yet be removed therefrom without damaging the sheets. Further lowering of rod 57, retracts at least the major portion of, and preferably all of, the leaves 47 and 48 downwardly below sorting level and into the leaf receiving space within the confines of base 35, between the fulcrum elements 41 and 42.

After the leaves 47 and 48 have been folded toward each other, with the central member 44 descending as the outer edge portions 71 and 72 are ascending, the fulcrum elements 38 and 39 guide the leaves toward each other and the entire table top 43 assumes the folded position of FIG. 1 where it is out of the way of the sheet inspector.

One of the principal advantages of the invention is the clamping of the stacks 22 and 24 by the leaves 47 and 48 during bodily translation of a pile 31 of sorted sheets from stack 22 to stack 24. When the piston rod 57 raises the central member 44 preparatory to a pile transfer, the links 68 and 69 slide as movable fulcrums along the fixed fulcrum elements 38 and 39 to assure that the leaves 47 and 48 move outwardly but do not touch the adjacent upper corners of the stack. The operator lifts the sorted pile 31, as indicated in FIG. 1, to permit the outer longitudinal edge 72 of leaf 48 to enter the gap under the pile 31. The fulcrumage of the links 68 and 69 causes the leaves 47 and 48 to assume a horizontal position as shown in FIG. 2 and further upward pressure by rod 57 causes the outer longitudinal edges 71 and 82 to press downwardly on the stacks with a clamping engagement thereby preventing the sheets in the stack from shifting. The table top 43 is then in space bridging position to enable the pile 31 to be slid off the stack 22, across the upper faces 88 and 89 of the leaves 47 and 48 and onto the sorted stack 24.

Another special advantage of the sorting table 20 is the provision of a plurality of spaced air holes 75 on the entire upper faces 88 and 89 of the leaves 47 and 48 as well as the provision of spaced air nozzles 76 in the outer longitudinal edge portions 71 and 72 of the leaves. Each leaf 47 or 48 includes a longitudinally extending air conduit, or manifold, 77 or 78 directing air to the holes and nozzles, the manifolds 77 and 78 being connected by the flexible air tubes 79 and 80 to the air generator 59. The air holes 75 create a film, or cushion of air under the pile 31 as it is slid across the table top, thus enabling a single operator to accomplish the transfer of the pile. The nozzles 76, as well as the holes 75 continuously emit streams of air during transfer, the streams from the nozzles penetrating the stack 22 underneath the pile 31. The pile 31 thus is floated from the top of stack 22 on an air cushion, floated across the table top 43 by reason of the air holes 75 and is deposited on the stack 24 still on an air cushion supplied by the nozzles in leaf 47.

A limit switch 82 is actuated by the table top 43 as it approaches its final space-bridging position for starting compressor 62 to supply air to the holes 75 and nozzles 76 at a relatively low pressure such as one p.s.i. Limit switch 82 stops the compressor 62 when the leaves 47 and 48 commence retraction. The foot pedal 58 actuates an air valve 85 to feed air to the cylinder 55 for raising and lowering rod 57 all in a manner well understood in the art.

I claim:

1. A sheet sorting table, for supporting a pile of sheets during movement from one stack to another stack, said sorting table including a narrow, elongated base adapted to fit between a pair of adjacent stacks; an elongated, foldable, table top extending horizontally at a predetermined sorting level above said base when unfolded, said top having a central member extending along the longitudinal centre line thereof and a pair of identical, oppositely disposed leaves each hingedly connected along the inner longitudinal edge portion thereof to said member; table top actuating means connecting said central member with said base for moving said member vertically up and down and a pair of fixed fulcrum elements oppositely disposed on said base, each said element supporting the intermediate, longitudinally extending, portion of one of said leaves, when said table top is in said unfolded horizontal position, the fulcrumage of said elements lifting the outer longitudinal edge portions of said leaves when said central member is moved vertically down by said actuating means.

2. A sheet sorting table as specified in claim 1 wherein said base includes a pair of hollow, vertical posts at each opposite end thereof; said central member includes a pair of vertical guides at each opposite end thereof, each telescopic in one of said posts, and said actuating means comprises a fluid operated piston slidable in a cylinder.

3. A sheet sorting table as specified in claim 1 wherein each said leaf includes a plurality of spaced air holes in the upper face thereof, a plurality of air nozzles spaced along the outer longitudinal edge thereof and air conduit means directing air under pressure to said holes and nozzles simultaneously for floating a sorted pile from a stack and across said leaf.

4. A sheet sorting table as specified in claim 1 wherein said table includes a plurality of air nozzles spaced along the outer longitudinal edge of each leaf, an air pressure generator in said base and means, including flexible air tubing, for connecting said generator to the nozzles in each said leaf.

5. A sheet sorting table as specified in claim 1 plus movable fulcrum links on said leaves, each encircling and slidable on one of said fixed fulcrum elements, the fulcrumage of said links pressing the underface of the outer longitudinal edge portions of said leaves downwardly when said central member is moved vertically upwardly by said actuating means.

6. A sheet sorting table for use between adjacent stacks, said table having a table top formed of a pair of identical leaves pivotally connected proximate the longitudinal centre line thereof; power operated folding mechanism on said table for moving said leaves between a horizontal pile translation position and a vertical sheet sorting position, below said horizontal position; fulcrum means on said table for guiding the outer longitudinal edge portion of said leaves in a direction to exert downward clamping pressure on said stacks and self contained air pressure mechanism in said table for automatically directing air under pressure into said stacks when said table top is in said horizontal pile translation position for floating a pile of sheets off one said stack and onto the other said stack.

7. Sheet sorting apparatus for use in the space between a vertically movable stack of unsorted sheets and a

vertically movable stack of sorted sheets, said apparatus comprising:

- a narrow, elongated, base adapted to fit within said space;
- a substantially horizontal table top including a pair of narrow, elongated leaves, each having an inner edge portion proximate the longitudinal centre line of said base and each having a free outer edge portion overlying the adjacent edge of one of said stacks, said table top bridging the space between said stacks at predetermined sorting level;
- a pair of fulcrum elements, fixed to said base, each in an opposite side of the longitudinal centre line thereof and each adapted to support the longitudinally extending central portion of one of said leaves at said sorting level while free of fixed pivot connection thereto;
- power operated, table top actuating means, mounted within said base, said means being connected to the inner edge portion of each said leaf and adapted to move the same vertically for retracting said leaves inwardly and downwardly into the confines of said base;
- a plurality of air nozzles on each said leaf, spaced along the outer edge thereof, for directing air streams into said stacks,
- and means on said apparatus for supplying air under pressure to said nozzles.

8. Sheet sorting apparatus for use in the space between a vertically movable stack of unsorted sheets and a vertically movable stack of sorted sheets, said apparatus comprising:

- a narrow, elongated base adapted to fit within said space;
- a substantially horizontal table top including a pair of narrow, elongated leaves, each having an inner edge portion proximate the longitudinal centre line of said base and each having a free outer edge portion overlying the adjacent edge of one of said stacks, said table top bridging the space between said stacks at predetermined sorting level;
- a pair of fulcrum elements, fixed to said base, each in an opposite side of the longitudinal centre line thereof and each adapted to support the longitudinally extending central portion of one of said leaves at said sorting level while free of fixed pivot connection thereto;
- power operated, table top actuating means, mounted within said base, said means being connected to the inner edge portion of each said leaf and adapted to move the same vertically for retracting said leaves inwardly and downwardly into the confines of said base;
- and clamping means on said table for exerting downward pressure on each said stack when said table top is in horizontal position.

9. Sheet sorting apparatus for use in the space between a vertically movable stack of unsorted sheets and a vertically movable stack of sorted sheets, said apparatus comprising:

- a narrow, elongated, upstanding base adapted to fit within said space;
- a substantially horizontal table top including a pair of narrow, elongated leaves, each having an inner edge portion proximate the longitudinal centre line of said base and a free outer edge portion overlying the adjacent edge of one of said stacks, said table top bridging the space between said stacks at predetermined sorting level;
- a pair of fulcrum elements, fixed to said base, each on an opposite side of the longitudinal centre line thereof to define a leaf receiving space therebetween and each adapted to support the longitudinally extending central portion of one of said leaves at said sorting level while free of fixed pivot connection thereto;

power operated, table top, actuating means mounted within said base, said means including vertically movable piston rod mechanism operably connected to the inner edge portion of each said leaf, said mechanism being movable downwardly within said base to cause the fulcrumage of said elements to raise the outer edge portions of said leaves toward each other and to then retract said leaves further downwardly into said leaf receiving space until at least the major portion of said leaves are below said sorting level and housed within the confines of said upstanding base;

air pressure supply means operably connected to each said leaf for forming an air film thereon, and automatic control mechanism for actuating said means only when said leaves are in horizontal, space bridging, position at sorting level.

References Cited by the Examiner

UNITED STATES PATENTS

1,390,853	9/21	Worth.	
1,563,747	12/25	Hosmer	209—123
2,514,190	7/50	Schlichter et al.	214—1
2,645,539	7/53	Thompson	311—92
2,650,705	9/53	Randall	209—123
2,815,249	12/57	Curtenius.	
2,886,190	5/59	Buealieu.	
2,944,684	7/60	Dennis.	

FOREIGN PATENTS

146,598 12/03 Germany.

HUGO O. SCHULZ, *Primary Examiner.*

55 ERNEST A. FALLER, JR., MORRIS TEMIN,
Examiners.