Feb. 18, 1930. L. K. ALDRICH 1,747,809

ROTARY FEEDER

Filed Nov. 9, 1928 3 Sheets-Sheet 1

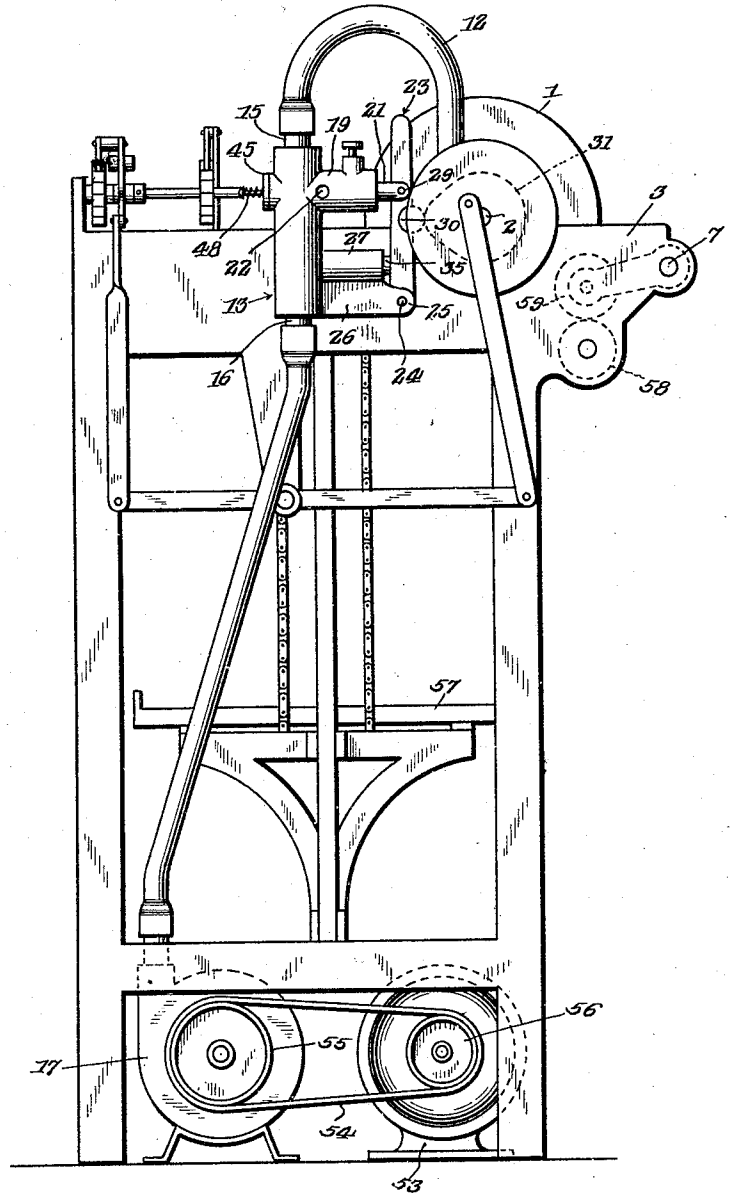


Fig. 1.

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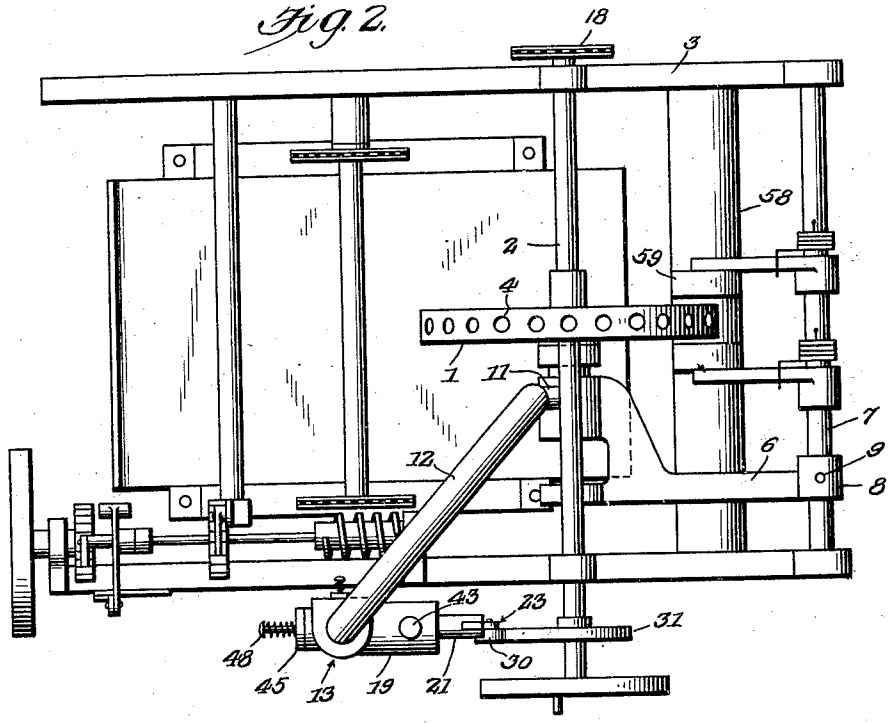
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ROTARY FEEDER

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Fig. 2.



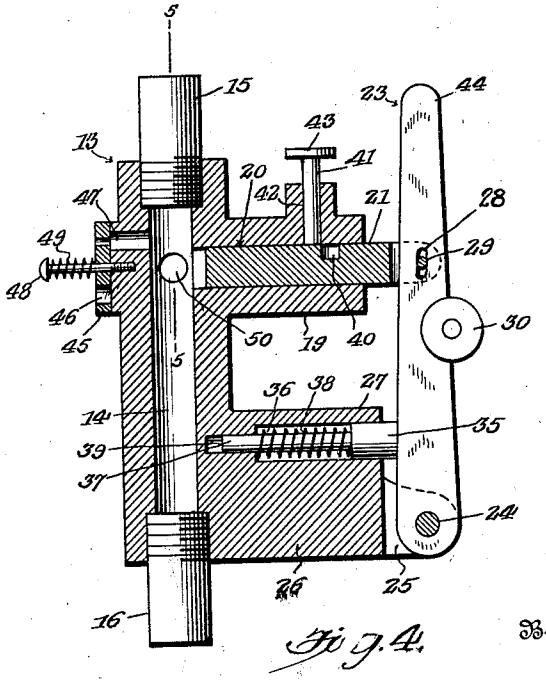


Fig. 4.

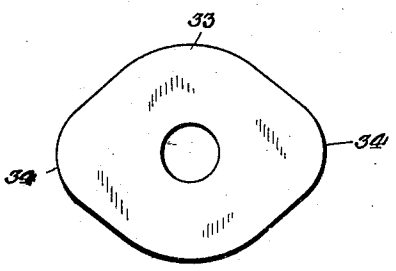


Fig. 6.

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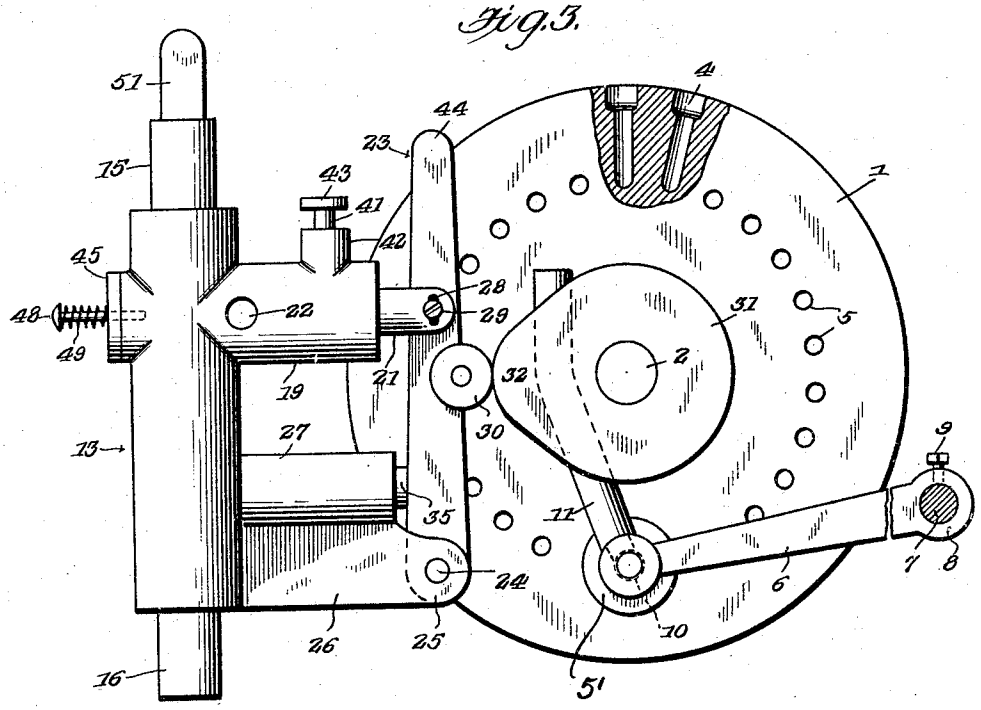
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ROTARY FEEDER

Filed Nov. 9, 1928 3 Sheets-Sheet 3

Fig. 3.



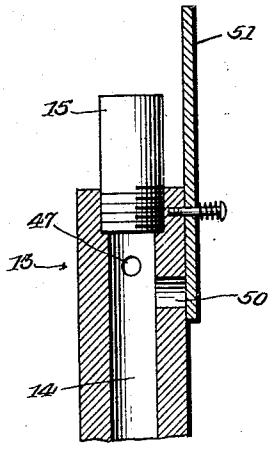


Fig. 5.

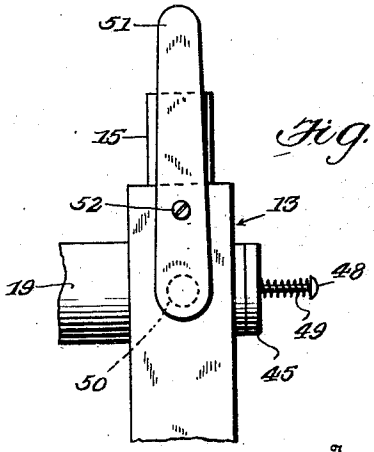


Fig. 7.

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Patented Feb. 18, 1930 1,747,809

UNITED STATES PATENT OFFICE

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ROTARY FEEDER

Application filed November 9, 1928. Serial No. 318,188.

The invention relates to improvements in rotary feeders.

The object of the present invention is to improve the construction of rotary feeders and to provide a simple, practical and efficient rotary feeder of strong, durable and comparatively inexpensive construction equipped with means for enabling it to be instantly converted from a time feeder into a continuous feeder, and vice versa. This is particularly valuable when feeding sheets to folders embodying both the buckle and knife folds. The knife folds require the sheets to be fed at predetermined intervals and when buckle folds exclusively are used the continuous rotary feature permits feeding of practically a solid web of paper broken only by the space of one port between each sheet.

Another object of the invention is to provide a rotary feeder of this character which may by the simple substitution of one cam for another feed either one sheet or two sheets during each revolution of a rotary suction disk.

A further object of the invention is to provide a rotary feeder in which the mechanism for destroying and restoring the vacuum for time feeding will remain stationary when the feeder is used as a continuous feeder, thereby eliminating wear of moving parts and the necessity for lubrication of the same.

With these and other objects in view, the invention consists in the construction and novel combination and arrangement of parts hereinafter fully described, illustrated in the accompanying drawings and pointed out in the claims hereto appended, it being understood that various changes in the form, proportion and minor details of construction, within the scope of the claims, may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings:—

Figure 1 is a side elevation of a rotary feeder constructed in accordance with this invention.

Fig. 2 is a plan view of the same.

Fig. 3 is an enlarged detail side view partly in section illustrating the arrangement of the rotary suction disks, the valve and the means for operating the valve for controlling the suction.

Fig. 4 is a detail vertical sectional view of the vacuum controlling valve.

Fig. 5 is a detail sectional view on the line 5—5 of Fig. 4.

Fig. 6 is a detail view of the double cam for feeding two sheets during each revolution of the suction disk.

Fig. 7 is a rear elevation of the valve 13 showing the manual starting and stopping air valve.

In the accompanying drawing in which is illustrated the preferred embodiment of the invention, the rotary feeder comprises in its construction a rotary suction disk 1 provided at its periphery with a circumferential series of suction mouths arranged at regular intervals throughout the entire periphery of the suction disk and constructed substantially the same as the suction mouths shown and described in Patents Nos. 1,664,960 and 1,664,961, granted to me April 3, 1928. The rotary suction disk is mounted on and suitably fixed to a rotary shaft 2 which is journaled in suitable bearings in the sides of the frame 3 of the feeder. The suction mouths are connected by passages or ducts 4 with lateral ports 5 which are adapted through the rotation of the suction disk to be brought successively into register with a vacuum head 5′. The vacuum head is carried by an arm 6 which is adjustably and rigidly secured to a transverse rod 7 mounted on the frame of the machine and suitably secured at its ends to the sides of the said frame 3. The arm 6 is provided at one end with an eye 8 into which is threaded a set screw 9 for clamping the arm on the transverse supporting rod 7. The vacuum head 5′ is constructed substantially the same as that shown and described in the aforesaid patents and it is provided with a passage 10 communicating with an upwardly extending tube 11 carried by the head and forming a connection for receiving one end of a flexible hose 12. The flexible hose 12 connects

the suction head 5' with a vacuum controlling valve 13 consisting of a body provided with a vertical passage 14 and having upper and lower nipples 15 and 16 threaded into the upper and lower ends of the passage.

The hose 12 is connected with the upper nipple 15 and the lower nipple 16 is connected by a suitable hose with a vacuum pump 17. The rotary suction disk is rotated by suitable sprocket gearing 18 located at one side of the frame of the machine and the vacuum controlling valve 13 is mounted on the frame of the machine at the other side thereof and it is provided at its upper portion with an arm 19 having a horizontal passage or opening 20 in which is mounted a slidable valve piston or member 21 movable inwardly and outwardly with respect to the vertical passage 14 and adapted to cover and uncover a lateral port or opening 22 which communicates with the atmosphere. The vacuum pump creates a suction or vacuum in the passage 14 of the valve 13 when the air port or opening 22 is covered or closed by the valve piston 21 and when the valve piston or member 21 is moved outwardly by the means hereinafter described the air port 22 is uncovered and air is admitted to the passage 14 and the vacuum therein is destroyed. When the air port 22 is covered or closed the vacuum will be restored and will be communicated to the rotary suction disk which will then be adapted for feeding sheets.

The valve piston 21 extends outwardly beyond the end of the arm 19 and is pivoted to a combined cam actuated and manually operable lever 23 fulcrumed at its lower end on a suitable pivot pin 24 which is mounted in suitable bearings 25 of a support 26 consisting of a web or extension of the body of the valve and located beneath a lower arm 27 and projecting outwardly beyond the same as clearly illustrated in Fig. 3 of the drawings.

The lever 23 is provided intermediate of its ends with a slot 28 to receive the pivot 29 which preferably consists of a screw threaded into the valve piston but the slot may be provided in either of the parts and the pivot may be of any other desired construction as will be readily understood. The lever 23 is also equipped with a roll 30 mounted on the lever in any preferred manner and arranged to be engaged by a cam 31 fixed to the rotary shaft 2 and provided with a projecting lever actuating portion 32 which moves the lever 23 towards the valve 13 once during each revolution of the suction disk for feeding one sheet during each revolution of the said disk, but a double cam 33 provided with two diametrically opposite lever actuated portions 34 may be substituted for the cam 31 for oscillating the lever 23 twice during each revolution of the suction disk for feeding two sheets of paper during each revolution of the said disk.

The cam 31 is adapted to positively force the lever 23 towards the valve 13 for moving the valve piston or member 21 inwardly and the valve piston or member is moved outwardly by a spring actuated plunger 35 which bears against the lever 23 and causes the same to follow the contour of the cam. The plunger 35 which holds the roll of the lever 23 in contact with the periphery of the cam is mounted in an opening 36 of the lower arm of the body of the bell and consists of an outer engaging portion or head and an inwardly extending stem 37 of less diameter than the head of the plunger.

The head of the plunger has a loose fit in the opening 36 and the stem 37 is spaced from the wall of the opening 36 to provide an intervening space for a coiled spring 38 which actuates the plunger and which is compressed when the plunger is moved inwardly. The spring is interposed between the head of the plunger and the rear wall of the opening 36 and the arm 27 provided with a reduced bore or extension 39 of the opening 36 to receive and guide the inner terminal portion of the stem 37.

The valve piston 21 is provided in its upper face or surface with a recess 40 which is adapted to receive and be engaged by the lower end of the vertically movable locking pin 41 mounted in a vertical opening 42 in the upper portion of the arm 19 and provided with a suitable head 43. The arm 19 is preferably enlarged at the upper portion to provide a boss around the outer portion of the opening 42 for supporting the locking pin 41. The upper portion 44 of the cam actuated lever 23 extends above the valve piston 21 to form a grip or handle and it is adapted to be manually operated for moving the valve piston inwardly beyond the position illustrated in Fig. 3 of the drawing to carry the recess 40 beneath the locking pin 41 to permit the latter to drop into the said recess and hold the lever 23 against outward movement with its roll 30 out of engagement with the cam for maintaining the vacuum continuous for producing a continuous feeding action of the suction disk.

The degree of suction may be varied and controlled by an adjustable valve member 45 consisting of a disk provided with a plurality of openings 46 of different sizes adapted to be brought into register with an air port 47 extending outwardly from the upper portion of the passage 14 of the body of the valve and adapted to communicate with the atmosphere. The valve disk or member 45 is mounted on a suitable pivot 48 preferably consisting of a screw threaded into the valve body and having a coiled spring 49 disposed on its outer portion and interposed between the head of the screw and the rotary valve member 45 for maintaining the latter in tight contact with the valve body. The rotary

valve member 45 is adapted to completely cover the port or opening 47 and also by its graduated openings 46 to adjust or vary the vacuum to suit the character of the sheets to be fed so that the required amount of vacuum or pull will be transmitted to the suction disk.

The air valve is also provided with a lateral air port 50 extending outwardly from the passage 14 and adapted to communicate with the atmosphere for destroying the vacuum. The lateral air port 50 is normally covered by the lower portion of a lever 51 fulcrumed intermediate of its ends on the upper portion of the body of the valve by a suitable pivot 52 and having its lower portion arranged to cover and uncover the port 50.

The lower portion of the lever 51 has a sliding fit or contact with the body of the valve and the upper portion of the lever 51 constitutes a handle by means of which the lever may be operated to start and stop the machine by hand. This lever enables the feeder to be instantly controlled by the operator to start or stop the feeding of the sheets.

The vacuum pump is preferably operated by an electric motor 53 which is connected by a belt 54 and suitable pulleys 55 and 56 with the vacuum pump but any other suitable means may be employed for operating the vacuum pump. Also, the sprocket gearing for operating the rotary suction disk may be connected with the electric motor in any desired manner.

The stack of sheets to be fed are arranged upon a vertically movable table 57 which is operated by suitable elevating mechanism which may be constructed as shown and described in the aforesaid patents or operated in any other desired manner.

When the feeder is operated as a time feeder for feeding one sheet from the stack during each revolution of the rotary suction disk, the disk will continue pulling the sheet until the cam has rotated sufficiently to cause the valve piston to uncover the air port and destroy the vacuum. This causes rotary suction disk to become inoperative until the cam has completed the revolution, at which time the suction will be restored and the rotary suction disk will pull off the next sheet.

When converting the feeder into a continuous feeder it is only necessary to move the lever 23 towards the valve body a sufficient distance to permit the locking pin 41 to drop into the recess 40, thereby arresting the motion. The lock gives a continuous pulling vacuum to the rotary suction disk by closing the air port 22 and it also eliminates wear of the moving parts and the necessity for lubrication of the same while the feeder is operating as a continuous rotary feeder. When the lever 23 is located in said position with the air port 22 closed it will be seen that the rotary suction disk will pull continuously and that when the tail of the top sheet has reached the center of the shaft 2 the pulley will pick up the next sheet irrespective of the length of the paper. Whether the feeder is being employed as a time feeder or a continuous feeder the operation of starting and stopping may be accomplished through the lever 51 by means of which the vacuum in the valve 13 may be instantaneously destroyed or restored. The sheet is fed by the rotary suction disk to a suitable pull off roll 58 and spools 59 which cooperate with the pull off roll to complete the feeding operation and carry the sheet into the machine with which the automatic feeder is associated.

What is claimed is:

1. A rotary feeder including a rotary suction disk provided at its periphery with a circumferential series of suction mouths, a vacuum head cooperating with the suction disk and adapted to be connected successively with the said suction mouths, vacuum means for creating a suction in the suction head, and means for interrupting the suction at intervals to produce time feeding and for throwing the latter means out of operation to produce a continuous feeding.

2. A rotary feeder including a rotary suction disk provided at its periphery with a circumferential series of suction mouths, a vacuum head cooperating with the suction disk, a vacuum controlling valve connected with the vacuum head and provided with a movable valve member cooperating with an air port for restoring and destroying the vacuum, means for operating the valve at regular intervals to produce a time feeding of the suction disk, and manually operable means for holding the vacuum controlling valve in position to produce a continuous feeding.

3. A rotary feeder including a rotary suction disk provided at its periphery with a circumferential series of suction mouths, a vacuum head cooperating with the suction disk, a vacuum controlling valve connected with the vacuum head and provided with a movable valve member cooperating with an air port for destroying and restoring the vacuum, means for operating the valve at regular intervals to produce a time feeding of the suction disk, and means for locking the latter means out of operation to produce a continuous feeding of the suction disk.

4. A rotary feeder including a rotary suction disk provided with a circumferential series of suction mouths, a vacuum head cooperating with the suction disk, a vacuum controlling valve connected with the vacuum head and provided with a movable valve cooperating with an air port for destroying and restoring the vacuum, an eccentric element rotating with the suction disk, means actuated by the said eccentric member for reciprocating the valve member to destroy and restore the vacuum at regular intervals to produce a time feeding, and manually opera-

ble means for directly engaging the vacuum controlling valve for holding the same in position for continuous feeding.

5. A rotary feeder including a rotary suction disk provided with a circumferential series of suction mouths, a vacuum head cooperating with the suction disk, a vacuum controlling valve connected with the vacuum head and provided with a movable valve cooperating with an air port for destroying and restoring the vacuum, an eccentric element rotating with the suction disk, means actuated by the said eccentric member for reciprocating the valve member to destroy and restore the vacuum at regular intervals to produce a time feeding, and means for locking the valve in its closed position to produce a continuous feeding of the suction disk.

6. A rotary feeder including a rotary suction disk provided with a circumferential series of suction mouths, a vacuum head cooperating with the suction disk, a vacuum controlling valve connected with the vacuum head and provided with an air port and having a valve member cooperating with the air port to cover and uncover the same, a cam rotating with the suction disk, a lever actuated by the cam and connected with the valve member for operating the latter at intervals for time feeding, and means manually operated by the said lever for directly engaging the valve for holding the same in position for continuous feeding.

7. A rotary feeder including a rotary suction disk provided with a circumferential series of suction mouths, a vacuum head cooperating with the suction disk, a vacuum controlling valve connected with the vacuum head and provided with an air port and having a valve member cooperating with the air port to cover and uncover the same, a cam rotating with the suction disk, a lever actuated by the cam and connected with the valve member for operating the latter at intervals for time feeding, and a locking device for holding the valve in closed position for continuous feeding.

8. A rotary feeder including a rotary suction disk provided with a circumferential series of suction mouths, a vacuum head cooperating with the suction disk, a vacuum controlling valve connected with the vacuum head and provided with an air port and having a valve member cooperating with the air port to cover and uncover the same, a cam rotating with the suction disk, a lever actuated by the cam and connected with the valve member for operating the latter at intervals for time feeding, said lever having a handle portion for manual operation, and an automatic locking device adapted to engage the valve member when the same is operated by hand for locking the valve member in closed position for continuous feeding.

9. A rotary feeder including a rotary suction disk provided with peripheral suction mouths, a vacuum head cooperating with the suction disk, a vacuum valve connected with the vacuum head and provided with a movable valve member cooperating with an air port to destroy and restore the vacuum, a lever connected with the valve member, a cam rotating with the suction disk for actuating the lever, a spring actuated plunger engaging the lever for maintaining the same in cooperative relation with the cam, and means manually operated by the said lever for directly engaging the valve for holding the same in position for continuous feeding.

10. A rotary feeder including a rotary suction disk provided with peripheral suction mouths, a vacuum head cooperating with the suction disk, a vacuum valve connected with the vacuum head and provided with a movable valve member cooperating with an air port to destroy and restore the vacuum, a lever connected with the valve member, a cam rotating with the suction disk for actuating the lever, a spring actuated plunger engaging the lever for maintaining the same in cooperative relation with the cam, and means for locking the valve against movement by the plunger for holding the lever out of cooperative relation with the cam for continuous feeding.

11. A rotary feeder including a rotary suction disk provided with peripheral suction mouths, a vacuum head cooperating with the suction disk, a vacuum controlling valve connected with the vacuum head and comprising a body portion having a passage and provided with spaced arms, one of the arms being also provided with a passage communicating with the said passage of the valve, such arm being also provided with an air port, a valve piston slidable in the passage of the said arm for covering and uncovering the said port, a lever fulcrumed on the valve body and connected with the said piston, an eccentric member rotating with the suction disk for actuating the lever, and means manually operated by the said lever for directly engaging the valve for holding the same in position for continuous feeding.

12. A rotary feeder including a rotary suction disk provided with peripheral suction mouths, a vacuum head cooperating with the suction disk, a vacuum controlling valve connected with the vacuum head and comprising a body portion having a passage and provided with spaced arms, one of the arms being also provided with a passage communicating with the said passage of the valve, such arm being also provided with an air port, a valve piston slidable in the passage of the said arm for covering and uncovering the said port, a lever fulcrumed on the valve body and connected with the said piston, a

cam rotating with the suction disk, and a roll carried by the lever and arranged to be engaged by the cam, and means manually operated by the said lever for directly engaging the valve for holding the same in position for continuous feeding.

13. A rotary feeder including a rotary suction disk provided with peripheral suction mouths, a vacuum head cooperating with the suction disk, a vacuum controlling valve connected with the vacuum head and comprising a body portion having a passage and provided with spaced arms, one of the arms being also provided with a passage communicating with the said passage of the valve, such arm being also provided with an air port, a valve piston slidable in the passage of the said arm for covering and uncovering the said port, a lever fulcrumed on the valve body and connected with the said piston, a cam rotating with the suction disk for actuating the lever, a spring actuated plunger mounted in the other arm of the said valve and engaging the lever for holding the same in cooperative relation with the cam, and means manually operated by the said lever for directly engaging the valve for holding the same in position for continuous feeding.

14. A rotary feeder including a rotary suction disk having peripheral suction mouths, a vacuum head cooperating with the suction disk, a vacuum controlling valve connected with the vacuum head and comprising a body having a vertical passage and provided with upper and lower arms, the upper arm having the passage to communicate with the said passage and provided also with a lateral air port, a piston operating in the upper arm and for covering and uncovering the lateral air port, a lever fulcrumed on the valve body adjacent the lower arm, a cam rotating with the suction disk for actuating the lever, a spring actuated plunger mounted in the lower arm and engaging the lever for maintaining the same in contact with the cam, and means manually operated by the said lever for directly engaging the valve for holding the same in position for continuous feeding.

15. A rotary feeder including a rotary suction disk having peripheral suction mouths, a vacuum head cooperating with the suction disk, a vacuum controlling valve connected with the vacuum head and comprising a body having a vertical passage and provided with upper and lower arms, the upper arm having the passage to communicate with the said passage and provided also with a lateral air port, a piston operating in the upper arm and for covering and uncovering the lateral air port, a lever fulcrumed on the valve body adjacent the lower arm, a cam rotating with the suction disk for actuating the lever, a spring actuated plunger mounted in the lower arm and engaging the lever for maintaining the same in contact with the cam, and a gravity acting locking device mounted on the upper arm and arranged to engage the piston for locking the same out of contact with the cam.

16. A rotary feeder including a rotary suction disk, a vacuum head cooperating with the suction disk, a vacuum controlling valve connected with the vacuum head and provided with a passage and having separate air ports, an automatically operating valve member arranged to cover and uncover one of the air ports for producing time feeding, a manually operable valve member controlling the other port for stopping and starting the feeder, and means operating with the suction disk for actuating the automatic valve member.

In testimony whereof I affix my signature.

LESTER KYLE ALDRICH.