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METHOD AND APPARATUS FOR USE IN SORTING PAPER

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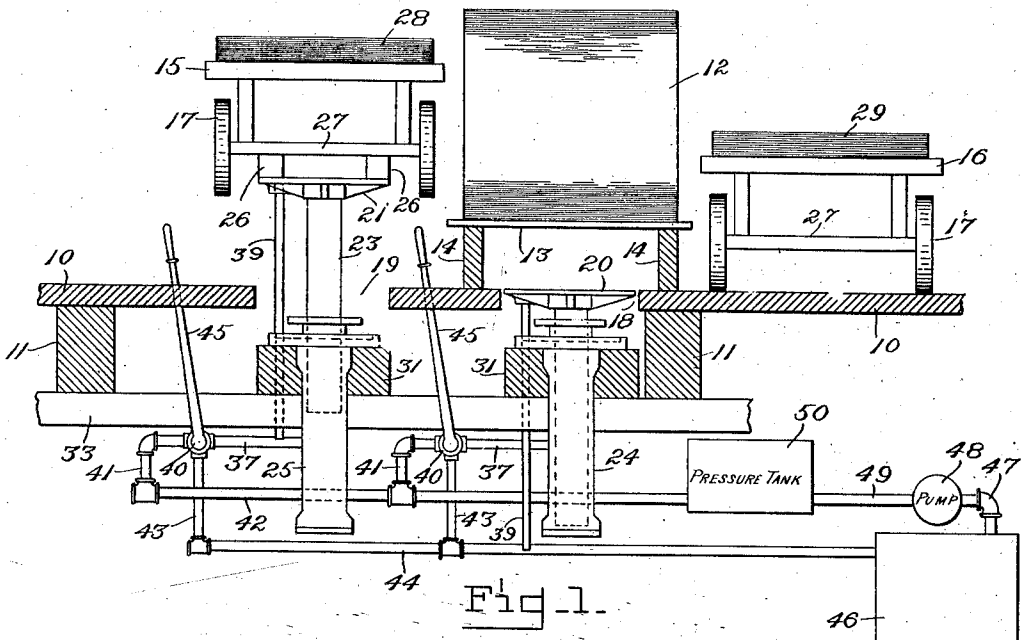


Fig. 1.

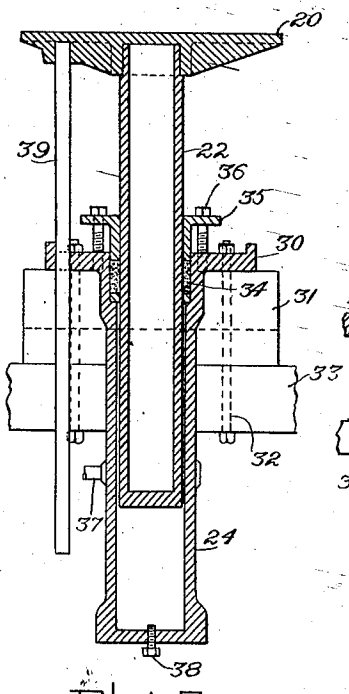


Fig. 3.

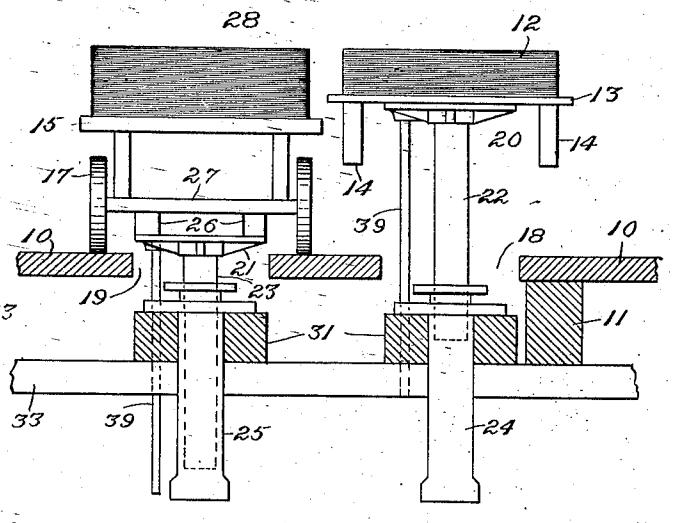


Fig. 2.

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UNITED STATES PATENT OFFICE.

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METHOD AND APPARATUS FOR USE IN SORTING PAPER.

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To all whom it may concern:

Be it known that I, GUY F. HOSMER, a citizen of the United States, residing at Rumford, county of Oxford, State of Maine, have invented a certain new and useful Improvement in Methods and Apparatus for Use in Sorting Paper, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to the inspection and sorting of sheets of paper and has for its general object to provide a method and apparatus whereby the sheets may be conveniently handled in such a manner that the operation in question can be carried on speedily and efficiently without danger of damage to the sheets.

In accordance with the practice heretofore followed, a stack of paper sheets to be inspected and sorted is supplied to the inspector upon a suitable platform on the opposite sides of which are placed suitable trucks to receive the accepted and rejected sheets respectively. The inspector, starting at the top of the stack of unsorted paper, lifts the sheets one by one, placing the perfect or accepted sheets upon the truck at one side of the stack and the imperfect or rejected sheets upon the truck at the opposite side. As the sheets are relatively large, it is desirable that they be moved from the stack of unsorted paper to the stack of accepted paper with minimum effort, and to this end it is necessary that the level of the top of the stack of unsorted paper be approximately the same as, or only slightly above that of the top of the stack of accepted paper. As the operation proceeds, the height of the stack of unsorted paper diminishes, while that of the stack of accepted paper increases, thereby varying the relative elevation of the tops of the two stacks. When this difference in elevation becomes considerable, there is difficulty in moving the sheets from one stack to the other without crushing, wrinkling, tearing, or otherwise damaging the paper. It has therefore been necessary to supply the stack of unsorted paper in relatively small quantities, which must be frequently replenished from time to time, thereby interrupting the sorting operation and reducing the output. Any attempt to increase the supply furnished at any one time beyond a certain point has resulted in considerable loss in damaged paper.

In accordance with the present invention the vertical positions of the support for the unsorted paper and of the truck for receiving the accepted paper are so controlled that the tops of the two stacks may be maintained at the desired relative elevations irrespective of the heights of the stacks, so that a stack of unsorted paper of substantially any height, within practical limits, may be supplied at once to the inspector, and the operation of sorting carried on smoothly, efficiently and without interruption, but without danger of damaging the sheets when moving them from the unsorted paper stack to the accepted paper stack. To this end, the invention consists in a method of and apparatus for varying the relative positions of the stacks of unsorted and accepted paper so as to maintain their tops at approximately the same elevation.

The foregoing and other objects of the invention will best be understood from the following description of the construction, arrangement, and operation of the apparatus illustrated in the accompanying drawings. It will be understood however that the particular constructions and operations described and shown have been chosen for illustrative purposes merely, and that the invention, as defined by the claims hereunto appended, may be otherwise embodied and practiced without departure from the spirit and scope thereof.

In said drawings:

Fig. 1 is a diagrammatic elevation, partly in vertical section, of an apparatus constructed and operating in accordance with the invention.

Fig. 2 is a similar view, showing the parts in different positions.

Fig. 3 is an enlarged vertical section of one of the hydraulic elevators.

At 10 is shown a suitable floor upon which the sorting is to take place, said floor being carried by suitable beams 11 and having thereon a support for the stack 12 of unsorted paper, said support comprising a platform 13 carried by uprights 14 normally resting on the floor. The trucks 15 and 16 for the accepted and rejected paper respectively are provided with wheels 17 upon which they may be moved over the floor

10 into and out of positions adjacent the platform or support 13, being preferably, when in operative position, located respectively at opposite sides of said support.

The floor 10 is formed with openings 18 and 19 located respectively immediately under the platform 13 and adjacent the same under the truck 15 which constitutes the support for the accepted paper. Operating through the openings 18 and 19 are the heads 20 and 21 of elevators in the form of hydraulic plungers operating in cylinders 24 and 25 respectively. The head 20 of the plunger 22 is adapted to engage the platform 13 and lift the same with its supporting uprights 14 from the floor 10. The head 21 of the plunger 23 is provided with blocks 26 to engage the axles 27 of the truck or support 15 for the stack 28 of accepted paper and lift said truck also from the floor 10.

The elevators 22, 24 and 23, 25 are substantially identical in construction, the former being shown in detail in Fig 3 and a description thereof being sufficient for both. The cylinder 24 is formed at its upper end with a flange 30 which, together with a spacing block 31, is secured by bolts 32 to a beam or stringer 33 supported by the floor beams 11. Said upper end of the cylinder 24 is enlarged to accommodate a stuffing box surrounding the plunger 22 and comprising a suitable packing 34 and a gland 35 secured to the flange 30 by cap screws 36. The plunger 22 is of an exterior diameter slightly less than the interior diameter of the cylinder 24 with which communicates a combined supply and exhaust pipe 37. In order to insure the necessary clearance between the lower end of the plunger 22 and the bottom of the cylinder 24, when said plunger is in its lowest position, as well as to provide for adjustably fixing said position with the head 20 flush with the floor 10, the end of the cylinder is preferably provided with an adjustable abutment screw 38 upon which said plunger rests when in the position in question. Should it become necessary, in installing the apparatus, to raise or lower the head 20 to make it level with the floor, this can be done by adjusting the screw 38. In order to steady and guide the vertical movements of the elevator, the head 20 is provided with a depending guide rod 39 which is received and guided in suitable aligned openings in the flange 30, block 31 and beam 33.

The combined supply and exhaust pipes 37 of the cylinders 24 and 25 are controlled by suitable valves 40 adapted to place said pipes in communication either with supply branches 41 leading from a supply header 42, or with exhaust branches 43 leading an exhaust header 44. The valves 40 are located below the floor 10 but are provided with operating handles 45 extended through said floor and operable above the latter. The exhaust header 44 leads to a supply tank 46 from which water, oil or other suitable liquid is drawn through a pipe 47 by a pump 48 and discharged through a pipe 49 into a pressure tank 50 with which the supply header 42 communicates. The tank 50 may be located at an elevation in order to maintain a suitable hydrostatic head in the supply header 42, or, preferably and as herein shown, is located below the floor 10 and comprises a closed chamber enclosing a certain amount of air which is put under pressure by the liquid forced into said tank through the pipe 49 by the pump 48, thereby maintaining the desired pressure in the supply header 42.

In use, a stack 12 of unsorted paper is placed upon the support or platform 13 whose uprights 14, as above stated, normally rest upon floor 10, as shown in Fig. 1. The stack 12 may be of any height within the limits for which the apparatus is designed. The valve 40 controlling the cylinder 25 is then operated by its handle 45 to admit pressure from the header 42 through the branch 41 to the pipe 37 to said cylinder, thereby causing the plunger 23 to rise, lifting the truck 15 from the floor until said truck is brought to an elevation sufficiently close to that of the top of the stack 12. The operator then proceeds to sort the paper of the stack 12, placing the accepted sheets in a stack 28 on the truck 15 and the rejected sheets in a stack 29 on the truck 15. As the stack 12 diminishes and the stack 28 at the same time increases, the valve 40 controlling the cylinder 25 may from time to time be operated by its handle 45 to lower the truck or support 15, so as to maintain the elevation of the tops of the stacks 12 and 28 substantially equal. This operation is continued until the plunger 23 has so far descended as to permit the wheels 17 of the truck 15 again to rest upon the floor 10, after which the relative elevations of the tops of the stacks 12 and 28 may be maintained by admitting pressure to the cylinder 24, causing the plunger 22 to lift the platform 13 from the floor to a progressively greater extent and support the same above the truck 15, as shown in Fig. 2.

Elevator mechanism similar to that employed for raising and lowering the truck 15 may, if desired, be employed for raising and lowering the truck 16, but as the latter truck receives the rejected paper, damage to which is immaterial, such mechanism is not essential and is preferably omitted.

Having thus described my invention, I claim:—

1. In an apparatus for use in sorting paper sheets, in combination, a support for

a stack of unsorted paper, supports for stacks of accepted and rejected paper disposed respectively adjacent said first named support, and mechanism for relatively moving said unsorted paper and accepted paper supports in a vertical direction.

2. In an apparatus for use in sorting paper sheets, in combination, a support for a stack of unsorted paper, supports for stacks of accepted and rejected paper disposed respectively adjacent said first named support, and elevators for raising and lowering said unsorted paper and accepted paper supports respectively.

3. In an apparatus for use in sorting paper sheets, in combination, a floor, a support on said floor for a stack of unsorted paper, trucks movable over said floor into and out of positions adjacent said support, and mechanism for lifting said support from said floor and holding the same in an elevated position.

4. In an apparatus for use in sorting paper sheets, in combination, a floor, a support on said floor for a stack of unsorted paper, trucks movable over said floor into and out of positions adjacent said support, and mechanism for lifting one of said trucks from said floor and holding the same in a position above said support.

5. In an apparatus for use in sorting paper sheets, in combination, a floor, a support on said floor for a stack of unsorted paper, trucks movable over said floor into and out of positions adjacent said support, and mechanism for lifting either said support or one of said trucks from said floor and holding the same in a position above the other.

6. In an apparatus for use in sorting paper sheets, in combination, a support for a stack of unsorted paper, supports for stacks of accepted and rejected paper disposed respectively adjacent said first named support, and hydraulic plungers for raising and lowering said unsorted paper and accepted paper supports respectively.

7. In an apparatus for use in sorting paper sheets, in combination, a floor, a support adjacent said floor for a stack of unsorted paper, trunks movable over said floor into and out of positions adjacent said support, and an elevator operating through said floor adjacent said support and adapted to engage and lift one of said trucks from said floor and hold the same in elevated position above said support.

8. In an apparatus for use in sorting paper sheets, in combination, a floor, a support adjacent said floor for a stack of unsorted paper, trucks movable over said floor into and out of positions adjacent said support, an elevator for raising and lowering said support, and an elevator operating through said floor adjacent said support and adapted to engage and lift one of said trucks from said floor and hold the same in elevated position above said support.

9. In an apparatus for use in sorting paper sheets, in combination, a floor, a support on said floor for a stack of unsorted paper, supports on said floor for stacks of accepted and rejected paper disposed respectively adjacent said first named support, hydraulic plungers for raising and lowering said unsorted paper and accepted paper and accepted paper supports respectively, valves located beneath said floor for controlling said plungers respectively, and means operable above said floor for operating said valves.

10. The herein described method of sorting paper sheets which consists in supplying the unsorted paper in a stack, transferring the accepted sheets successively from the top of said stack to the top of an adjacent stack, and relatively lowering the accepted paper stack and raising the unsorted paper stack as the operation progresses.

11. The herein described method of sorting paper sheets which consists in supplying the unsorted paper in a stack, transferring the accepted sheets successively from the top of said stack to the top of an adjacent stack, and progressively lowering the accepted paper stack and thereafter progressively raising the unsorted paper stack as the operation proceeds.

In testimony whereof I affix my signature.

GUY F. HOSMER.