Aug. 26, 1930. A. BROADMEYER 1,774,315

SUCTION MECHANISM FOR SHEET FEEDERS

Filed Feb. 21, 1929

Fig. 1.

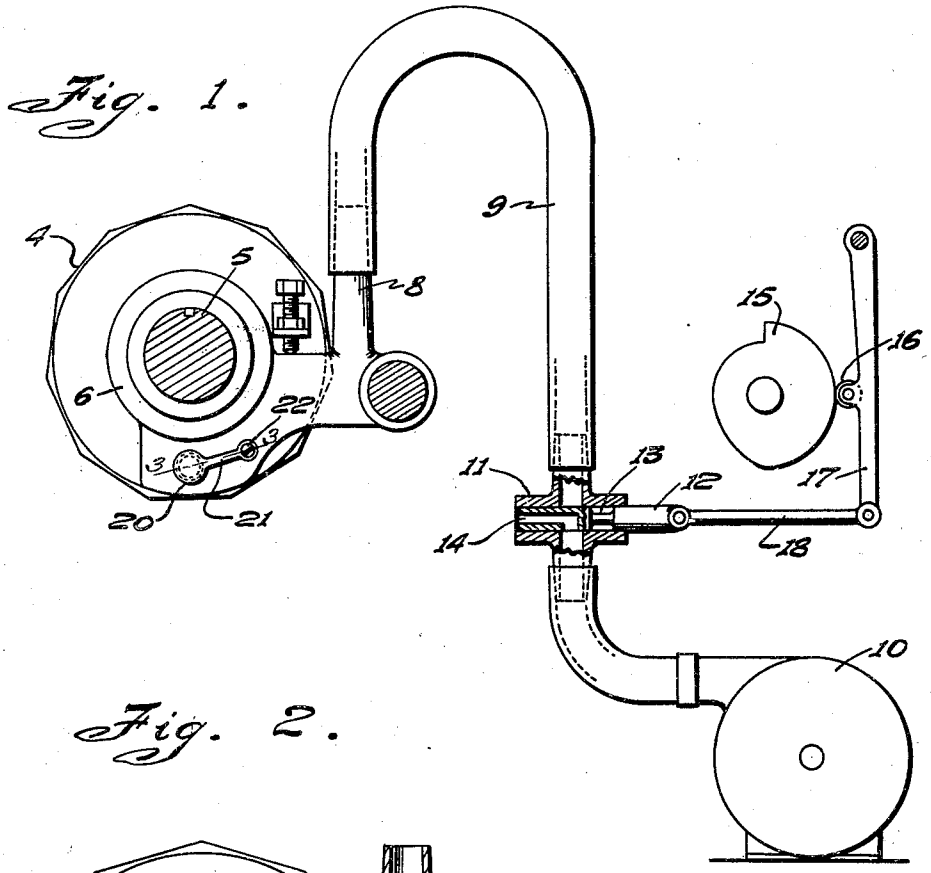


Fig. 2.

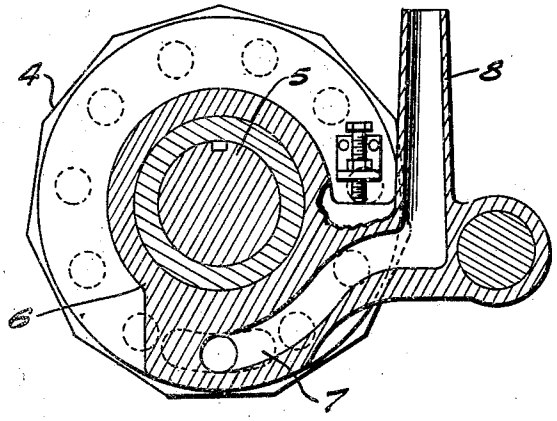
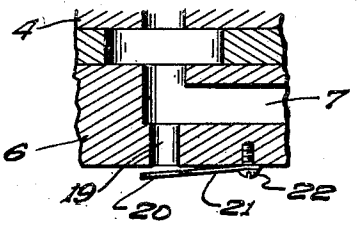


Fig. 3.



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Patented Aug. 26, 1930 1,774,315

UNITED STATES PATENT OFFICE

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SUCTION MECHANISM FOR SHEET FEEDERS

Application filed February 21, 1929. Serial No. 341,734.

In the feeding of paper sheets at high speed with suction rollers, it is found that the vacuum utilized for causing the sheets to adhere to the suction roller does not always "break" with sufficient quickness to release the sheets from the roller and permit them to be carried on freely.

The object of the present invention is to provide simple and effective means for causing an almost instantaneous relief of the suction or vacuum as soon as communication is cut off between the suction creating means and the suction roller.

In the accompanying drawings:

Figure 1 is a view diagrammatic in its character of a suction feeding system and illustrating the preferred embodiment of the improvement in place thereon.

Figure 2 is a detail sectional view through the suction head associated with the suction roller.

Figure 3 is a detail sectional view on the line 3—3 of Figure 1.

Any desired type of sheet-engaging suction roller may be employed. That shown and designated 4, constitutes the subject-matter of Letters Patent No. 1,706,952 granted as a result of my application, Serial No. 149,471, filed Nov. 19, 1926. This suction roller is mounted on a suitable driving shaft 5 and rotates therewith. Also mounted on the shaft 5, but fixed against rotation is a suction head 6, having a passageway 7 leading to the suction roller 4. The passageway 7 opens through a coupling stem 8, from which leads a conduit 9 to the intake side of an air pump 10. In the conduit 9 is a valve mechanism including a casing 11 and in this casing is a reciprocatory plunger valve 12. The valve 12 has a groove 13 and a vent port 14. The valve is operated by means of a suitable cam 15, against which rides a roller 16 journaled on an actuating arm 17. The arm 17 has a link connection 18 with the valve 12.

As is well known, when the mechanism is in operation, the rotation of the cam 15 causes a periodic operation of the valve 12 first, to move the groove 13 into a position to afford communication through the conduit 9 between the air pump 10 and the suction roller, at which time suction through the roller causes a sheet to adhere thereto and as the roller rotates the sheet is moved by said roller. When the valve 12 moves in the opposite direction communication between the pump and suction roller is cut off and the pump is vented to atmosphere through the port 14 of the valve.

Upon the closing of the valve 12 a partial vacuum remains in the portion of the conduit 9 between the said valve and the suction roller, and as a consequence the sheet held to the suction roller because of the vacuum, is not as quickly released as is desirable, especially where the suction roller is operating at relatively high speed.

To overcome this, there is provided in the head 6 a vent port 19 leading from the passageway 7 and opening to atmosphere through the outer side of the head. Located over the outer end of this vent port is a light spring flap valve comprising a freely swinging head 20 carried by a shank or stem 21 secured by a screw or other fastener 22 to the head 6. The tendency of this valve is normally to open, but the head 20 even in its open position, is so close to the vent port that when suction takes place through the passageway 7, the indraft of air through the port 19 will cause the head 20 to move down against the head 6 and thus close the port. As soon as the controlling valve 12 moves to its closed position, there is a reduction of vacuum in the passageway 7 and the spring 21 of the valve is then sufficient to raise the valve from the port, opening the same and permitting the entrance of air to completely break the vacuum not only in the passageway, but in the suction roller 4. Experience has demonstrated that this device effectively eliminates any tendency on the part of the sheets to remain attached to the suction roller when the pump is cut off from the same and results in better feeding operation of the roller.

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, 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 invention.

What I claim is:

1. In sheet feeding apparatus, the combination with a suction feeding head having suction ports, of means for creating suction in the head and through the ports, means for periodically cutting off such suction, said suction creating means including a vent port in addition to the suction ports, a valve for closing said port, and yielding means of sufficient strength to open the valve when the suction is cut off and relieve the suction through the suction ports and sufficiently weak to cause the intake of air through the vent when suction is on to close the vent.

2. In sheet feeding apparatus, the combination with a suction feeding head having suction ports, of means for creating suction in the head and through the ports, means for periodically cutting off such suction, said suction creating means including a vent port in addition to the suction ports, a valve for closing said port, and a spring carrying the valve, said spring being of sufficient strength to open the valve when the suction is cut off and relieve the suction through the suction ports and sufficiently weak to cause the intake of air through the vent when suction is on to close the vent.

3. In sheet feeding apparatus, the combination with a sheet feeding suction roller, of suction creating means, a conduit leading from the suction creating means to the roller and including a head associated with the roller and having a suction passageway with which the roller communicates, a valve in the conduit for permitting and cutting off communication through the conduit and passageway between the suction creating means and the roller, said head having a vent in communication with the passageway and opening to atmosphere, and a spring opened flap valve on the head that closes the port when suction is in the passageway and opens when suction is cut off by the valve.

4. In sheet feeding apparatus, the combination with a suction roller, of a head adjacent thereto and with which the roller is rotatably associated, said head having a suction passageway that communicates with the interior of the roller, and a vent port leading from the passageway to atmosphere and a freely movable spring-opened flap valve on the head and controlling the vent port.

In testimony whereof, I affix my signature.

ALBERT BROADMEYER.