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1,709,006

DIRECTION CHANGING MECHANISM FOR SHEET FEEDERS

Filed Sept. 21, 1927

2 Sheets-Sheet 1

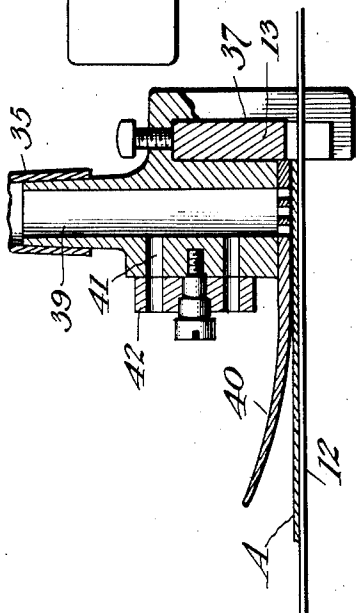
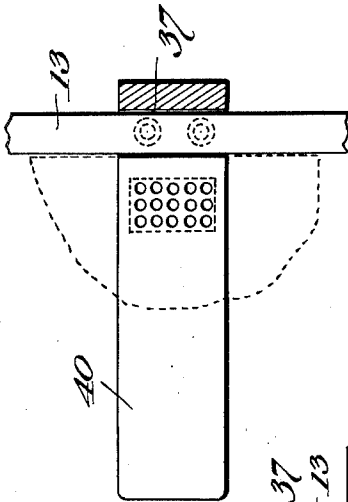
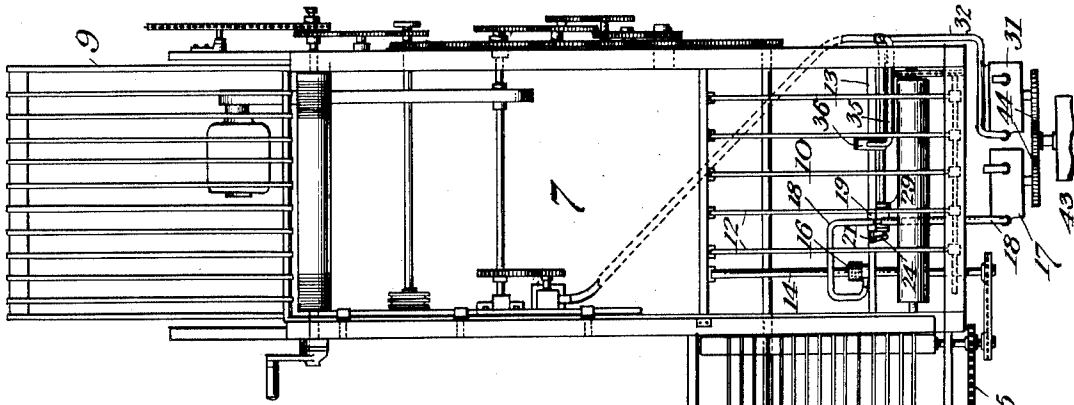


Fig. 5.

Fig. 6.

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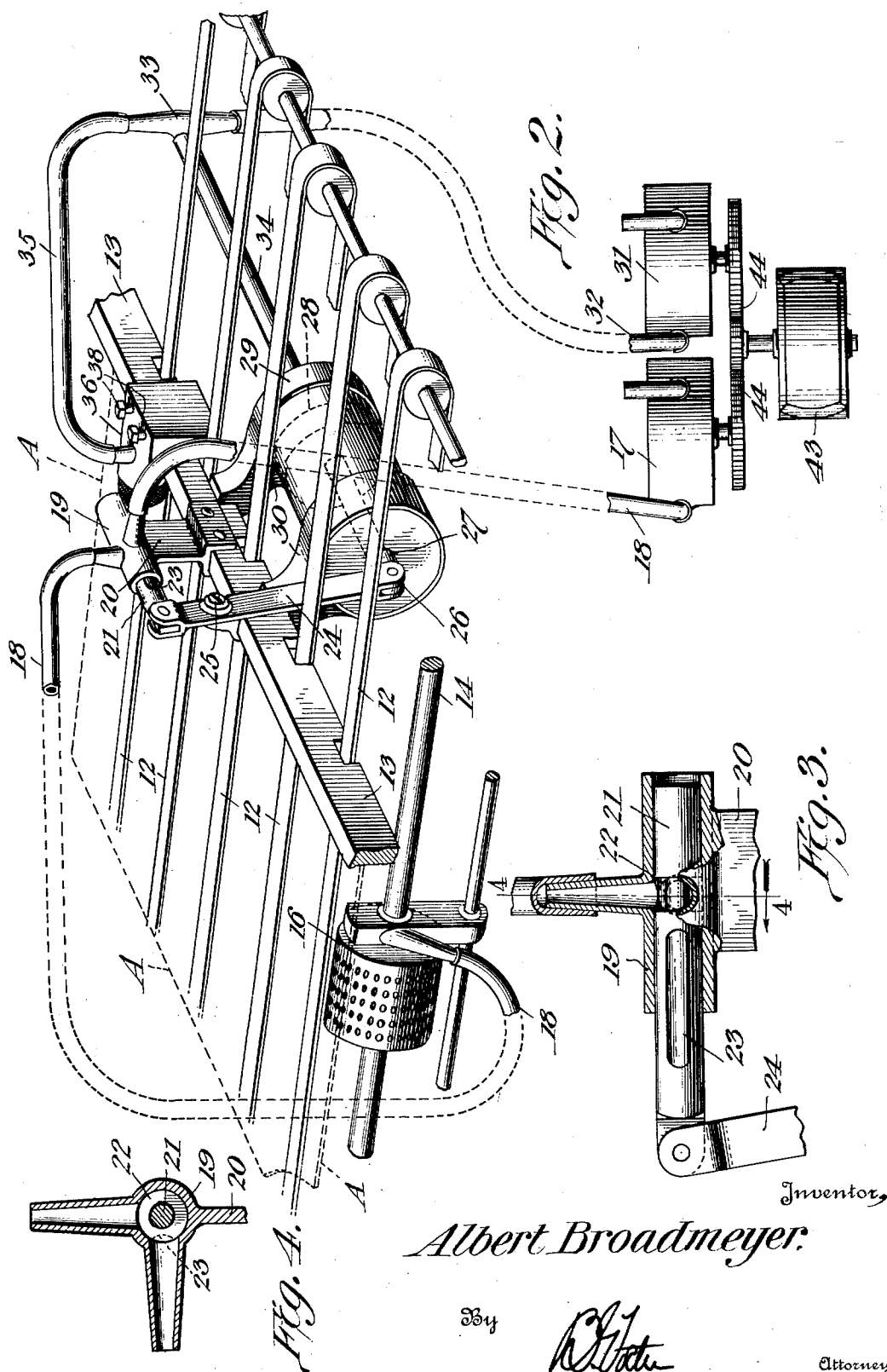
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DIRECTION CHANGING MECHANISM FOR SHEET FEEDERS

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE.

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DIRECTION-CHANGING MECHANISM FOR SHEET FEEDERS.

Application filed September 21, 1927. Serial No. 220,993.

The present invention relates particularly to means for changing the direction of paper sheets and the like, and the object is to provide simple and effective means whereby the sheet whose direction of movement is to be changed, itself controls such change.

In the accompanying drawings:

Figure 1 is a plan view in outline of a dual-L ruling machine, showing the novel mechanism applied thereto at the corner for starting the sheets that have been ruled by the first machine toward the second right angularly disposed machine.

Figure 2 is a perspective view of the direction-changing mechanism,

Figure 3 is a detail sectional view of the controlling valve.

Figure 4 is a sectional view on the line 4-4 of Figure 3,

Figure 5 is a detail perspective view of the relief head,

Figure 6 is a bottom plan view of the same.

As stated above, the mechanism is shown in connection with a dual-L ruling machine. These apparatuses are well known, and it is believed to be unnecessary to describe them in detail.

The first machine is designated 7, and the second machine is identified by the reference numeral 8. A feeder for the first machine is indicated at 9. Between the two machines is the "corner" 10 that receives the sheets of paper which have been delivered to and ruled by the first machine 7. From this corner the sheets are started at right angles from the direction of their delivery into the corner, on to a toboggan 11 and this toboggan delivers them to the second ruling machine 8.

The corner 10 is provided with endless tapes 12, on to which the sheets are delivered, and these tapes carry the sheets to a position to be started on to the toboggan 11. This position is determined by a stop bar 13 that is, as is well known, adjustable to different positions along the tapes, depending on the size of the sheets that are being ruled.

In the present embodiment, a shaft 14, driven by sprocket gearing 15 from the second machine, is provided with a suction roller 16. This suction roller may be of any desired type, but preferably is that dis-

closed in my Patent No. 1,494,303. This suction roller 16, it will be noted, has its axis of rotation disposed longitudinally of and preferably parallel to the tapes 12. Suction is created in the roller by means of an exhaust pump 17, having a conduit 18 leading to the said suction roller 16.

In this conduit is located a valve casing 19 mounted on a bracket 20 that is fixed to and therefore adjustable with the stop bar 13. The passageway through the valve casing is controlled by a reciprocatory plunger valve 21 having an annular groove 22 that is movable into and out of communication with the passageway to permit the passage of air therethrough. This valve may also be provided with a suitable relief channel 23 affording communication between the intake of the pump and atmosphere when the groove 22 is out of register with the passageways. Obviously therefore when the valve is in the position shown in Figure 3, suction is created in the roller 16 because of the communication afforded between the intake side of the pump 17 and said roller.

The valve 21 is connected to a lever 24 fulcrumed at 25 on the stop bar 13 and this lever in turn has communication at 26 with a rod 27 of a piston 28. The piston 28 operates in a cylinder 29 mounted by brackets 30 on the stop bar 13. The cylinder 29 and piston 28 constitute a pneumatic motor of the suction type, and for operating it, preferably a second exhaust pump 31 is employed, to the intake side of which is connected a conduit 32 that is connected by means of a T-head 33 and a conduit 34 with one end of the cylinder 29. There is also attached to this T-head 33 a conduit 35 leading to a controlling head 36 adjustably mounted on the stop bar 13 by having a guideway 37, through which the stop bar 13 passes. Set screws 38 serve to normally hold the head against adjustment on the stop bar. The conduit 35 is in communication with a relief port 39 opening through a shoe 40 which overlies the path of the sheets, a portion of one of said sheets being illustrated at A in Figure 5. Preferably there are supplemental vent ports 41 in the head 36 opening into the port 39 and controlled by a rotary valve 42.

The two pumps 17 and 31 are operated by

any suitable means. In the present embodiment a motor is indicated at 43, and is geared as shown at 44 to the pumps.

The operation of the mechanism is substantially as follows: The sheets are delivered successively on to the tapes 12 and are moved thereby edgewise and longitudinally of the axis of rotation of the roller 16 until they are brought against the stop 13. Ordinarily the valve 21 is in its closed position so that there is no partial vacuum in the roller and a sheet can pass freely thereover until it is abutted against the stop bar 13. Similarly the pump 31 is opened to atmosphere through the conduit 35 and head 36 so that the piston 28 is in its outermost position. When, however, a sheet has moved over the roller 16 and comes to a stop against the bar 13, as illustrated in Figure 5, it has closed the lower end of the relief port 39, thus cutting down the supply of air to the pump 31 and creating a partial vacuum which extends to the cylinder 29 through the conduit 34 (the character of this vacuum being controlled by the valve 42). As a result the piston 28 will move to its innermost position, or as shown in Figure 2, whereupon the valve will be moved outwardly, or to its open position as illustrated in Figure 3. The pump 17 is now in direct communication with the suction roller 16 so that a partial vacuum is now being created therein and the indraft of air will cause the sheet that has effected these various operations to adhere to the roller 16, and be started to the second ruling machine. As soon as this sheet has been moved sufficiently to uncover the port 39 of the relief head 36, the parts reassume their original relation or in position to be operated when another sheet arrives.

It will be noted therefore that in this apparatus the starting of the sheet at right angles is dependent on the arrival of the sheet itself.

From the foregoing, it is thought that the construction, operation and many advantages of the herein described invention will be apparent to those skilled in the art without further description and it will be understood that various changes in the size, shape, proportion and minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of the herein described invention.

What I claim, is:

1. A mechanism for effecting the movement of sheets, comprising a movable suction member, means for delivering sheets edgewise to a position to be acted on by said suction member, and pneumatically operated means controlled by a sheet so delivered to the suction member by said means for causing suction in the suction member to act on

said delivered sheet and continue its movement.

2. A mechanism for changing the direction of movement of sheets, comprising a movable suction member, means for delivering sheets edgewise in one direction to a position to be acted on by said suction member, and means controlled by the sheets so delivered and prior to their being acted on by the suction member for causing suction in the suction member to act on the delivered sheets and continue their movement in a different direction.

3. A mechanism for effecting the movement of sheets, comprising a rotatable suction member, means for moving sheets in succession to the suction member, and means engaged and controlled by the sheets so fed and prior to their being acted on by the suction member to produce suction in the member and thereby to cause the sheets to adhere to and be moved by said member.

4. A mechanism for changing the direction of movement of sheets, comprising a rotatable suction member, means for moving sheets in succession in one direction to the suction member, and means controlled by the sheets so fed and that are in position to be acted on by the suction member to produce suction in the member and thereby to cause the sheets to adhere to and be moved in another direction by said member.

5. A mechanism for changing the direction of movement of sheets comprising a rotatable suction member, means for moving sheets successively to the suction member in a direction longitudinally of its axis of rotation, and means controlled by each sheet when it reaches a predetermined position with respect to the member to create suction in the member and cause the sheet to adhere to said member and be started transversely of its axis of rotation.

6. A mechanism for changing the direction of movement of sheets, comprising, a rotatable suction roller, a valve for controlling the withdrawal of air from the roller to create suction therein, means for delivering sheets longitudinally of the roller with their margins adjacent thereto, a stop for positioning the sheets so delivered, and means for operating the valve controlled by the sheets brought to the stop.

7. A mechanism for changing the direction of movement of sheets, comprising a rotatable suction roller, a valve for controlling the withdrawal of air from the roller to create suction therein, means for delivering sheets longitudinally of the roller with their margins adjacent thereto, a stop for preventing the sheets so delivered, a pneumatic motor connected to the valve for operating it, and means adjacent the stop and controlled by the sheets brought thereto for effecting the operation of the motor to open the valve.

8. A mechanism for changing the direction of movement of sheets, comprising a rotatable suction roller, a valve for controlling the withdrawal of air from the roller to create suction thereinto, means for delivering sheets longitudinally of the roller with their margins adjacent thereto, a stop for positioning the sheets so delivered, a pneumatic suction motor connected to the valve, and mechanism for creating suction in the motor including a relief port covered by the sheets brought to the stop.

9. A mechanism for changing the direction of movement of sheets, comprising a rotatable suction roller, a valve for controlling the withdrawal of air from the roller to create suction thereinto, means for delivering sheets longitudinally of the roller with their margins adjacent thereto, a stop bar for positioning the sheets so delivered, a pneumatic suction motor connected to the valve and mounted on the stop bar, and means for creating suction in the motor to open the valve, said means including a head mounted on the stop bar and having a relief port covered by the sheets brought to the stop.

10. A mechanism for changing the direc-

tion of movement of sheets comprising a suction member for moving the sheets in a predetermined direction, means for delivering sheets in a different direction successively to said suction member, and pneumatically operated means governing the creation of suction in the suction member, said means including a device engaged by the sheets when delivered to the suction member to cause suction in said member and said member then moving the sheets in said predetermined direction.

11. A mechanism for changing the direction of movement of sheets comprising a suction member for moving the sheets in a predetermined direction, means for delivering sheets in a different direction successively to said suction member, and pneumatically operated means governing the creation of suction in the suction member, said means including a vent device covered by the sheets when delivered to the suction member to cause suction in said member and said member then moving the sheets in said predetermined direction and causing them to uncover the vent device.

In testimony whereof, I affix my signature.
ALBERT BROADMEYER.