April 6, 1937. J. A. VOSS 2,076,389

MACHINE FOR COMPRESSING COTTON WADS

Filed May 3, 1935 7 Sheets-Sheet 1

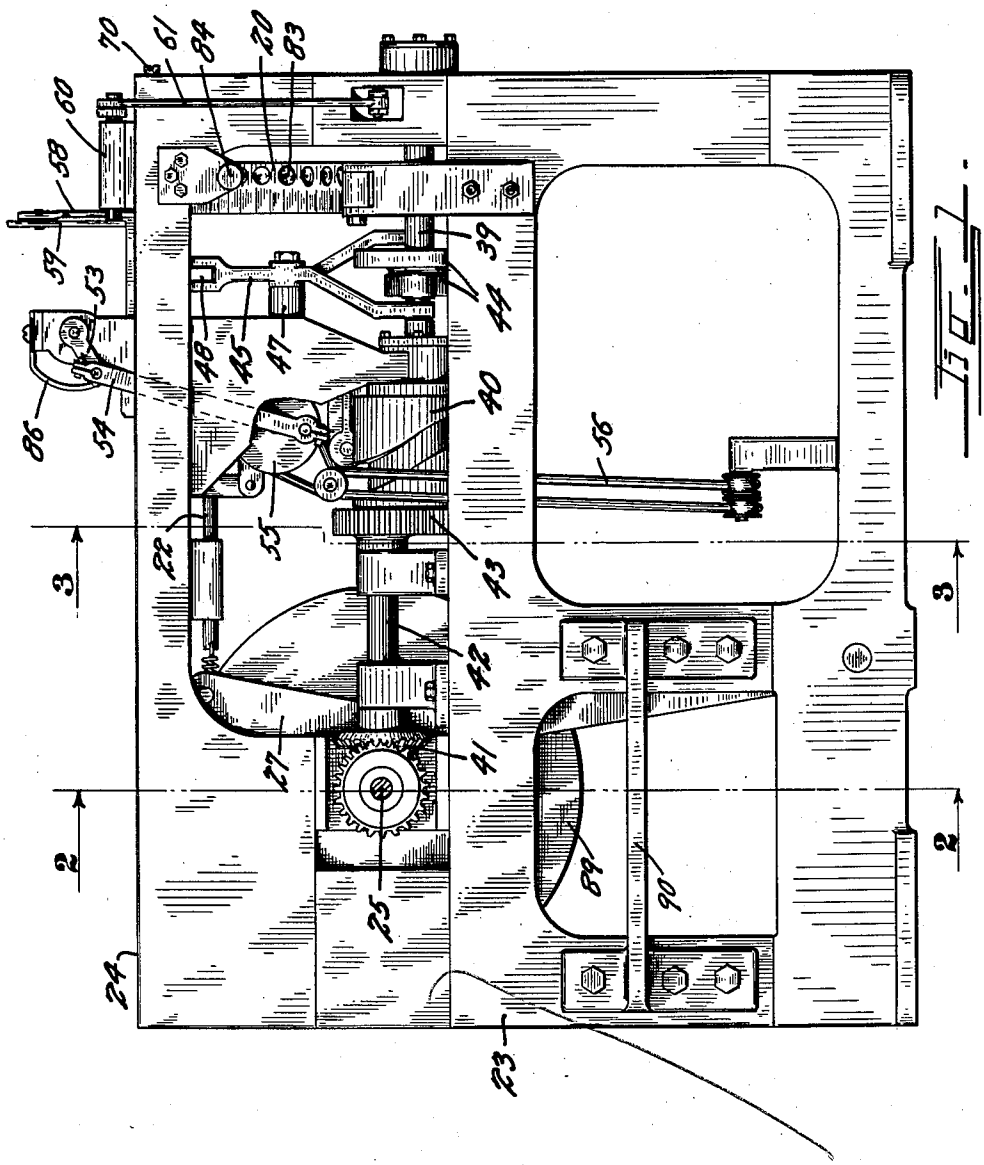


FIG. 1.

INVENTOR.
JOSEPH A. VOSS
BY
ATTORNEY.

April 6, 1937. J. A. VOSS 2,076,389

MACHINE FOR COMPRESSING COTTON WADS

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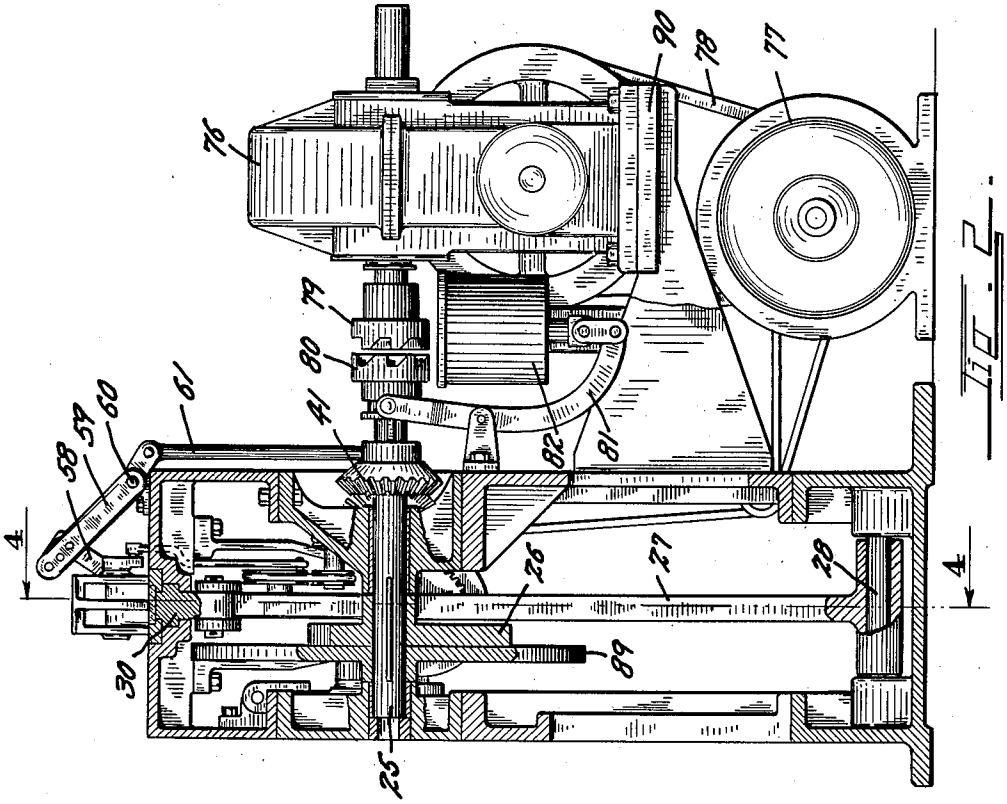


Fig. 2.

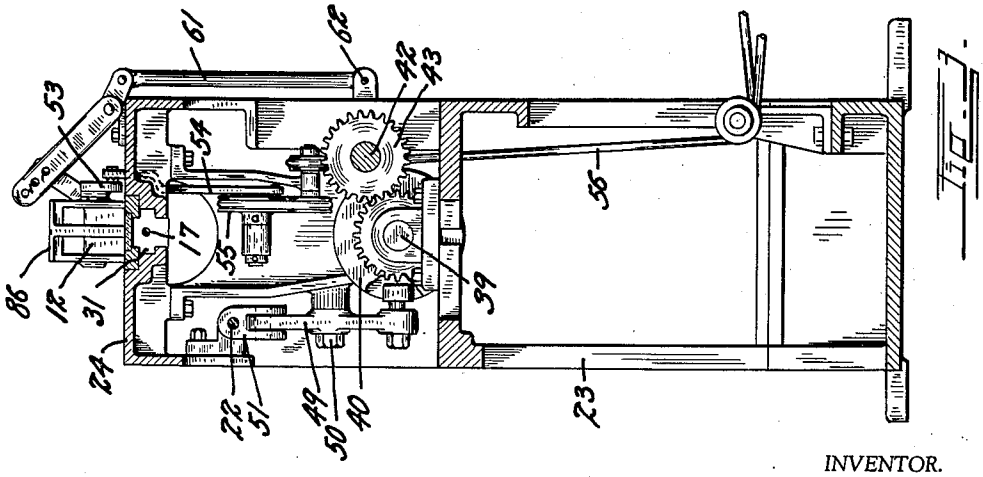


Fig. 1.

INVENTOR.

JOSEPH A. VOSS

BY

ATTORNEY.

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MACHINE FOR COMPRESSING COTTON WADS

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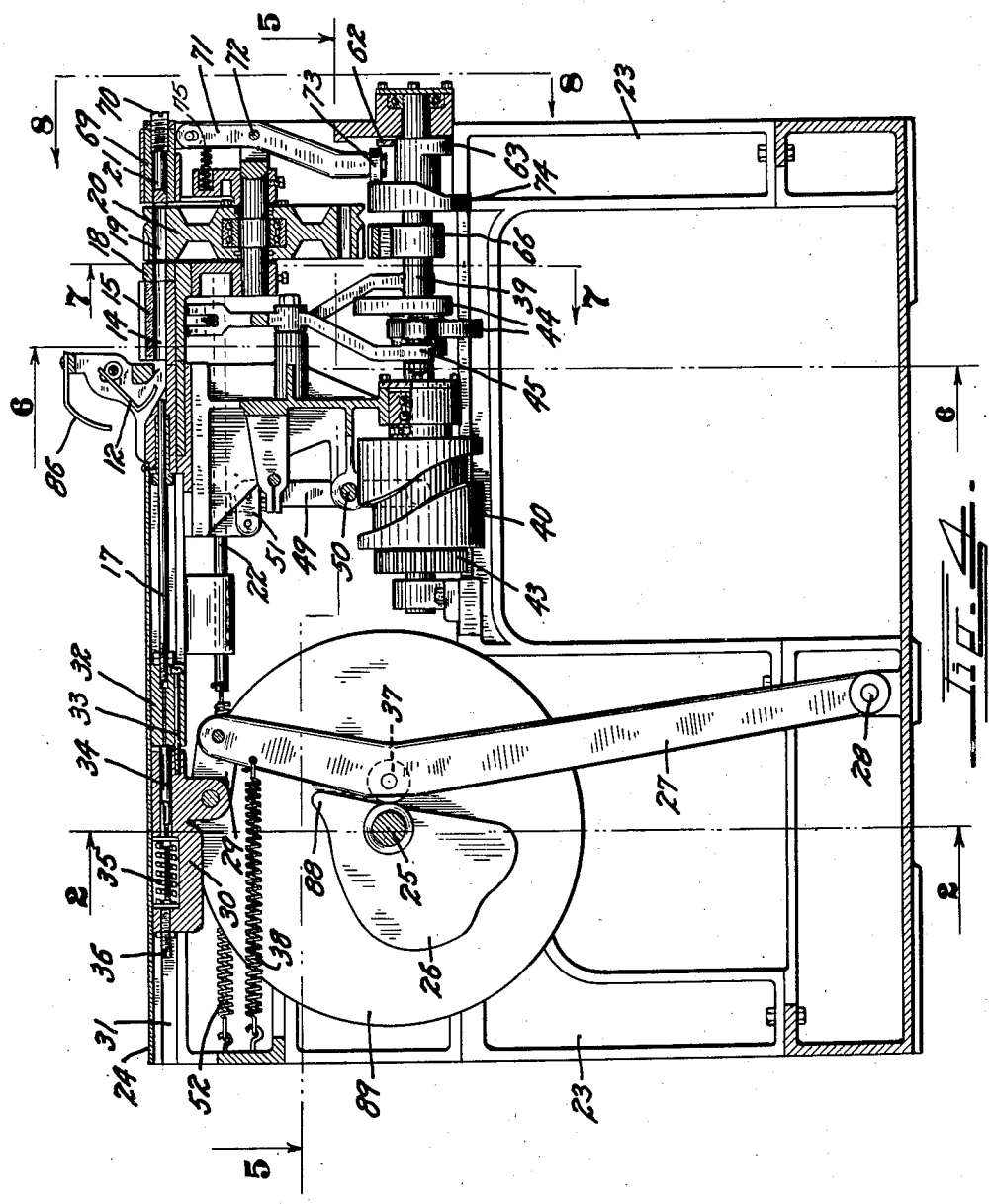


FIG. 4.

INVENTOR.

JOSEPH A. VOSS

BY

ATTORNEY.

April 6, 1937. J. A. VOSS 2,076,389

MACHINE FOR COMPRESSING COTTON WADS

Filed May 3, 1935 7 Sheets-Sheet 4

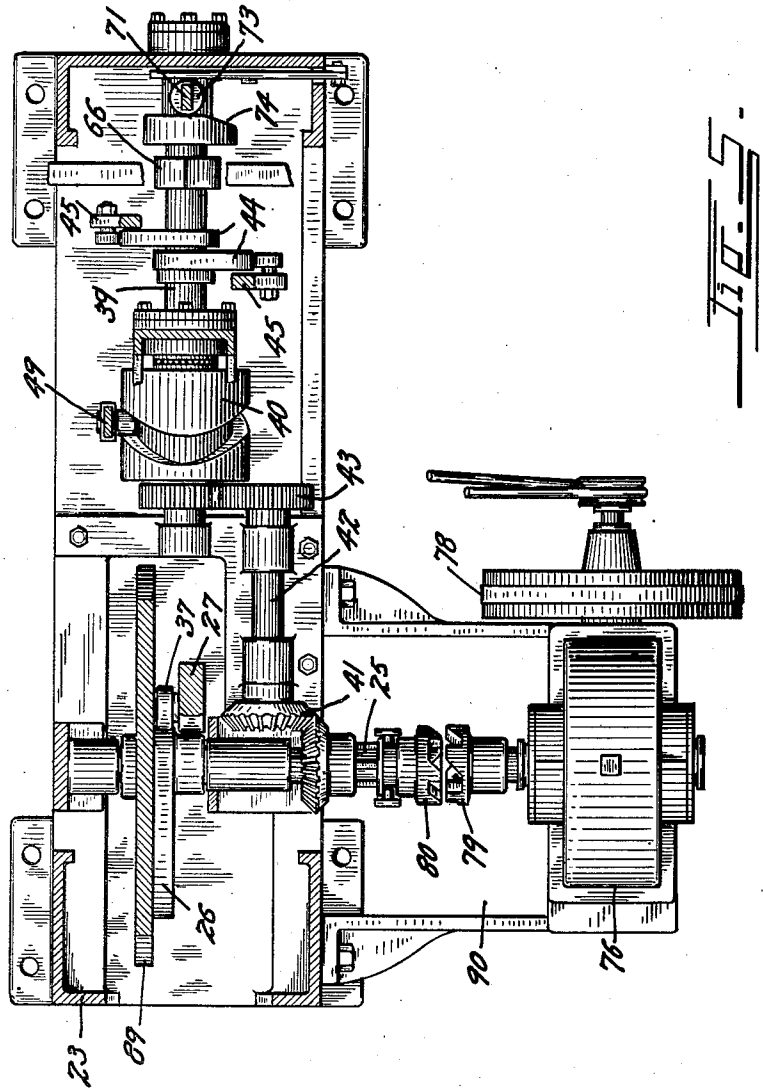


FIG. 5.

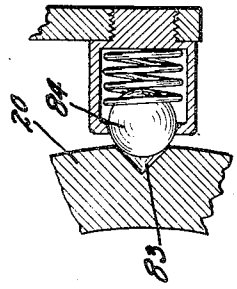


FIG. 14.

INVENTOR.
JOSEPH A. VOSS
BY
ATTORNEY.

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MACHINE FOR COMPRESSING COTTON WADS

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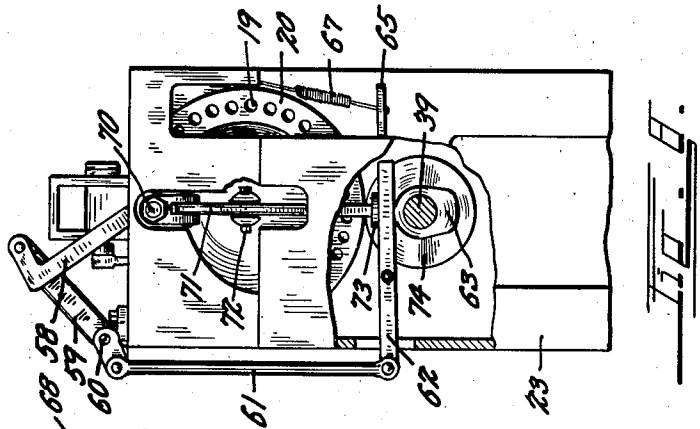


FIG. 6.

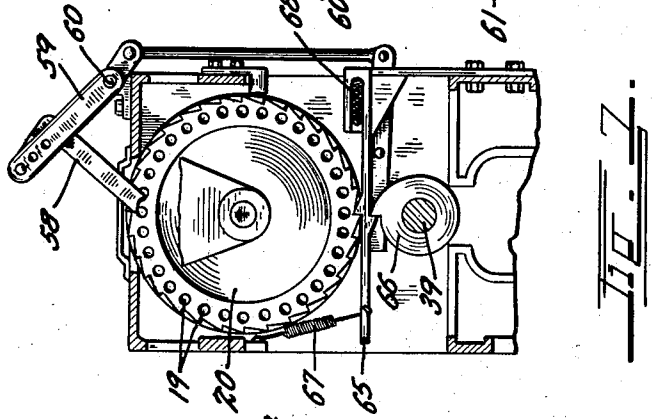


FIG. 7.

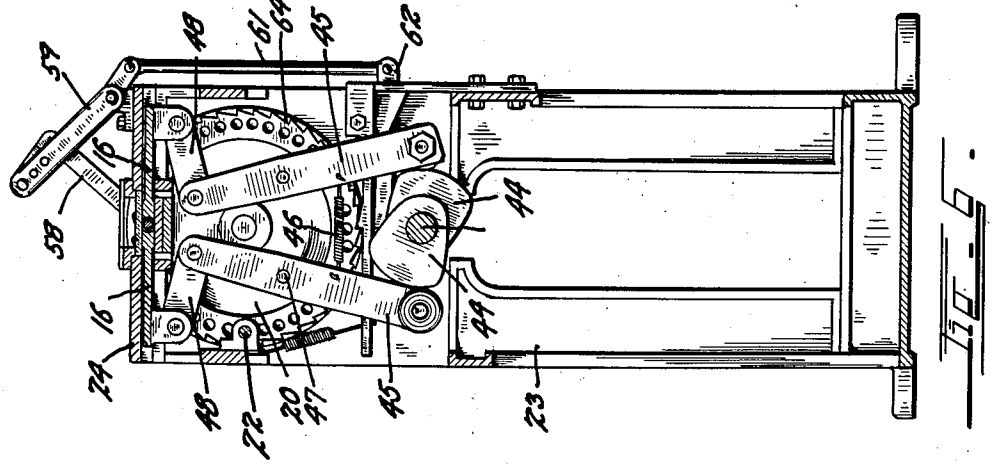


FIG. 5.

INVENTOR.

JOSEPH A. VOSS

BY

ATTORNEY.

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MACHINE FOR COMPRESSING COTTON WADS

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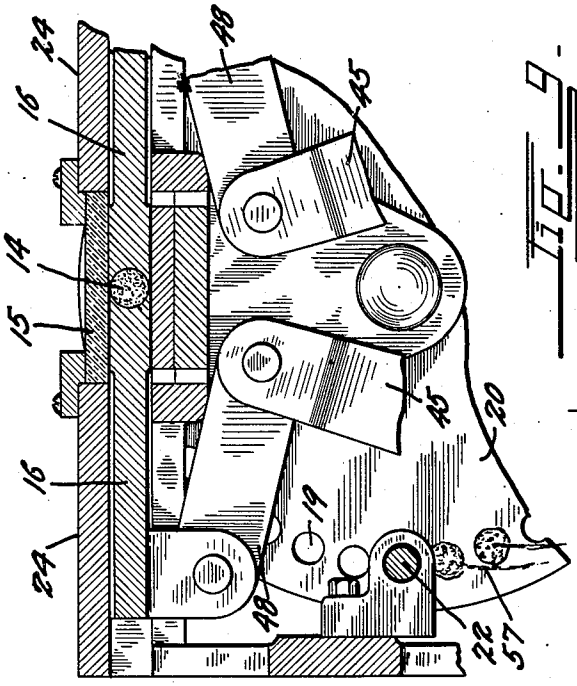


FIG. 9.

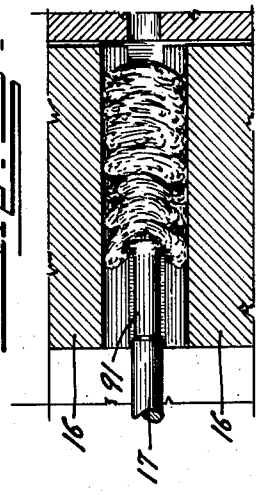


FIG. 15.

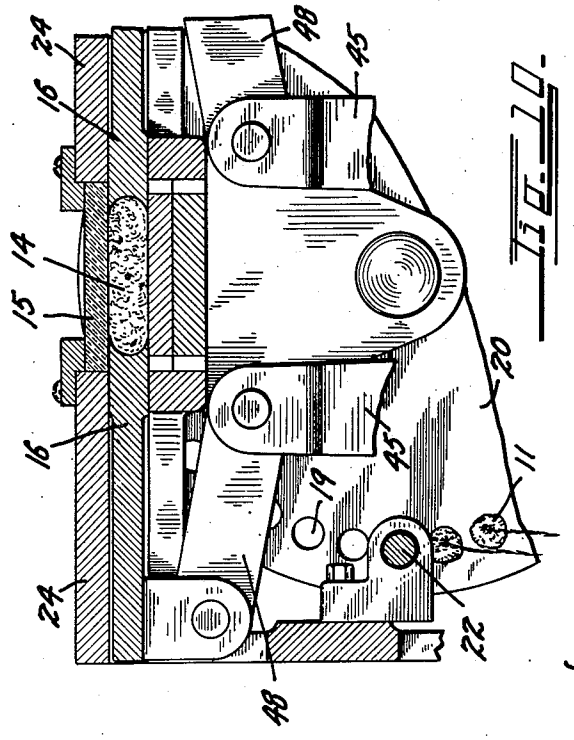


FIG. 10.

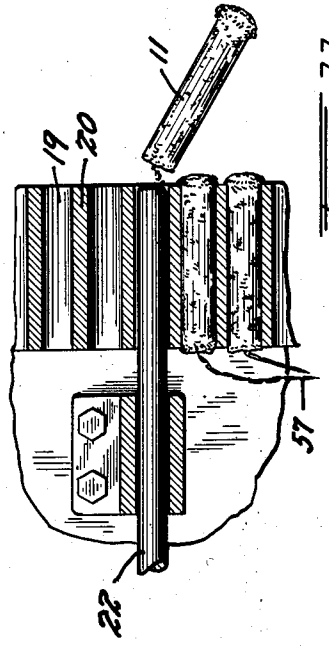


FIG. 11.

INVENTOR.

JOSEPH A. VOSS

BY

ATTORNEY.

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MACHINE FOR COMPRESSING COTTON WADS

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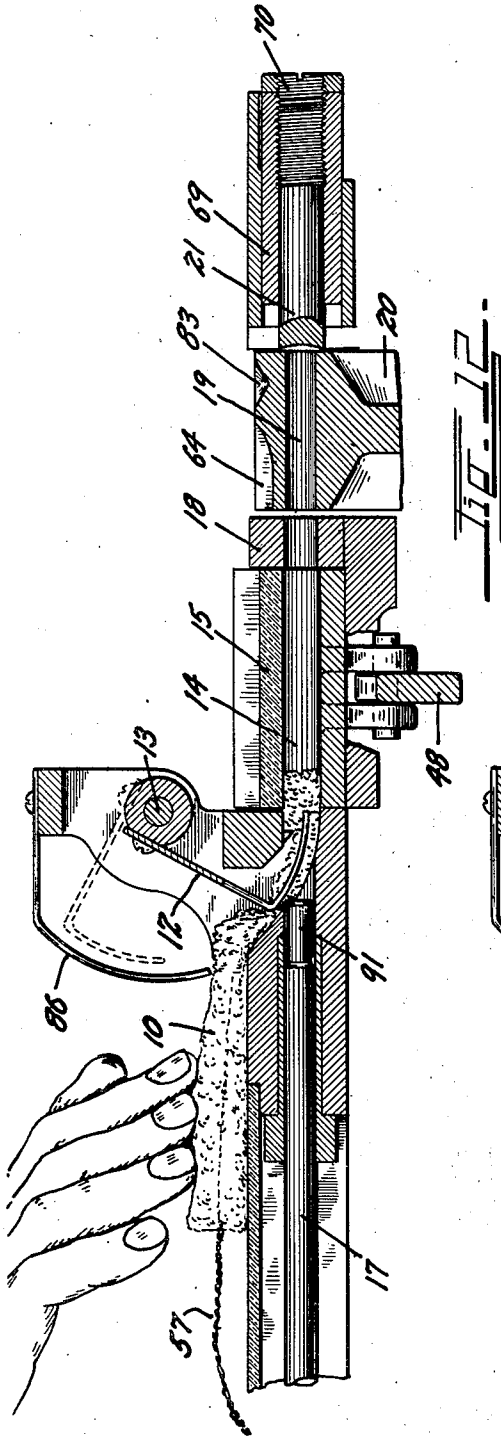


FIG. 12.

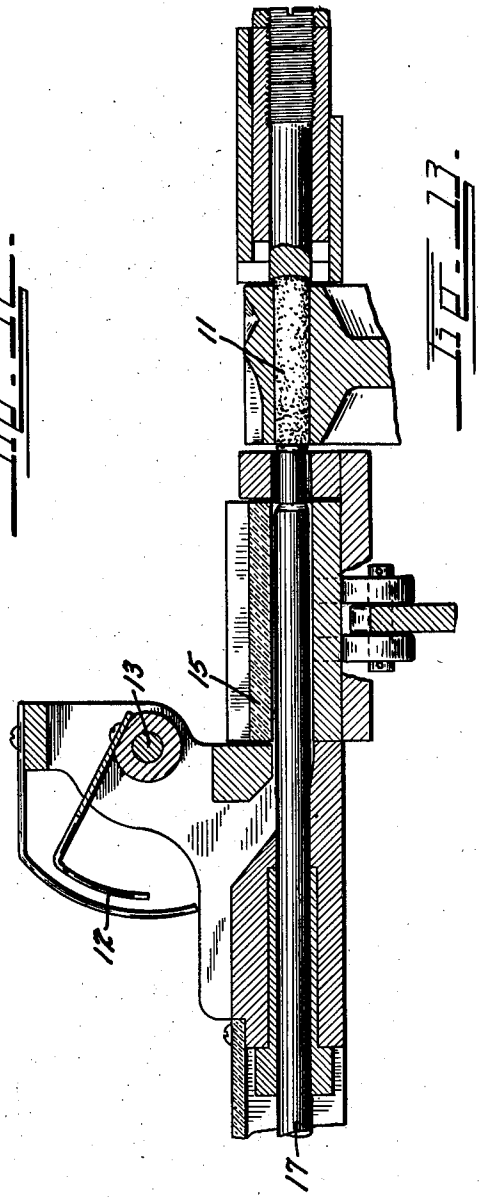


FIG. 13.

INVENTOR.
JOSEPH A. VOSS
BY
ATTORNEY.

Patented Apr. 6, 1937

2,076,389

UNITED STATES PATENT OFFICE

2,076,389

MACHINE FOR COMPRESSING COTTON WADS

Joseph A. Voss, Denver, Colo., assignor to Tampax Sales Corporation, Denver, Colo.

Application May 3, 1935, Serial No. 19,658

8 Claims. (Cl. 18—5)

This invention relates to a machine for compressing cotton for the manufacture of catamenial devices, and more particularly to the manufacture of a catamenial device such as shown in prior Patent No. 1,926,900.

The principal object of the invention is to provide a highly efficient machine which will rapidly and efficiently convolute cotton strips and compress the same into a relatively tight self-sustaining core or wad.

Another object of the invention is to so construct the device that the wads or cores will be held under compression for an interval of time to "set" the fibers thereof, without this interval interfering with the quantity production of the machine.

Other objects of the invention are to construct a machine of this type which will be safe to operate; which will automatically stop in case of unusual strains, improper feeding, etc.; which will form a cotton wad with an enlarged head thereon; and which will not break, crush, or damage the threads or strings with which such wads are provided.

Other objects and advantages reside in the detail construction of the invention, which is designed for simplicity, economy, and efficiency. These will become more apparent from the following description.

In the following detailed description of the invention reference is had to the accompanying drawings which forms a part hereof. Like numerals refer to like parts in all views of the drawings and throughout the description.

In the drawings:—

Fig. 1 is a side elevation of the invention, looking at the "right" side thereof, with the drive mechanism removed.

Fig. 2 is a vertical section, taken on the line 2—2, Fig. 1.

Fig. 3 is a similar section, taken on the line 3—3, Fig. 1.

Fig. 4 is a longitudinal section, taken on the line 4—4, Fig. 2.

Fig. 5 is a horizontal section, taken on the line 5—5, Fig. 4.

Fig. 6 is a vertical section, taken on the line 6—6, Fig. 4.

Fig. 7 is a detail section taken on the line 7—7, Fig. 4.

Fig. 8 is a fragmentary end view, taken on the line 8—8, Fig. 4.

Figs. 9 and 10 are enlarged, fragmentary sections on the line 6—6, Fig. 4, illustrating the side compression jaws in the closed and open positions, respectively.

Fig. 11 is a detail section, illustrating the action of the ejecting plunger in the chamber wheel.

Figs. 12 and 13 are enlarged longitudinal sections, on the line 4—4, Fig. 2, illustrating the end compression plunger in the withdrawn and compression positions, respectively.

Fig. 14 is a detail view of the cartridge wheel ball click.

Fig. 15 is a diagrammatic view of the first compression step.

In the drawings, the strip of cotton to be compressed is indicated at 10 with its withdrawal string at 57, and the compressed wads or cores are indicated at 11.

Briefly, the machine comprises a tucking blade 12 having a reciprocating motion to tuck the cotton strip 11 into a compression chamber 14. The compression chamber is covered by means of a glass plate 15 beneath which two side compression dies 16 reciprocate. After the tucked cotton enters the compression chamber 14, the two side dies 16 close. The faces of these dies are semi-cylindrical so that they form the cotton into the cylindrical core shape 11. This compressed core is then expelled from the compression chamber by means of a compression plunger 17. From the compression chamber, the cotton passes through a bore in a guide block 18 and into one of a plurality of chambers 19 into a chamber wheel 20. The plunger 17 passes sufficiently far into the chambers 19 to give a secondary compression to the cotton core therein so as to force it against a head forming die 21 at the opposite extremity of the chamber which forms a mushroom-like head upon the wad. The chamber wheel then moves to present the next successive chamber to receive the next successive wad, etc. The wads are held in the chamber wheel until the latter rotates approximately ¾ of a revolution, at which time, the chambers come opposite an expelling plunger 22 which expels the wads from the chamber wheel to any suitable receiver.

In detail, the machine comprises a suitable supporting frame 23, the top of which forms a work table 24. The table 24 is grooved longitudinally throughout its length to provide space for the compression plunger 17 and its operating mechanism. A drive shaft 25 is journalled laterally of the frame 10 and provided with a cam 26. A fly wheel disc 89 is secured on the drive shaft to store energy for the various cams.

A cam lever 27 is hinged at 28 adjacent the bottom of the frame 23. The cam lever 27 is pro-

vided with a cam follower roll 37 which is constantly held against the cam 26 by means of a tension spring 38. The upper extremity of this lever is connected through the medium of a link 29 with a slide block 30 which travels in side grooves 31 in the central slot of the work table 24. The rear extremity of the plunger 17 is threaded into a plunger block 32 which is tied to the slide block 30 by means of an adjustment screw 33 so that the distance between the plunger block and the slide block can be varied to accurately adjust the projection of the plunger 17. The pressure of the slide block 30 is transmitted to the plunger block by means of a slidable pressure rod 34 mounted in the block 30. This rod is forced forwardly against the plunger block 32 by means of a compression spring 35. The compression spring 35 determines the pressure exerted on the wad and is adjustable through a spring adjusting screw 36. It can be readily seen that as the shaft 25 rotates, the cam 26 will swing the lever 27 to reciprocate the plunger 17 in accordance with the contour of the cam 26.

The mechanism for operating the side compression dies 16 is as follows: a cam shaft 39 is mounted below the side dies and provided with a cylindrical cam 40. The cam shaft 39 is driven from the drive shaft 25 through the medium of suitable miter gears 41, jack shaft 42, and spur gears 43 so that the cam shaft 39 will rotate in unison with the drive shaft 25. The cam shaft 39 is provided with a pair of oppositely acting cams 44 against each of which cam followers on the lower extremities of a pair of levers 45 are held by means of a tension spring 46. The levers 45 are pivoted intermediate their extremities on studs 47 extending from a cross member in the frame 23. The upper extremity of each of the levers 45 is connected to one of the two side compression dies 16 through a suitable link 48. Thus, it can be seen that as the shaft 39 rotates, the cams 44 will cause the levers 45 to alternately push the side dies 16 away from each other or pull them toward each other once in each revolution.

The ejection plunger 22 is actuated from a cam 40 on the cam shaft 39. This cam actuates the lower extremity of a lever 49 which is pivoted intermediate its extremities at 50. The upper extremity of this lever is connected by means of a link 51 to the ejecting plunger 22. A tension spring 52 draws upon the plunger 22 to assist the return thereof.

The tucking blade 12 is mounted on a blade shaft 13 which is operated from a crank 53. A connecting rod 54 connects the crank 53 with a crank pin upon the face of a driven pulley 55 within the frame 23. The pulley 55 is driven from a suitable belt 56. A guard 86 is provided to protect the operator from the tucker blade 12.

The cotton strips 10, as before stated, are provided with withdrawal strings or cords 57 which follow behind the strips as they enter the compression chamber 14. The cartridge wheel 20 does not rotate sufficiently far between each operation of the plunger 17 to completely withdraw these strings 57 from the compression chamber. Means must therefore be provided to withdraw the preceding string before the next plug enters the chamber. This is accomplished by means of a relatively thin string blade 58 which reciprocates into the space between the guide block 18 and the cartridge wheel 20 after each plug enters its chamber 19, so as to pull the strings from the compression chamber and fold them downwardly along the face of the cartridge wheel 20. The blade 58 is reciprocated from a bell crank lever 59 pivoted at 60 on the work table 24. The bell crank lever 59 is reciprocated by means of a connecting rod 61, leading from the outer extremity of a cam lever 62. The other extremity of the cam lever 62 bears against a cam 63 on the shaft 39 so that at each revolution of the latter, the lever 62 will be lifted to force the blade 58 downwardly along the face of the cartridge wheel 20 to push the string 57 downwardly therealong.

The cartridge wheel 20 is rotated by the following mechanism. The periphery of the wheel is provided with ratchet teeth 64 against which a sliding pawl 65 acts. The sliding pawl 65 is actuated from a single toothed ratchet 66 secured on the cam shaft 39. The pawl is provided with an upper ratchet tooth for engaging the teeth 64 of the wheel 20, and with a lower ratchet tooth to be engaged by the tooth of the gear 66. A spring 67 constantly holds one extremity of the pawl upwardly so as to maintain the upper tooth in engagement with the teeth 64. A second spring 68 acts to return the pawl to its normal position after each reciprocation.

It can be seen that each revolution of the shaft 39 will cause the pawl 65 to rotate the cartridge wheel one tooth space, and since the teeth are equal in number to the chambers 19, it will rotate this wheel one chamber space.

It is essential that the chambers 19 of the cartridge wheel stop in perfect alignment with the plunger 17. To insure this, the periphery of the cartridge wheel is provided with a series of depressions 83 into which a spring actuated ball 84, see Fig. 14, is forced, after each movement of the wheel, thus insuring perfect alignment with the chambers 19.

The end thrust of the plugs as they enter the chambers in the wheel 20 is received on the head of a die 21, the extremity of which is indented to form a mushroom-like head upon each of the plugs. The die 21 is carried in a slidably mounted die block 69 and its position in the die block can be adjusted by means of an adjusting screw 70. The die block 69 reciprocates toward the chamber wheel at each compression stroke, and moves away from the chamber wheel during the rotation of the latter. This reciprocating motion is accomplished by connecting the die block 69 with the upper extremity of a rocking lever 71. The lever 71 is hinged intermediate its extremities on a hinge pin 72 and carries a cam follower roll 73 at its lower extremity. The roll 73 rides against a cam face on a face cam 74 also mounted on the cam shaft 39. It can be seen that at each revolution of the shaft 39, the end forming die 21 will move against the cartridge wheel to absorb the thrust of the incoming core so as to prevent the latter being forced through the chamber, and to mold a head thereon. A compression spring 75 acts to maintain the lever 71 against its cam 74.

The machine may be driven in any suitable manner, as illustrated, it is driven from a speed reducer 76 which in turn is driven from a suitable electric motor 77 through the medium of a belt 78. The belt 56 which actuates the tucker blade 12 can be driven from a pulley 85 upon the fast shaft of the speed reducer 76. The shaft of the speed reducer is provided with a fixed clutch member 79 and the extremity of the drive shaft 25 is provided with a slidable clutch member 80, splined thereon, which cooperates with the first clutch member 79. The clutch member

80 is actuated from a clutch lever 81 which in turn is actuated from an electric solenoid 82. Thus, whenever the solenoid is energized, the clutch will be thrown to the engaged position, and when deenergized, will move to the disengaged position. The solenoid can be operated from a button or switch convenient to the operator's position so as to quickly stop and start the machine. A friction clutch could be used if preferred.

Operation

The operator feeds the strip of cotton 10 beneath the tucker blade guard 86 where it will be engaged by the tucker blade 12 and tucked into the compression chamber 15. The operator then touches the solenoid contact, causing the solenoid 82 to engage the drive shaft clutch. The first movement is to cause a first point 88 on the cam 26 to reciprocate the plunger a relatively short stroke to press the cotton into the compression chamber 14. The plunger then moves slightly rearward while the side dies 16 close upon the cotton to form it into a cylindrical block. The plunger 17 again starts forward and pushes the compressed plug into the chamber wheel where it exerts the final pressure thereon against the heading member 21. The plunger then quickly returns to its withdrawn position, the side jaws open, the heading member moves away from the cartridge wheel, and the latter rotates one space to receive the next plug. While the plug is receiving its final compression in the cartridge wheel, the expelling plunger 24 is forced forward by the cam 40 to expel the next successive plug from the cartridge wheel.

It is desired to call attention to the first action of the plunger 17. As this plunger makes its initial entrance between the side dies, the latter are in frictional engagement with the cotton core. This causes the plunger to bend the convolutions forward as shown in Fig. 15. When the side dies then close these convolutions are uniformly bent back upon themselves. This plug structure has been found more satisfactory than a non-uniform compression of the convoluted cotton.

While a specific form of the improvement has been described and illustrated herein, it is desired to be understood that the same may be varied, within the scope of the appended claims, without departing from the spirit of the invention.

Having thus described the invention, what is claimed and desired secured by Letters Patent is:—

1. A machine for compressing cotton strips into compressed self-sustaining cores comprising: an inserting member; a compression chamber for receiving said cotton from said inserting member; laterally moving dies initially compressing said cotton in said compression chamber; a longitudinal moving plunger for imparting a second compression to said cotton therein; a guide block on the discharge extremity of said compression chamber in alignment with said plunger; a traveling series of receiving chambers; and means for successively aligning said chambers with the passage in said guide block so that said plunger may force the wad from said compression chamber through said guide block into one of said receiving chambers.

2. A machine for compressing cotton strips into compressed self-sustaining cores comprising an inserting member; a compression chamber for receiving said cotton from said inserting member; laterally moving dies initially compressing said cotton in said compression chamber; a longitudinal moving plunger for imparting a second compression to said cotton therein; a guide block on the discharge extremity of said compression chamber in alignment with said plunger; a traveling series of receiving chambers; and means for successively aligning said chambers with the passage in said guide block so that said plunger may force the wad from said compression chamber through said guide block into one of said receiving chambers; an expelling plunger with which said receiving chambers successively align; and means for actuating said expelling plunger so as to force said wads from said receiving chambers.

3. A machine for compressing cotton strips into compressed self-sustaining cores comprising: an inserting member; a compression chamber for receiving said cotton from said inserting member; laterally moving dies initially compressing said cotton in said compression chamber; a longitudinal moving plunger for imparting a second compression to said cotton therein; a guide block on the discharge extremity of said compression chamber in alignment with said plunger; a traveling series of receiving chambers; means for successively aligning said chambers with the passage in said guide block so that said plunger may force the wad from said compression chamber through said guide block into one of said receiving chambers; a heading die; and means for moving said heading die against each of said receiving chambers when the latter are in alignment with said compression chamber.

4. In a machine for compressing cotton wads having a string depending therefrom; a compression chamber; a receiving chamber; and a blade-like member moving between said compression chamber and said receiving chamber so as to contact and withdraw said string from said compression chamber.

5. In a machine for compressing cotton wads of the type having a withdrawal string attached thereto; a compression chamber; a traveling series of receiving chambers; means for intermittently actuating said series so as to successively bring said receiving chambers opposite said compression chamber; a plunger for forcing a wad from said compression chamber into said receiving chamber; and means for withdrawing said withdrawal string from said compression chamber.

6. In a machine for compressing cotton wads of the type having a withdrawal string attached thereto; a compression chamber; a traveling series of receiving chambers; means for intermittently actuating said series so as to successively bring said receiving chambers opposite said compression chamber; a plunger for forcing a wad from said compression chamber into said receiving chamber; a relatively thin blade-like member positioned between said compression chamber and said receiving chamber; and means for reciprocating said blade-like member so as to contact with and withdraw each of said strings from said compression chamber.

7. A machine for compressing cotton into self-sustaining wads comprising: a work table; a compression chamber positioned below the surface of said work table; a plunger; means for moving said plunger into said compression chamber, said plunger being positioned below the surface of said table and parallel therewith; a pas-

sage extending from the surface of said work table to said compression chamber; a shaft positioned above said passage; a tucking arm secured to said shaft and provided with a curved extremity to enter said passage; and means for reciprocating said shaft so as to cause said arm to tuck the cotton from said work table through said passage into said compression chamber.

8. A machine for compressing cotton into self-sustaining wads comprising: a work table; a compression chamber positioned below the surface of said work table; a plunger; means for moving said plunger into said compression chamber, said plunger being positioned below the surface of said table and parallel therewith; a passage extending from the surface of said work table to said compression chamber; and means for passing cotton from said work table through said passage into said compression chamber ahead of said plunger.

JOSEPH A. VOSS.