April 28, 1942. C. E. WHITE 2,281,344

CARDING MACHINE

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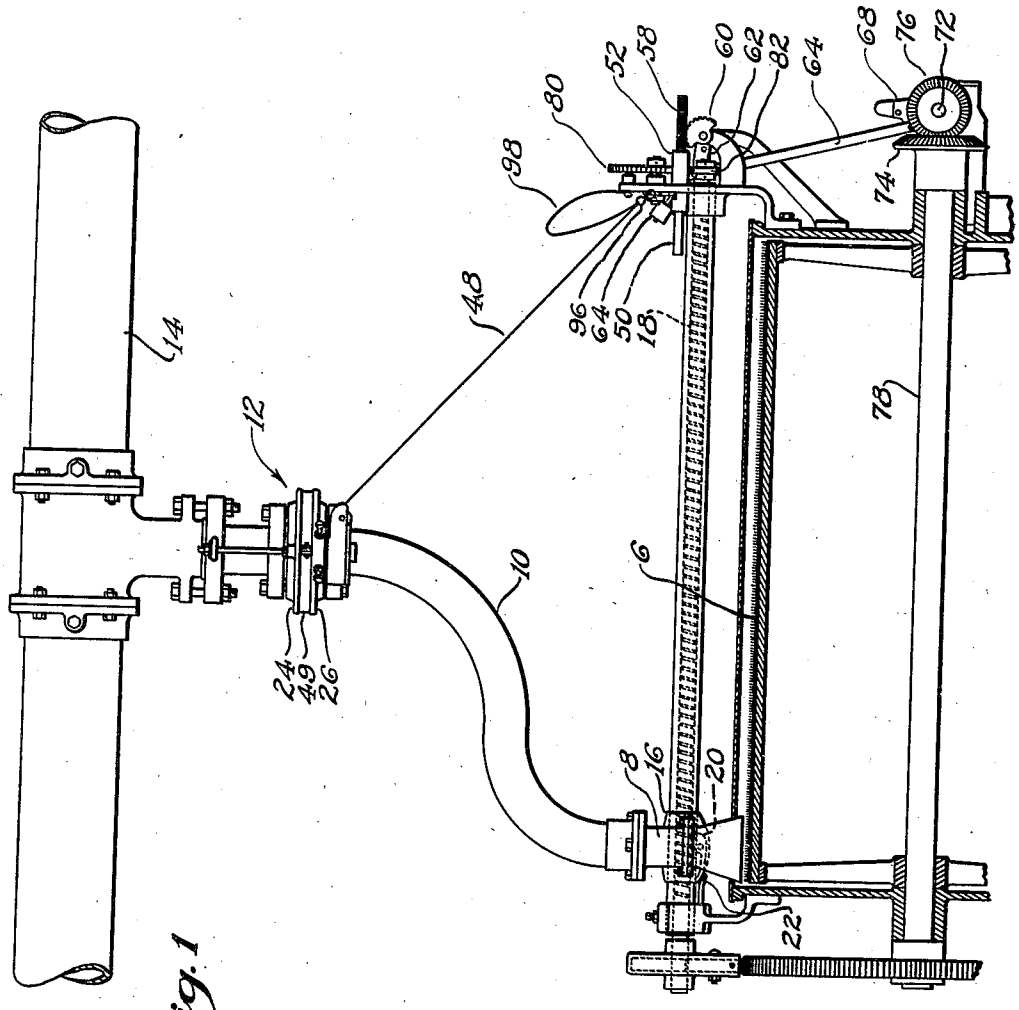



Fig. 1

Witness

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by his attorneys

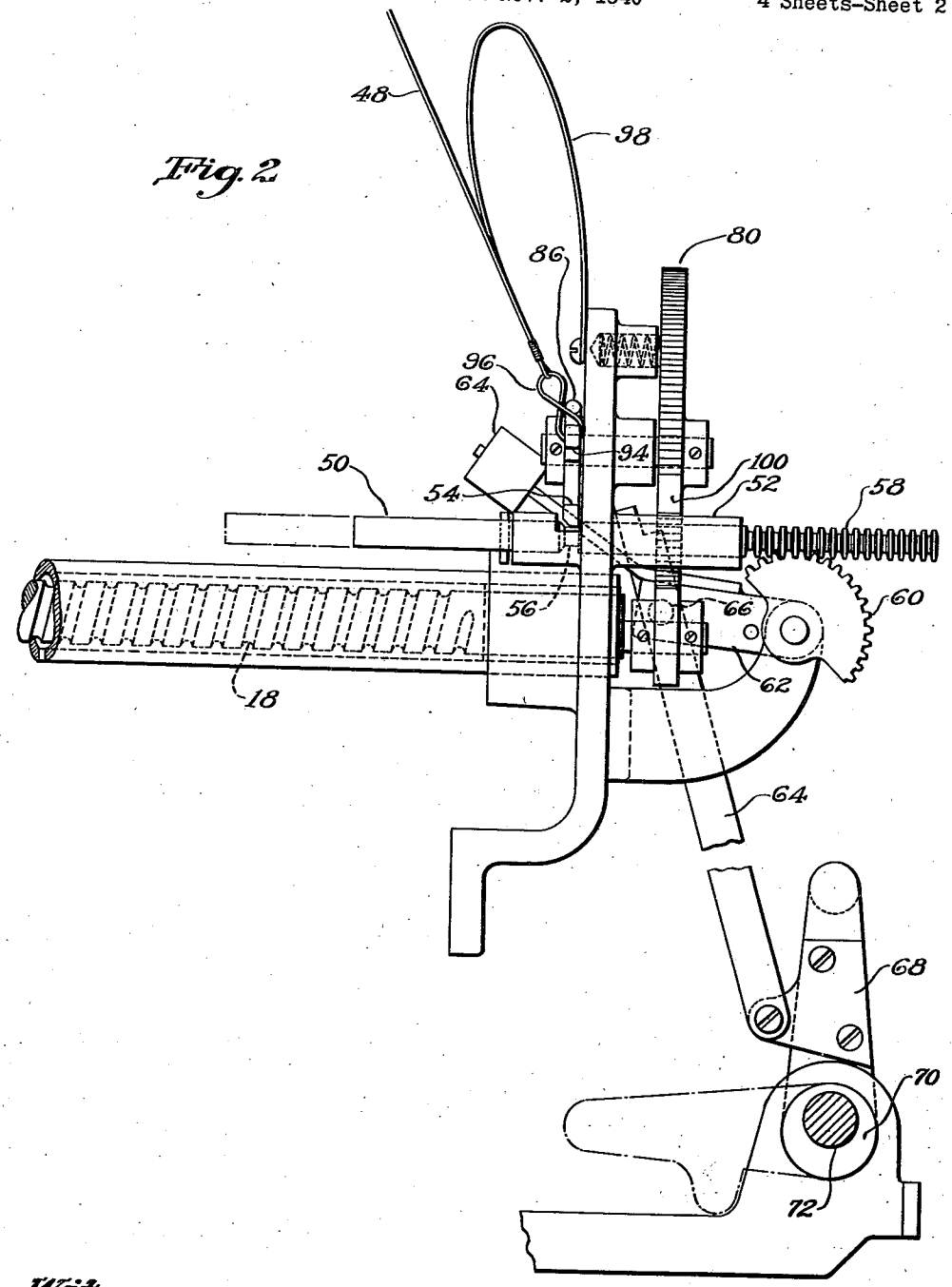
Fish, Wilbretth, Cary & Jemey

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Fig. 2




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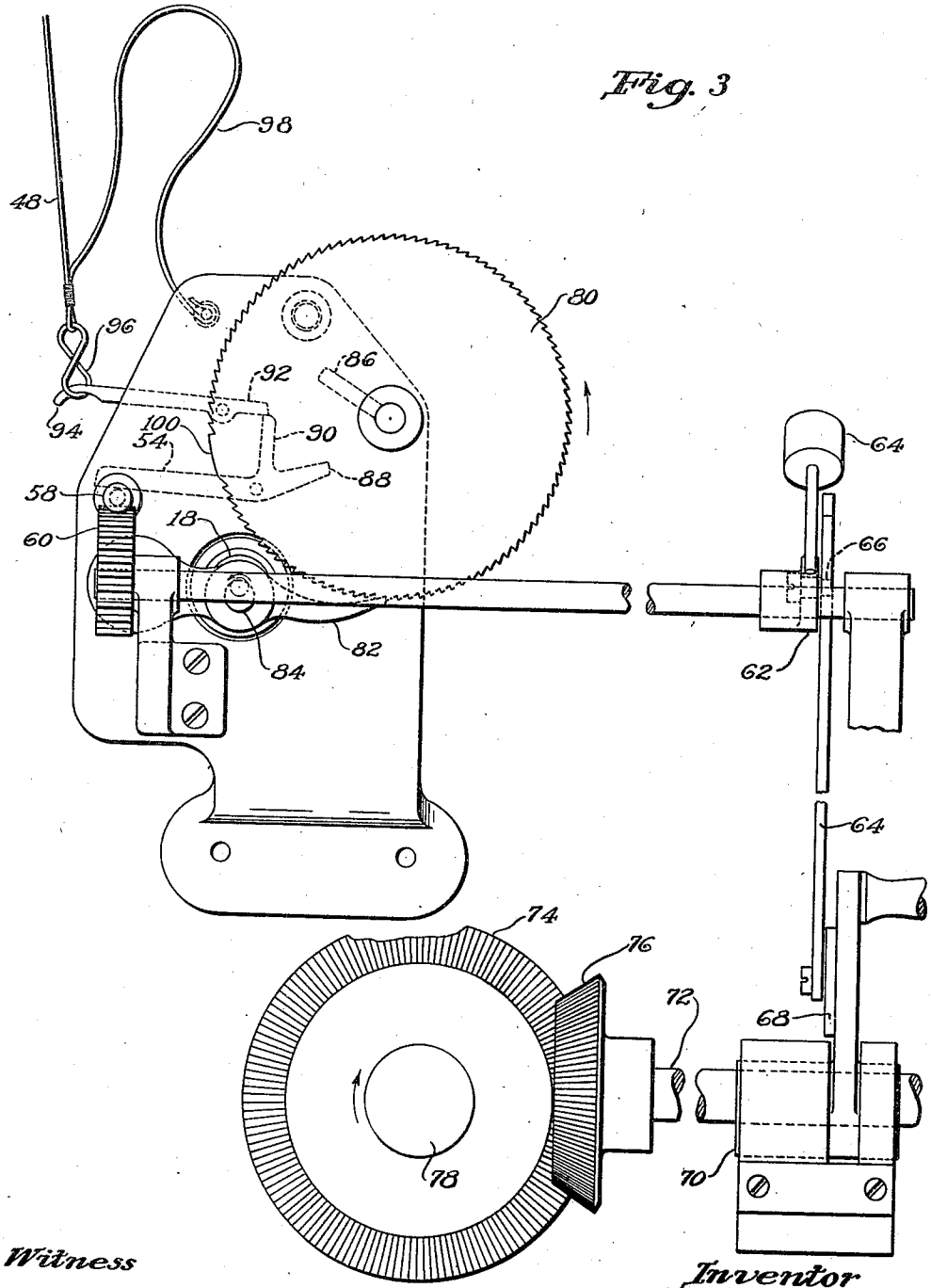
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Fig. 3




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Fig. 4

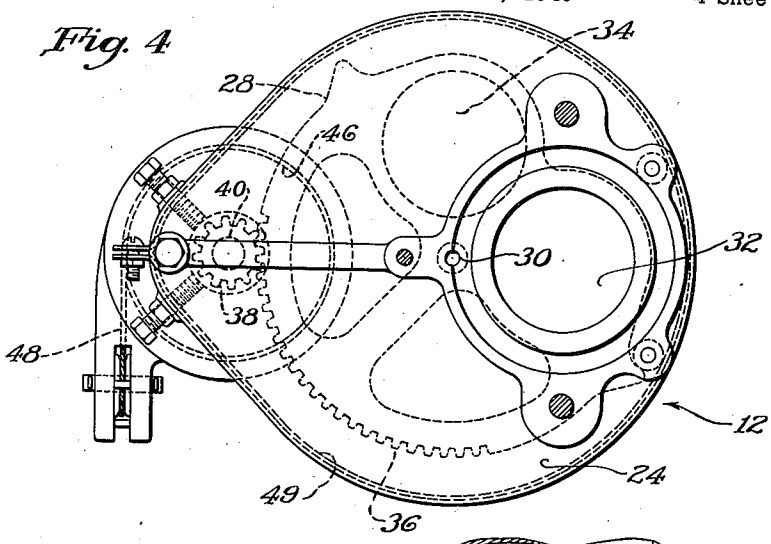
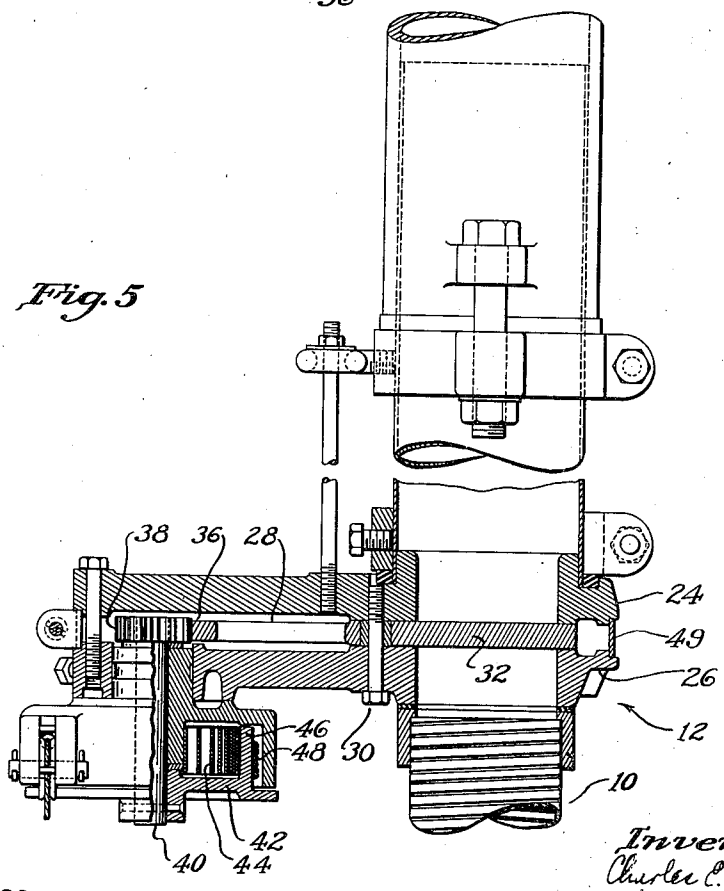



Fig. 5




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# UNITED STATES PATENT OFFICE

2,281,344

## CARDING MACHINE

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Application November 2, 1940, Serial No. 364,066

9 Claims. (Cl. 19—109)

The present invention relates to carding machines, and more particularly to pneumatic stripping apparatus therefor.

The principal object of the present invention is to provide improvements in carding machines with a particular view to cutting off the suction and restoring the feed automatically at the conclusion of the stripping operation.

With this and other objects in view as will hereinafter appear, the present invention comprises the carding machine hereinafter described and particularly defined in the claims.

In the accompanying drawings Fig. 1 is a front elevation of so much of a carding machine as is necessary for an understanding of the present invention; Figs. 2 and 3 are enlarged detail views of the timing and feed throw-out mechanisms; and Figs. 4 and 5 are detail views of the suction valve.

In Fig. 1 there is shown a carding machine having a doffer 6 and a suction stripper nozzle 8 co-operating therewith. The nozzle is connected through a flexible tube 10 and valve 12 with the main suction line 14 which connects with the stripper nozzles of other similar machines. The machine may be provided with a stripper nozzle for the main cylinder, also connected to the pipe 10. The nozzle is mounted on a head 16 which is adapted to be manually moved from left to right to start the stripping operation, and automatically moved from right to left by means of a traverse screw 18. The head is provided with a suitable follower 20 for engagement with the traverse screw. A throw-out plate 22 is mounted on the machine to disengage the follower from the screw when the nozzle reaches the limit of its left-hand movement, all as generally described in the Clark Patent 1,614,103, dated January 11, 1927.

To start the stripping operation the operator shifts the nozzle to the right-hand end of the machine. This operation automatically shuts off the feed of material to the carding machine by mechanism to be later described. After shifting the stripper nozzle, the operator opens the valve 12 to apply suction to the stripper. Thereupon the nozzle travels leftward under the action of the traverse screw, with suction applied thereto.

The valve, as shown in Figs. 4 and 5, comprises an upper body portion 24 and a lower portion 26 connected respectively with the suction line 14 and the flexible tube 10. A valve plate 28 is centrally pivoted on a bolt 30 which connects the two body portions of the valve together. The plate has a solid portion 32 to cut off the suction and another portion 34 with a circular port adapted to permit communication between the suction line and the tube. A portion of the edge of the plate is provided with teeth 36 engaging a gear 38 mounted on a stud 40 to which is connected a spring housing 42. A torsion spring 44 within the housing normally acts to force the plate into the position shown in Fig. 4 wherein the suction is cut off. The housing has a cylindrical flange 46 about which is wound an operating cord 48. By drawing on the cord the operator opens the valve at the time the stripping operation is to begin.

The body portions 24 and 26 are enclosed and sealed by a clamping ring 49. The feed throw-out mechanism is shown particularly in Figs. 2 and 3. Near the right-hand end of the machine is mounted a sliding rod 50 which is adapted to be engaged by the nozzle head 16 at the end of its right-hand movement. The rod is normally in the position indicated by dot-and-dash lines in Fig. 2, and when engaged by the nozzle head is moved outwardly through a bearing 52. When moved outwardly, the rod is latched by the tail of a latch arm 54 which drops into a notch 56 in the rod. The outer end of the rod is provided with rack teeth 58 engaging a pinion 60 to which is attached an arm 62. A weight 64 is connected with the arm in order to hold the arm normally in a downward position and also to force the rod 50 inwardly. A link 65 is pivoted at 66 on the arm 62 and connects at its lower end with a shift lever 68, which is operative to move an eccentric bearing 70. Journaled in the eccentric bearing is a shaft 72 which under normal carding conditions is driven through bevel gears 74 and 76 from the doffer shaft 78. The shaft 72 connects by suitable gearing, familiar to those skilled in the art, with the feed mechanism by which material is fed to the machine during the normal carding operation. When the nozzle is set at the right-hand side of the machine, the lever 68 is therefore brought to its upright position (as indicated in full lines in Fig. 2) to rotate the eccentric bearing and disengage the gear 76 from the gear 74. The feed is thus shut off, and remains off during the stripping operation.

Timing mechanism is provided, under the control of which the feed is restored and the suction is cut off automatically after completion of the stripping operation. The timing mechanism comprises a ratchet 80 which is advanced by a counterweighted pawl 82 operated by an eccentric drive 84 from the traverse shaft, whereby

each revolution of the shaft advances the ratchet one tooth. The number of teeth in the ratchet is equal to the number of turns of the traverse shaft necessary to effect full traverse of the stripper nozzle, plus a sufficient number of additional teeth to allow for proper stripping of the left-hand edge of the cylinder after the leftward movement of the stripper has been stopped by disengagement of the follower 20 from the traverse screw. The ratchet shaft is provided with an outwardly extending arm 86 adapted to strike a tail 88 on the latch arm 54. The arm 54 also has an upwardly extending projection 90 which is adapted to support the rear end of a pivoted lever 92. The lever 92 at its forward end has a hook portion 94 to engage a wire loop 96 attached to the cord 48. With the parts as shown in Figs. 2 and 3 the wire loop 96, when placed over the hook 94, holds the valve open. The cord is extended in a loop as indicated at 98, to be attached to a stationary part of the machine. The loop 96 provides sufficient slack to allow the valve to close when the cord is released from the hook.

The ratchet 80 has a smooth portion 100 against which the pawl 82 may reciprocate without advancing the ratchet. This smooth portion is arranged to come opposite the ratchet at the time the tail 88 of the latch lever 54 is engaged by the operating arm 86. It will be seen, therefore, that after the counting mechanism has counted off the requisite number of revolutions of the traverse shaft, the arm 86 strikes the tail 88, thereby unlatching the rod 50 and also releasing the arm 92. The latter is pulled up by the tension of the spring 44 acting on the cord so that the loop 96 is released from the hook and the valve is closed. Inward motion of the rod 50 is then caused by dropping of the weight 64 acting through the pinion 60 and rack 58. At the same time the arm 66 drops and causes the lever 68 to turn to the dot-and-dash position of Fig. 2, thus swinging the eccentric bearing in a direction to re-engage the bevel gears 74, 76 and restore the feed.

The operation of the machine will now be briefly reviewed. When the cylinder is to be stripped the operator shifts the nozzle to the right, pulls on the cord 48, hooks the loop 96 over the hook 94, and depresses the hook 94 so that it is latched in the position of Fig. 3 by the arm 90 on the latch arm 54. The movement of the nozzle to the right has pushed the rod 50 outwardly, in which position it is latched by the arm 54 and the feed has been cut off by the disengagement of the bevel gears through the operation of the eccentric bearing. At this time the pawl 82 is riding idly on the smooth portion 100 of the ratchet. The operator turns the ratchet counterclockwise until the pawl engages with the first tooth, whereupon the ratchet starts its automatic advance. The stripper traverses the cylinder to the limit of its left-hand movement when it is automatically disengaged from the traverse screw. The ratchet continues to operate for a predetermined number of revolutions of the traverse shaft sufficient to allow complete stripping of the left-hand end of the cylinder, whereupon the arm 86 engages the tail 88 of the latch lever 54. The suction valve is then automatically shut and the feed is restored, as above described, so that the machine then performs its normal carding function.

The automatic cut-off of suction and re-connection of the feed at the conclusion of the stripping operation are important for several reasons. First, because the capacity of the vacuum system is limited, it is desirable to cut off the suction from a stripped machine as soon as possible in order that stripping may be started on another machine. Second, since the stripping operation is non-productive, the feed should be restored so that the carding function may be resumed as quickly as possible. Finally, the most important advantage lies in the fact that the operator is not required to return to the stripped machine until such time as it is necessary for him to perform the piercing operation on newly carded material, and he may therefore plan his operations with respect to all machines under his supervision in such a manner as to conserve labor and to maintain maximum production.

Having thus described the invention, I claim:

1. In a carding machine, pneumatic stripping mechanism including a nozzle, means for applying suction to the nozzle, a suction valve, traverse mechanism for the nozzle, timing means operable upon each revolution of the traverse mechanism, and connections between the timing means and the suction valve to close the latter after a predetermined number of revolutions of the traverse mechanism greater than the number required for traverse of the nozzle.

2. In a carding machine, pneumatic stripping mechanism including a nozzle, means for applying suction to the nozzle, a suction valve, traverse mechanism for the nozzle, timing means including a pawl operated on each revolution of the traverse mechanism, a ratchet advanced by the pawl, and means controlled by a predetermined advance of the ratchet after complete traverse of the nozzle to close the valve.

3. In a carding machine, pneumatic stripping mechanism including a nozzle, means for applying suction to the nozzle, a suction valve, traverse mechanism for the nozzle, timing means operable upon each revolution of the traverse mechanism, connections between the timing means and the suction valve to close the latter after a predetermined number of revolutions of the traverse mechanism greater than the number required for traverse of the nozzle, a feed drive adapted to be disconnected at the beginning of the stripping operation, and means controlled by the timing means for re-connecting the feed drive.

4. In a carding machine, pneumatic stripping mechanism including a nozzle, means for applying suction to the nozzle, a suction valve, traverse mechanism for the nozzle, timing means including a pawl operated on each revolution of the traverse mechanism, a ratchet advanced by the pawl, means controlled by a predetermined advance of the ratchet after complete traverse of the nozzle to close the valve, a feed drive adapted to be disconnected at the beginning of the stripping operation, and means controlled by the ratchet for re-connecting the feed drive.

5. In a carding machine, pneumatic stripping mechanism including a nozzle, means for applying suction to the nozzle, a suction valve, traverse mechanism for the nozzle, timing means including a pawl operated by the traverse mechanism during and after traverse of the nozzle, a ratchet advanced by the pawl, latching means to hold the suction valve open, and means operated by the ratchet to trip the latching means.

6. In a carding machine, pneumatic stripping mechanism including a nozzle, means for applying suction to the nozzle, a suction valve, traverse mechanism for the nozzle, timing means in-

cluding a pawl operated by the traverse mechanism during and after traverse of the nozzle, a ratchet advanced by the pawl, a flexible member to open the valve, a latch to which the flexible member is connected to hold the valve open during traverse of the nozzle and for a predetermined time thereafter, and means operated by the ratchet for tripping the latch to close the valve.

7. In a carding machine, pneumatic stripping mechanism including a nozzle, means for applying suction to the nozzle, a suction valve, traverse mechanism for the nozzle, timing means, a feed drive and a throw-out mechanism therefor, means operated by setting of the nozzle at the beginning of the stripping operation to actuate the throw-out mechanism to disconnect the feed drive, a valve-operating member, timing means operated by the traverse mechanism during traverse of the nozzle and for a predetermined time thereafter, and means controlled by the timing means for actuating the valve-operating member and the throw-out mechanism to shut the valve and to re-connect the feed drive.

8. In a carding machine, pneumatic stripping mechanism including a nozzle, means for applying suction to the nozzle, a suction valve, traverse mechanism for the nozzle, timing means including a pawl operated by the traverse mechanism during and after traverse of the nozzle, a ratchet advanced by the pawl, a cord for manual opening of the valve, a latch having a hook to which the cord is connected to hold the valve open, and timing means operated by the traverse mechanism during a predetermined number of revolutions of the traverse mechanism to trip the latch and release the cord.

9. In a carding machine, pneumatic stripping mechanism including a nozzle, means for applying suction to the nozzle, a suction valve, traverse mechanism for the nozzle, timing means including a pawl operated by the traverse mechanism and a ratchet advanced by the pawl, a rod engaged by the nozzle during setting thereof at the beginning of the stripping operation, feed throw-out mechanism operated by the rod, a latch to hold the rod, connections between the valve and the latch to hold the valve open, and means operated by the ratchet for tripping the latch to release the rod, to shut the valve and to restore the feed throw-out mechanism.

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