No. 881,367. PATENTED MAR. 10, 1908.

H. AUCHU.

MACHINE FOR FORMING A CARTRIDGE ROPE FROM EXPLOSIVE GELATIN.

APPLICATION FILED MAY 23, 1907.

5 SHEETS—SHEET 1.

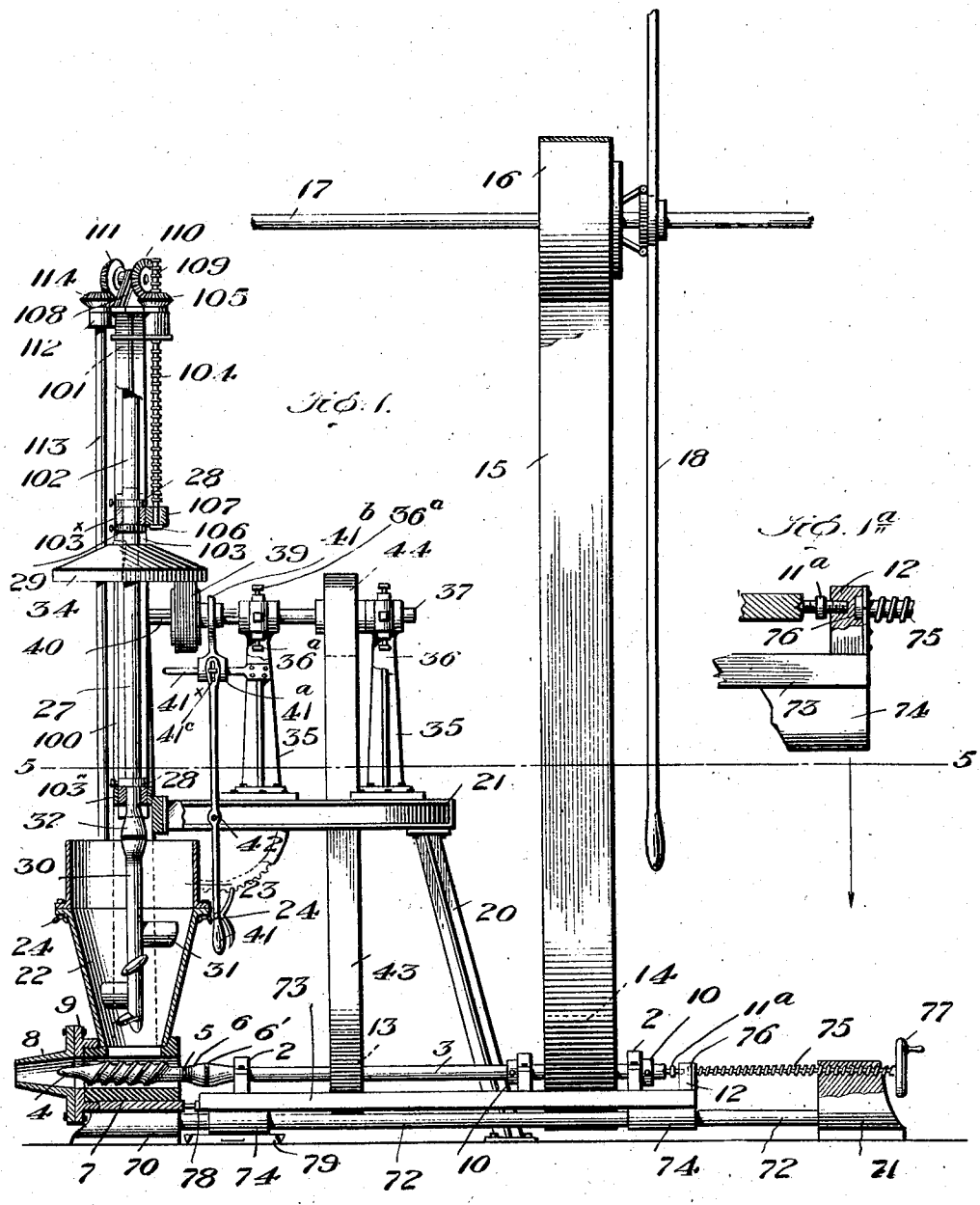


Fig. 1.

Fig. 1a.

Witnesses

Inventor

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his Attorney

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5 SHEETS—SHEET 2.

Fig. 2.

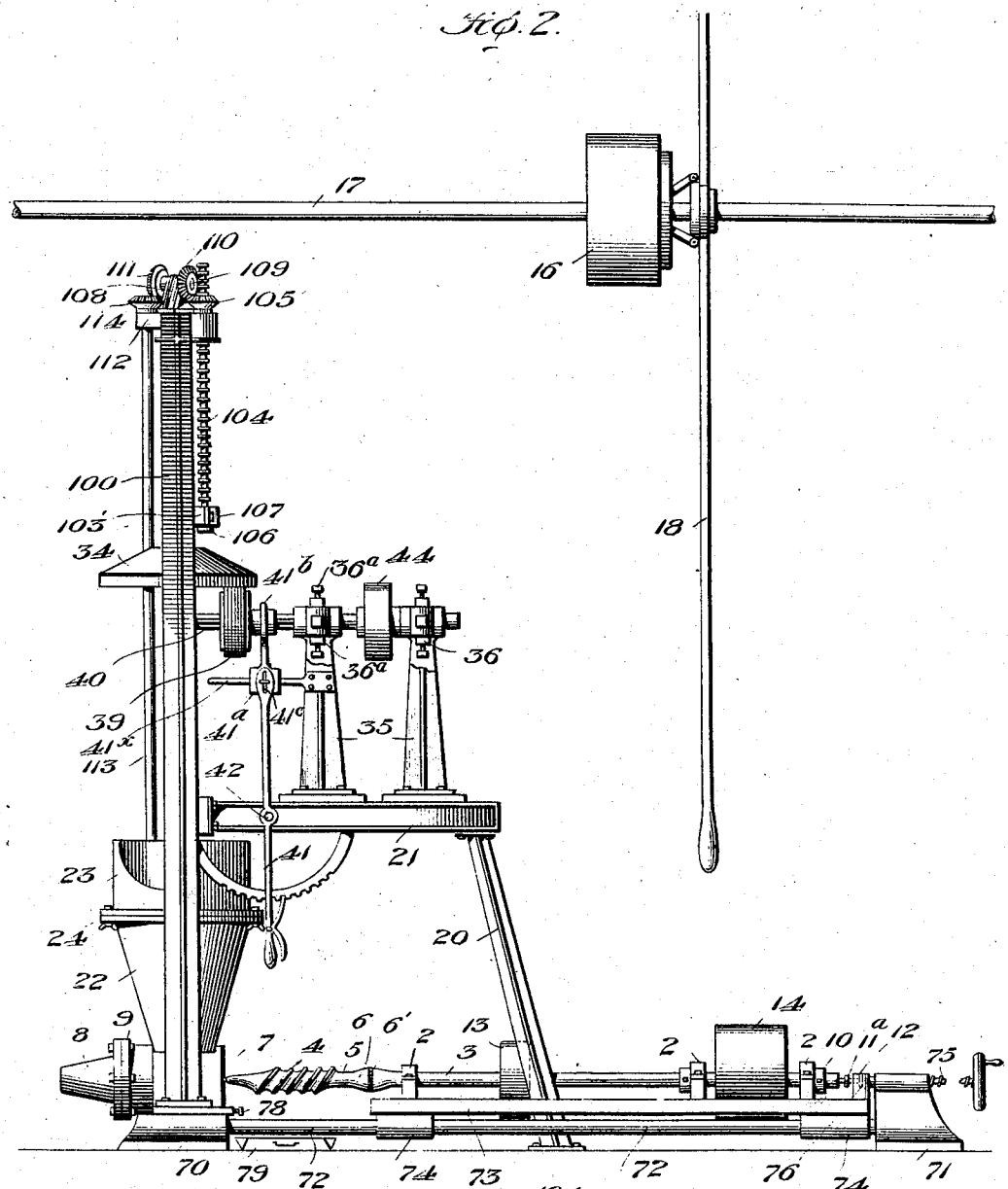


Fig. 2b.

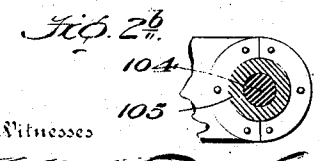
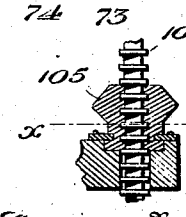


Fig. 2a.



Witnesses

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5 SHEETS—SHEET 3.

Fig. 3.

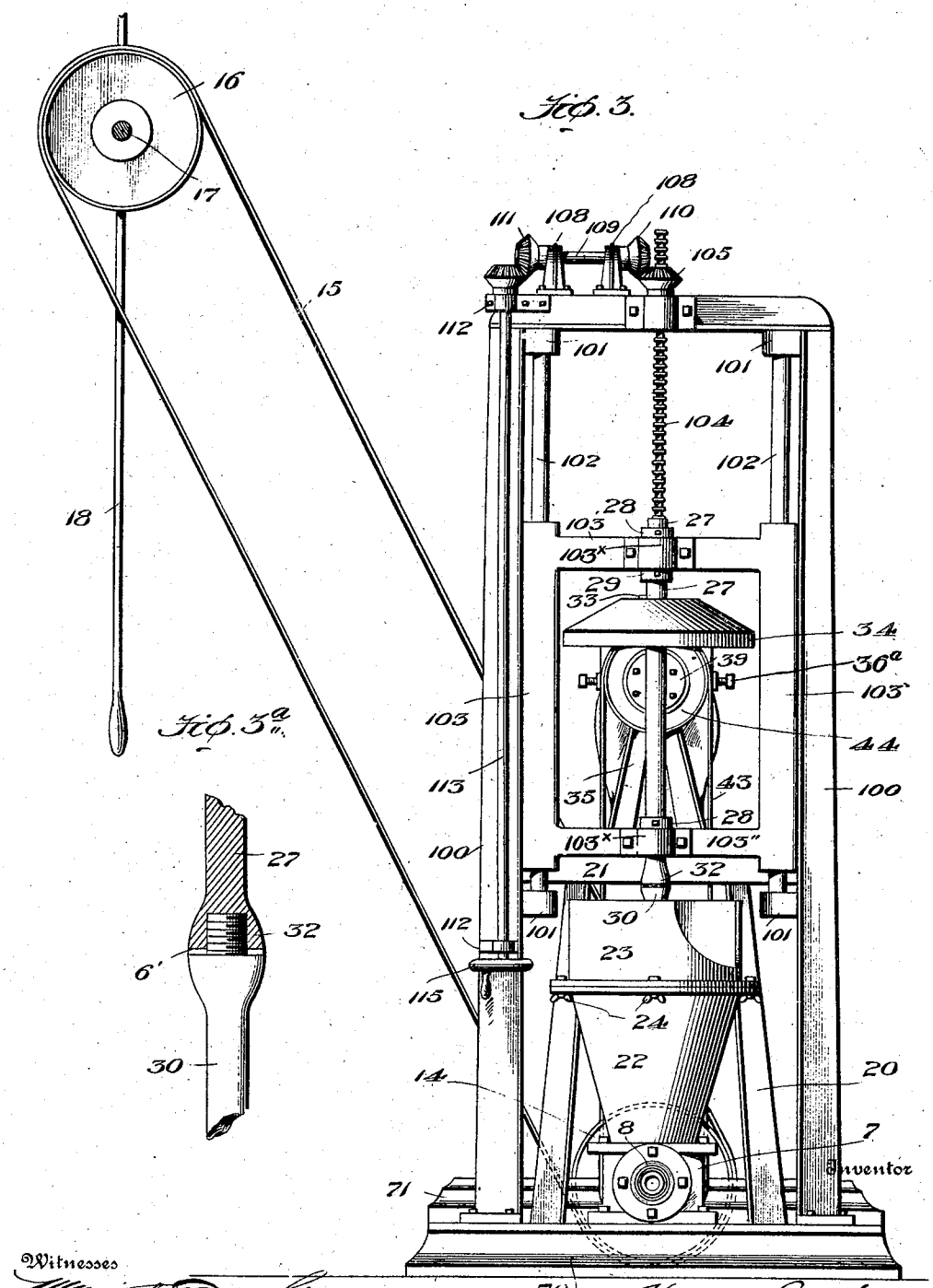


Fig. 3a.

Witnesses

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No. 881,367. PATENTED MAR. 10, 1908.

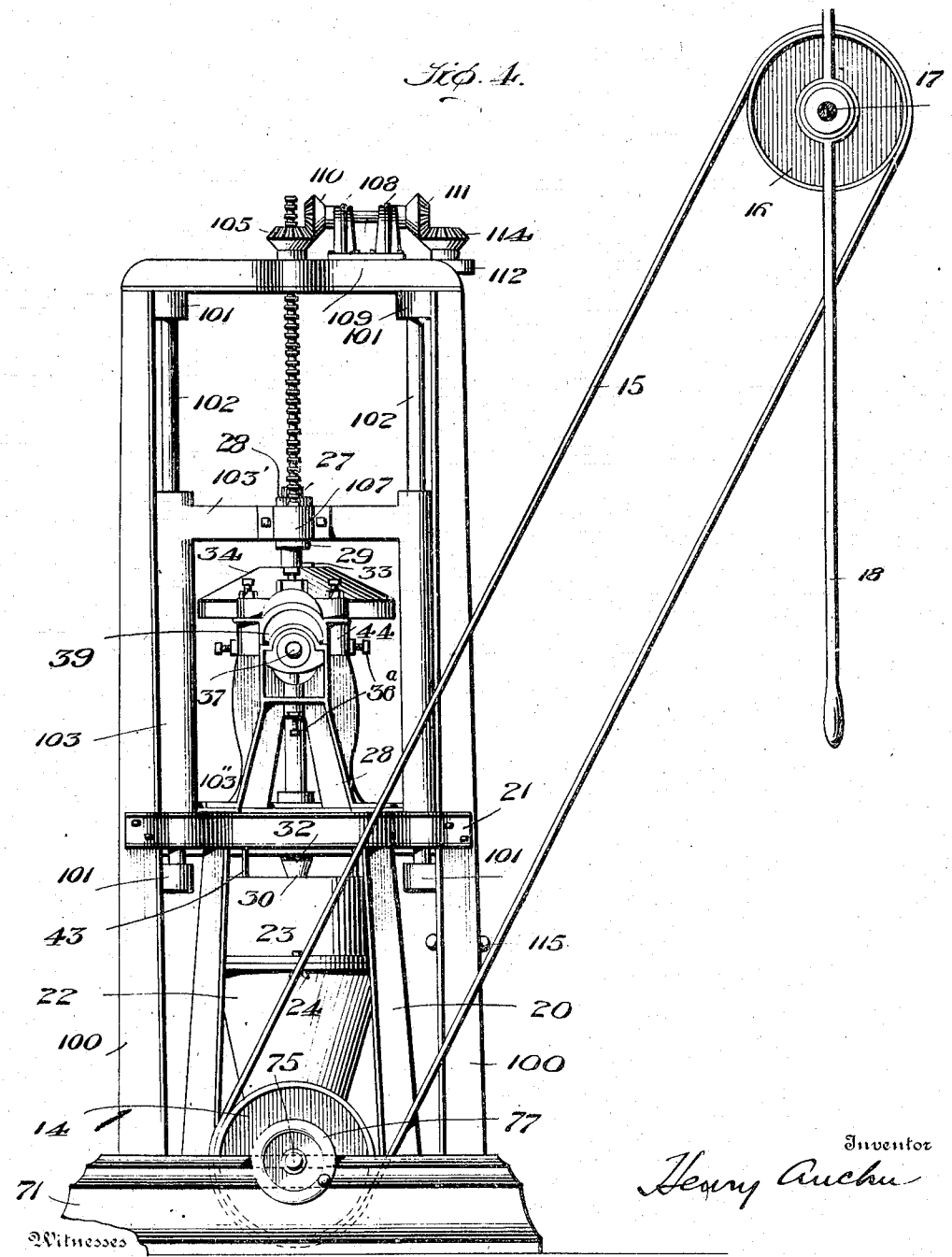
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5 SHEETS—SHEET 4.

Fig. 4.



Witnesses

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MACHINE FOR FORMING A CARTRIDGE ROPE FROM EXPLOSIVE GELATIN.

APPLICATION FILED MAY 23, 1907. 5 SHEETS—SHEET 5.

Fig. 5.

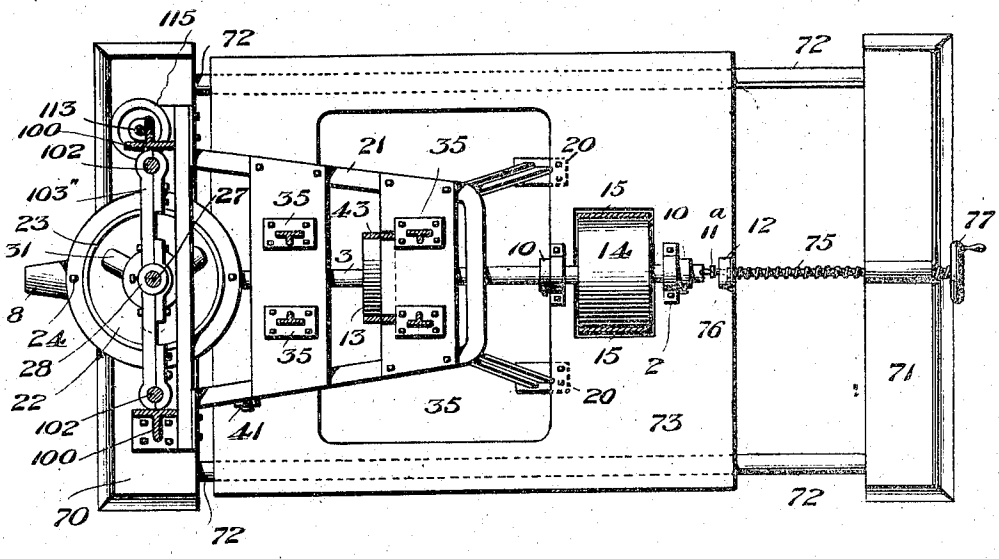


Fig. 6.

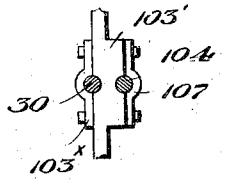


Fig. 7.

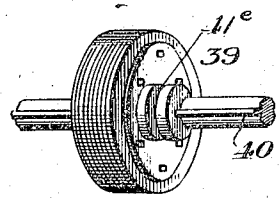
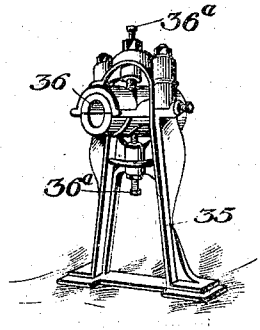


Fig. 8.



Inventor

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Jacob L. Lechner

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UNITED STATES PATENT OFFICE.

HENRY AUCHU, OF EMPORIUM, PENNSYLVANIA.

MACHINE FOR FORMING A CARTRIDGE-ROPE FROM EXPLOSIVE GELATIN.

No. 881,367. Specification of Letters Patent. Patented March 10, 1908.

Application filed May 23, 1907. Serial No. 375,299.

To all whom it may concern:

Be it known that I, HENRY AUCHU, a citizen of the United States, residing at Emporium, county of Cameron and State of Pennsylvania, have invented certain new and useful Improvements in Machines for Forming a Cartridge Rope from Explosive Gelatin, of which the following is a specification.

This invention relates to machines for forming a cartridge rope from explosive gelatin.

The manufacture of cartridges from explosive gelatin, which is a plastic substance of a consistency depending upon various conditions, is generally carried on by forcing it, under pressure, through a nozzle from which the gelatin emerges as a continuous rope, the diameter of which may be from less than an inch to upwards of two inches, this rope being cut into suitable lengths, usually about eight inches, after emergence from the nozzle, to thereby form the cartridges which are then suitably wrapped so as to be ready for commercial use.

Machines of the character set forth have usually employed a horizontal screw, termed by skilled workers in explosives a "packing screw," for forcing the explosive gelatin through the nozzle, and associated with this packing screw means have been employed to feed the plastic gelatin to the screw.

Heretofore in machines for forming a cartridge rope from explosive gelatin, no means have been provided for removing the feeder, which delivers the explosive gelatin to the packing screw, from the hopper in which it operates except by taking apart the machine itself. Machines of the character set forth have to be cleaned quite frequently, usually at the end of a day's run, and for this reason, it is very desirable to provide for such cleaning without taking the machine apart.

The particular object of the present invention is the provision of means whereby the feeder may be readily and easily removed from the hopper in which it operates whenever it is desired to inspect or clean it, and in this connection I seek to provide such an arrangement that the packing screw may continue its operation regardless of the position of the feeder, so that the feeder and packing screw are entirely independent in their operations.

To carry out this object I provide a novel carriage supporting the feeder, together with novel means, whereby the carriage may be raised or lowered to remove the feeder from the hopper or to replace it in the hopper, and in this connection there is employed an operating device for the feeder which permits the foregoing operations without requiring any stoppage of the machine or detachment of any of the parts thereof.

While the present improvements are shown and described as being embodied in a machine employing a horizontal packing screw, I wish it understood that such use is not the only one to which the invention may be put, as it is susceptible of use in other connections and even without the employment of a separate packing screw.

In the present invention I have shown certain other novel constructions relating to the mounting and shiftability of the packing screw, the rotating means for the feeder, etc., which are fully set forth and claimed in other applications executed by me of even date herewith, (Serial Nos. 375,296 and 375,298) and hence, no claim is laid to them herein.

The present invention is fully set forth hereinafter and its novel features are recited in the appended claims.

In the accompanying drawings: Figure 1 is a side elevation, partly in section; Fig. 1[a], a detail of the means for adjusting the packing screw shaft and packing screw carriage; Fig. 2, a side elevation of the machine, showing the packing screw and its carriage retreated from the packing screw case; Figs. 2[a] and 2[b], details of the bevel gear coöperating with the screw that raises and lowers the feeder; Fig. 3, a front end elevation of the machines; Fig. 3[a], a detail of the detachable coupling between both packing screw and its shaft and the feeder and its shaft; Fig. 4, a rear end elevation of the machine; Fig. 5, a horizontal section on line 5—5 of Fig. 1; Fig. 6, a detail section showing the lower cross-piece of the carriage which carries the feeder; Fig. 7, a detail of the movable friction wheel and its shaft; and Fig. 8, a detail of one of the adjustable bearings.

The base of the machine consists of a base part 70 which supports the packing screw case 7, which is of lead or Babbitt metal and is bolted to the base part 70, there being employed a tail-piece 71. The parts 70 and 71 are rigidly connected by parallel guide-rods 72. A sub-base or carriage 73, which has sleeves 74 that slide on the guide-rods 72, is

provided with bearings 2, in which a packing screw shaft 3 is journaled, while 4 designates the packing screw, which is of bronze, and this screw is of slightly less diameter than the bore of the packing screw case 7 which receives it. The packing screw has a short shaft-section 5 which is connected by a screw-coupling 6 with interposed rubber or paper washer 6′ to shaft 3, the threads of the screw-coupling being so arranged that rotation of the packing screw and shaft 3 tends to tighten the joint 6. In machines for packing explosive gelatin, it has been usual to form the packing screw and its complete shaft from a single piece of bronze, as this material when in contact with the gelatin is not adapted to cause danger by friction, but as bronze and other alloys increase the expense, the foregoing arrangement enables the shaft 3 to be made of steel without detracting from the advantages of the use of bronze for the packing screw. A screw 11^a, threaded into the lug 12 and bearing against the rear end of shaft 3, provides means for adjusting the packing screw 4 in its case 7 to bring its tip as near as possible to the inside of the nozzle 8 without touching the latter, the nozzle 8 being bolted to a collar 9 which is threadedly and detachably connected to the packing screw case 7, thus permitting separation of these parts for purposes of cleaning. When a nozzle is employed which has a small aperture so that a small sized cartridge will be formed, it may be found advisable to adjust the packing screw as indicated, as the gelatin will then be forced through the nozzle with greater facility and the pressure which would otherwise arise would be relieved. Adjustable set collars 10 are employed on shaft 3 to limit end play thereof. Secured by splining or otherwise, to shaft 3, are belt pulleys 13 and 14, the latter being connected by belt 15 to a clutch-pulley 16 on a line or countershaft 17, a hand-lever 18 being provided for throwing the clutch-pulley 16 into and out of operative engagement with shaft 17, whereby the machine may be started or stopped.

To shift the sub-base, which may be termed a carriage, 73 back and forth on the rods or guides 72, a screw 75 is employed, the same being threaded through the tail-piece 71 and having a head 76 swiveled in lug 12 so that the carriage or sub-base may be retreated as well as advanced. A suitable hand-wheel 77, carried by the screw, is used for advancing or retreating the carriage in order that the packing screw 4 may be inserted in its case 7 or removed therefrom for purposes of cleaning. To prevent too far insertion of screw 4 in case 7, an adjustable screw 78 is employed, against which carriage 73 abuts. A removable pan 79 is adapted to catch any loose particles of gelatin falling from screw 4 when it is removed from its case.

As thus far described, the machine is substantially similar to constructions set forth and claimed in other applications executed by me of even date herewith.

Rising from and bolted to the base part 70 on opposite sides of the packing screw case 7, is a frame 100 having an upper cross-piece. This frame is provided with lugs 101 in which are secured parallel vertical guide-rods 102. A carriage 103 has its vertical parts sleeved upon or slidable on the guide-rods 102, this carriage having cross-pieces 103′ and 103″ in bearings $103^{\times}$ of which is journaled a feeder shaft 27, which is held from dropping by collars 28 adjustably secured by set screws to the shaft 27 and resting upon the upper faces of cross-pieces 103′ and 103″. To prevent upward movement of the shaft 27, except that very small endwise movement such as is common with any rotatable collared shaft, there is secured on the shaft 27 a collar 29, which is held by a set screw. The collars 28 and 29 may be adjusted to the desired extent to prevent binding of the shaft 27 in its bearings. Rigidly secured to shaft 27 by the key 33 is a friction wheel 34, the lower face of which is by preference perfectly flat.

The feeder is of bronze and comprises a shaft 30 having horizontal blades or paddles 31, which are substantially elliptical in cross-section and are disposed with their faces at an angle to the length of the shaft 30, said shaft 30 having a detachable screw-threaded coupling 32 with the lower end of shaft 27, this coupling being in all respects similar to the coupling 6 and having the rubber or paper gasket or washer between its parts.

The hopper 22 is bolted to the top of the packing screw case 7 and the upper part of the hopper is in the form of a cylindrical ring 23, which is detachably connected to the lower part thereof by the flanges and bolts 24, permitting removal of the upper part for purposes of cleaning. The ring 23 is cut out at one side to facilitate introduction of the gelatin into the hopper.

Rising from the base 1 and suitably bolted thereto is a yoke-upright 20, to which is bolted a substantially horizontal yoke-frame 21, which in turn, is bolted to the upright frame 100, thereby rigidly bracing said frame 100. Mounted upon and connected to the yoke-frame 21 are bearing standards 35 which have vertically and horizontally adjustable bearings 36 made so by the four screws 36^a, in which is mounted a horizontal shaft 37. Splined upon the projecting end of shaft 37 by a feather 40 carried by said shaft, is a friction wheel 39 which may, owing to said splined connection 40, be slid lengthwise of the shaft by a hand-lever 41 pivoted to the frame-piece 21 at 42, said lever having a slot and pin connection 41^c with a shifter 41^a slidable on a stationary guide $41^{\times}$ and having a fork 41^b engaging a groove 41^e in the hub

of the wheel 39. The friction wheel 39 bears against the flat under face of the friction wheel 34, and as the shaft 37 is in the same plane as shaft 27, the friction-wheel 34 will be driven faster or slower, according as the friction wheel 39 is moved toward or away from shaft 27. The shifting of friction wheel 39 may be instantly accomplished by the operator, who thus has the rate of rotation of the feeder under absolute control so that if the operator finds that the feeder is crowding the packing screw by feeding too much gelatin to it, or if the consistency of the gelatin demands a different rate of feed, the operator can at once change the feed as his experience may dictate is advisable. A belt 43 connects pulley 13 with pulley 44 on shaft 37.

Passing loosely through the cross-piece of the upright frame 100, is a coarse-thread screw 104 which is threaded through a bevel gear 105, which rests upon said cross-piece. The lower end of the screw 104 is provided with a head 106 which is rigidly held against turning in the box 107 on the upper cross-piece 103', said box having removable parts permitting attachment and detachment of the head 106. Journaled in bearing standards 108 on the upper cross-piece of frame 100 is a shaft 109 to the opposite ends of which are fastened bevel gears 110 and 111, the former meshing with bevel gear 105. Journaled in bearings 112 on frame 100, is a shaft 113, which has secured to its upper end a bevel gear 114 meshing with bevel gear 111, while the lower end of this shaft has a hand-wheel 115 located at one side of the packing box for case 7 in convenient position to be turned by the operator.

In the operation of the machine, the feeder within the hopper 22—23, forces the gelatin through the opening in the top of the packing screw case 7, and the packing screw 4, in turn, presses the gelatin out through the nozzle 8 in the form of a continuous cartridge rope, which is afterward severed into marketable lengths of about eight inches and then wrapped.

As previously explained, the shaft 27 is capable of a very slight endwise movement which is no greater in magnitude than is common in any shaft having collars to limit its endwise or lengthwise thrust as some play is necessary in shafts thus held, in order to prevent binding of the collars on the bearing. This slight play, which is only a very small fraction of an inch, is sufficient, however, to cause the face of friction-wheel 34 to lift clear of engagement with friction-wheel 39, when the pressure of the feeder upon the gelatin in the hopper becomes so great that the reactionary effect overcomes the combined weight of the feeder, feeder shaft, friction-wheel, etc., and hence the feeder will automatically stop rotating by reason of the disengagement of the friction-wheels 34 and 39 when the feed becomes too great. Immediately the pressure on the gelatin is relieved somewhat, the friction-wheel 34 drops slightly and again bears on friction-wheel 39 and the feeder then resumes its rotation.

When it is desired to inspect the feeder for purposes of cleaning, it may be lifted bodily out of the hopper by turning the hand-wheel 115, which operation causes rotation of the bevel gear 105, which in turn, draws upon the screw 104, lifting it, and lifting the carriage 103, shaft 27 and wheel 34, and the feeder itself, the carriage 103 sliding vertically on the guides 102. With this arrangement the entire feeder may be lifted out of the hopper or the feeder may be only partly raised. The lifting of the carriage 103 causes the wheel 34 to be raised out of contact with friction-wheel 39 and this can be done without stopping the machine. The means for raising the feeder being self-locking, the carriage and feeder will remain in any position to which they may be raised. The elevating means employed obviates the necessity of forming the hopper in sections unless it is desired to do so. The engagement of the wheels 34 and 39, when the feeder is lowered, prevents the lower end of the feeder from striking the packing screw or the paddles from striking the interior of the hopper, thereby rendering lowering of the feeder entirely safe.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In a machine for forming a cartridge rope from explosive gelatin, the combination with a shell or case having a delivery mouth from which the gelatin is adapted to issue, of a rotary device within said shell or case for forcing the gelatin through said mouth, means for bodily removing said rotary gelatin forcing device from the shell or case or for inserting it therein, and operating means for said rotary gelatin forcing device comprising disengageable elements one of which is carried by the rotary gelatin forcing device and is thrown out of action when said gelatin forcing device is shifted from its usual position.

2. In a machine for forming a cartridge rope from explosive gelatin, the combination with a shell or case having a delivery mouth from which the gelatin is adapted to issue, of a slidable carriage, and means carried and supported solely by the carriage adapted for forcing the gelatin through said mouth, said carriage affording means for bodily withdrawing the gelatin forcing device aforesaid from the shell or case.

3. In a machine for forming a cartridge rope from explosive gelatin, the combination with a shell or case having a delivery mouth from which the gelatin is adapted to

issue, of a slidable carriage, means carried and supported solely by the carriage adapted for forcing the gelatin through said mouth, and means for shifting the carriage to thereby bodily shift the gelatin forcing device into or out of the shell or case aforesaid.

4. In a machine for forming a cartridge rope from explosive gelatin, the combination with an upright shell or case having a delivery mouth from which the gelatin is adapted to issue, of a carriage slidable in a general up and down direction, and means carried and supported solely by the carriage for forcing the gelatin through said mouth, said carriage affording means for bodily withdrawing the gelatin forcing device from the shell or case or for positioning it within the shell or case.

5. In a machine for forming a cartridge rope from explosive gelatin, the combination with a shell or case having a delivery mouth from which the gelatin is adapted to issue, of a carriage slidable in a general up and down direction, means carried and supported solely by the carriage for forcing the gelatin through said mouth, and means for raising and lowering the carriage to thereby bodily raise the gelatin forcing device from the shell or case or to lower it into the shell or case.

6. In a machine for forming a cartridge rope from explosive gelatin, the combination with a shell or case having a delivery mouth from which the gelatin is adapted to issue, of means within the shell or case for forcing the gelatin through said mouth, means for shifting said gelatin forcing device into and out of the shell or case, and operating means for said gelatin forcing device which is rendered inactive when the gelatin forcing device is shifted from its gelatin forcing position.

7. In a machine for forming a cartridge rope from explosive gelatin, the combination with a shell or case having a delivery mouth from which the gelatin is adapted to issue, of a rotary gelatin forcing device within the shell or case, means for shifting said gelatin forcing device into and out of the shell or case, and driving and driven wheels for rotating said gelatin forcing device which are adapted for disengagement when the gelatin forcing device is shifted out of the shell or case.

8. In a machine for forming a cartridge rope from explosive gelatin, the combination with an upright shell or case having a delivery mouth from which the gelatin is adapted to issue, of a carriage movable in a general up and down direction, a rotary gelatin forcing device carried by said carriage and adapted for forcing the gelatin through said mouth, a wheel connected to and turning with said rotary gelatin forcing device, and another wheel for driving the aforesaid wheel, said wheels becoming disengaged when the gelatin forcing device is shifted from gelatin forcing position and by their engagement limiting entrance of the feeder into the hopper.

9. In a machine for forming a cartridge rope from explosive gelatin, the combination with an upright shell or case having a delivery mouth from which the gelatin is adapted to issue, of a carriage movable in a general up and down direction, a rotary gelatin forcing device carried by said carriage and adapted for forcing the gelatin through said mouth, a wheel connected to and turning with said rotary gelatin forcing device, another wheel for driving the aforesaid wheel, said wheels becoming disengaged when the gelatin forcing device is shifted from gelatin forcing position, and means for raising and lowering the carriage to thereby raise the gelatin forcing device from the shell or case or to lower it into the shell or case.

10. In a machine for operating on explosive gelatin, the combination with a shell or case for containing the explosive gelatin, of a rotary device for operating on the gelatin within the shell or case, said device being shiftable into and out of the shell or case, and means for rotating said rotary device which is rendered inactive when the said rotary device is shifted out of the shell or case.

11. In a machine for operating on explosive gelatin, the combination with a shell or case for containing the explosive gelatin, of a movable carriage, a rotary device carried by the carriage for operating on the gelatin within the shell or case, said rotary device being shiftable into and out of the shell or case, means for moving the carriage to shift the rotary device, and means for rotating said rotary device which is rendered inactive when the said rotary device is shifted out of the shell or case.

12. In a machine for forming a cartridge rope from explosive gelatin, the combination with a shell or case having a delivery mouth from which the gelatin is adapted to issue, of a rotary device for forcing the gelatin through said delivery mouth, a slidable carriage to which the rotary gelatin forcing device is journaled and by which it is solely supported, and a carriage shifting screw and operating means therefor.

13. In a machine for forming a cartridge rope from explosive gelatin, the combination with a shell or case having a delivery mouth from which the gelatin is adapted to issue, of a rotary device for forcing the gelatin through said delivery mouth, a slidable carriage to which the rotary gelatin forcing device is journaled, a carriage shifting screw, a wheel through which the said screw is threaded, an abutment for said wheel, and means for rotating the wheel to shift the screw.

14. In a machine for forming a cartridge

rope from explosive gelatin, the combination with an upright shell or case having a delivery mouth from which the gelatin is adapted to issue, of a carriage movable in a general up and down direction, guides for said carriage, a rotary gelatin forcing device carried by the carriage and adapted for operating on the gelatin within the shell or case, means for rotating said gelatin forcing device, an abutment, a screw connected to the carriage, a wheel bearing against the abutment and through which said screw is threaded, whereby turning of the wheel will shift the screw vertically, and means for turning said wheel, said carriage being adapted for shifting the gelatin forcing device into and out of the shell or case.

15. In a machine for forming a cartridge rope from explosive gelatin, the combination with a shell or case having a delivery mouth from which the gelatin is adapted to issue, of a device adapted to force the gelatin from the shell or case through the mouth aforesaid, means for bodily removing said gelatin forcing device from the shell or case or for inserting it therein, and operating means for said gelatin forcing device comprising disengageable elements which are separated when the gelatin forcing device is removed from the shell or case.

In testimony whereof, I hereunto affix my signature in presence of two witnesses.

HENRY AUCHU.

Witnesses:
C. F. LOGAN,
GEO. P. JONES.