

No. 881,366.

H. AUCHU.

PATENTED MAR. 10, 1908.

MACHINE FOR FORMING A CARTRIDGE ROPE FROM EXPLOSIVE GELATIN.

APPLICATION FILED MAY 23, 1907.

2 SHEETS—SHEET 1.

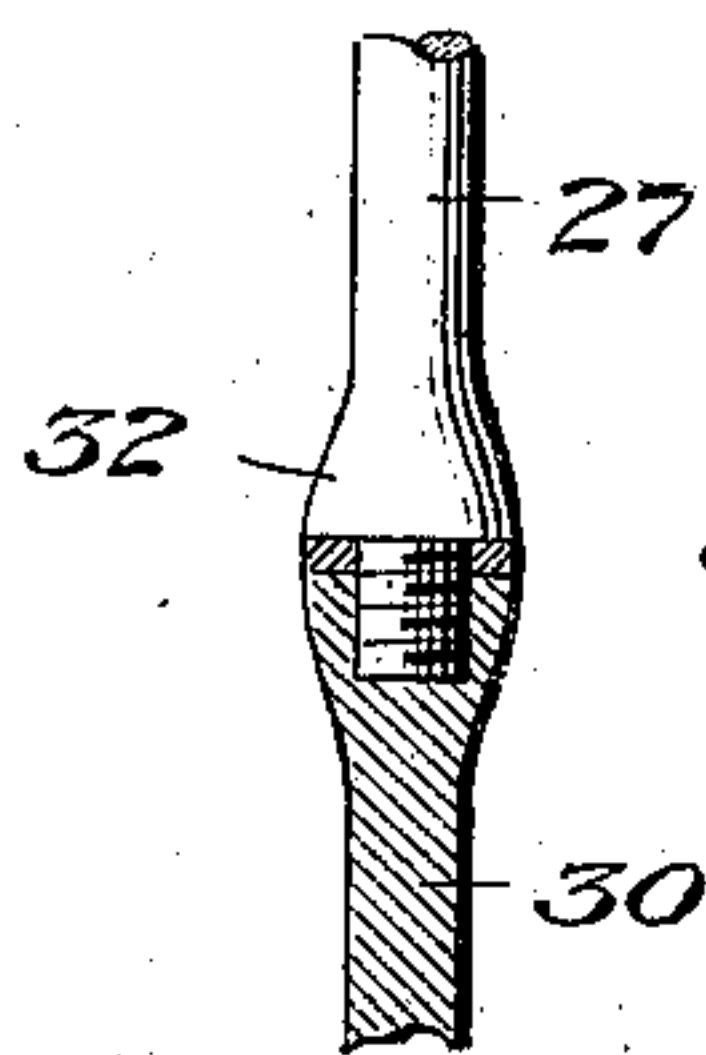
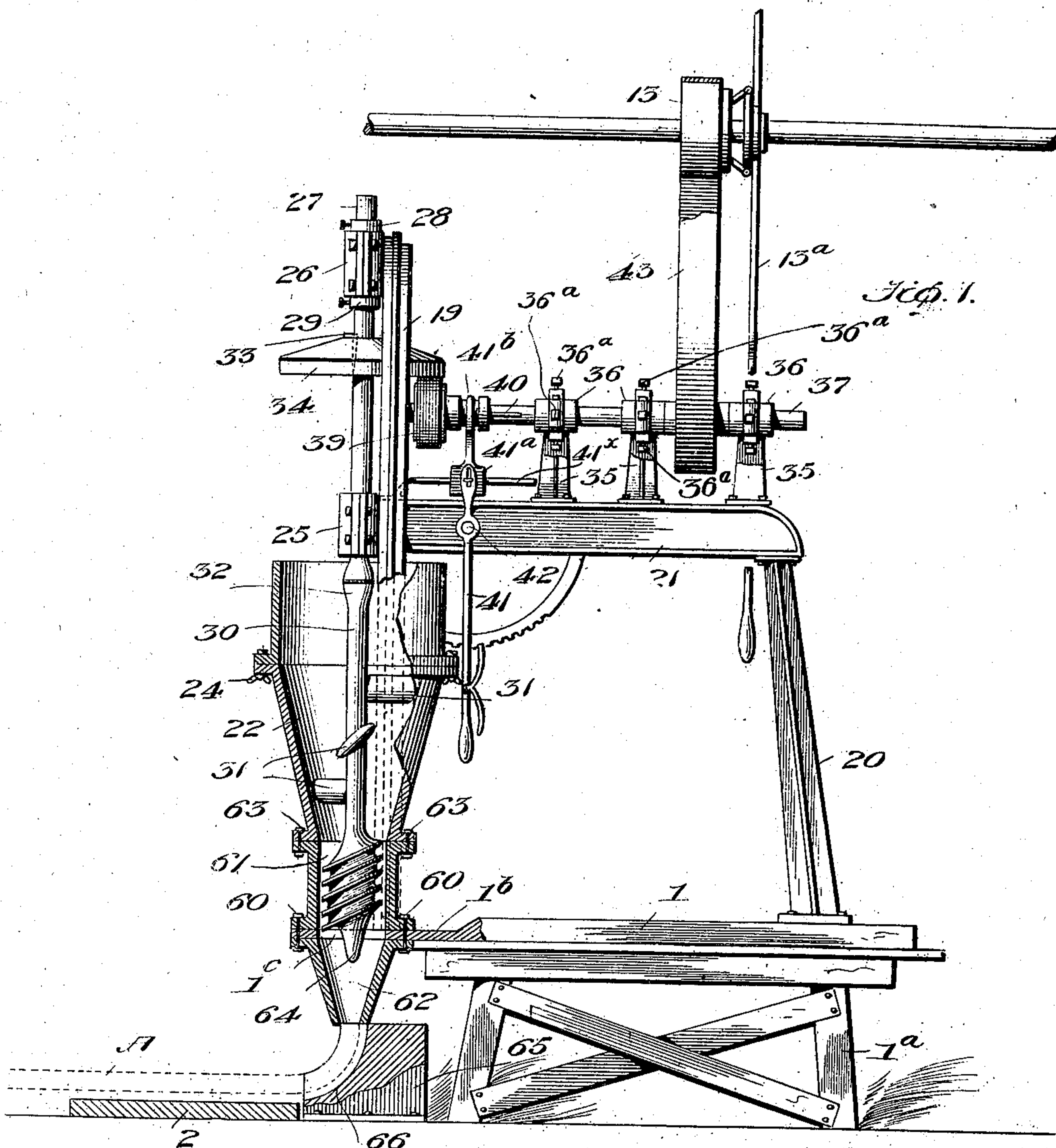
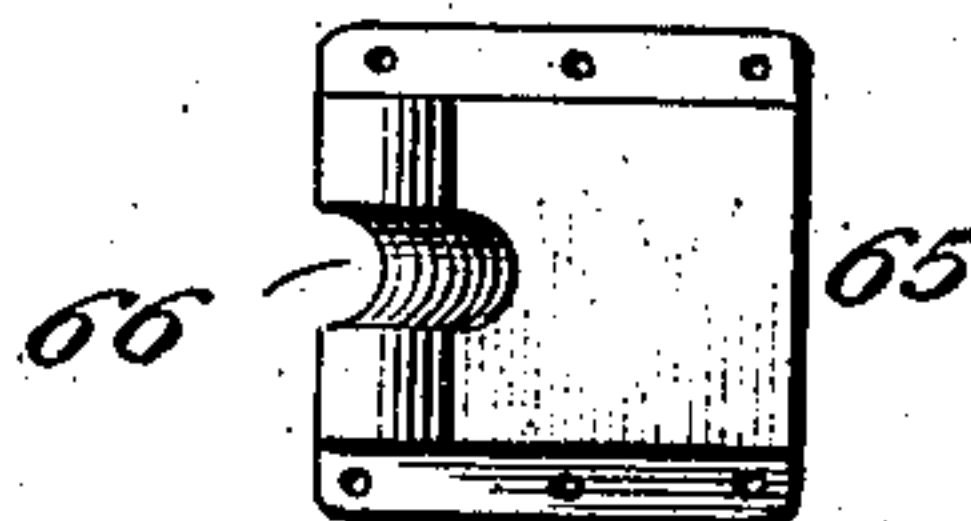


Fig. 7.

Fig. 8.



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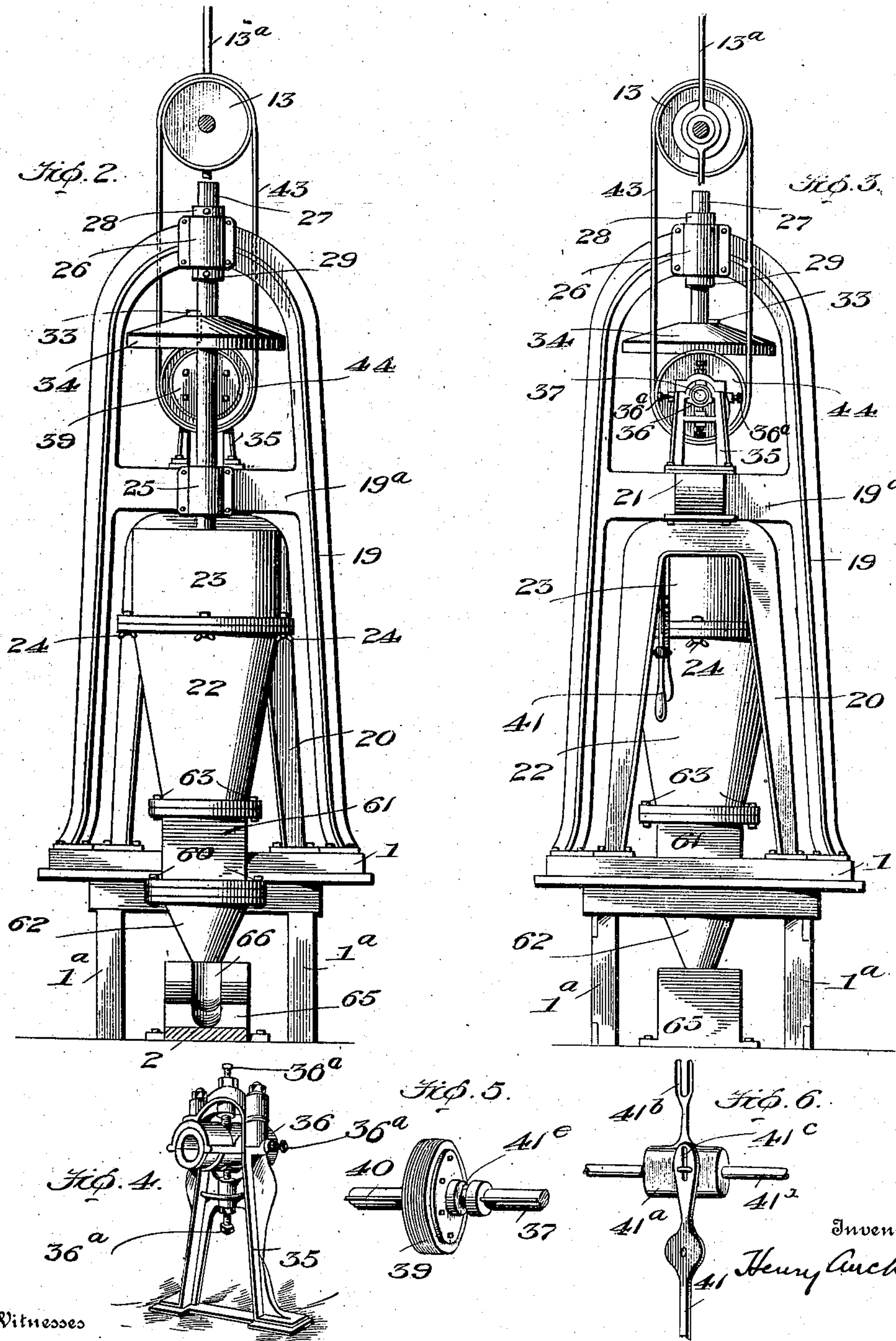
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2 SHEETS—SHEET 2.



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# UNITED STATES PATENT OFFICE.

HENRY AUCHU, OF EMPORIUM, PENNSYLVANIA.

MACHINE FOR FORMING A CARTRIDGE-ROPE FROM EXPLOSIVE GELATIN.

No. 881,366.

Specification of Letters Patent.

Patented March 10, 1908.

Application filed May 23, 1907. Serial No. 375,298.

*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.

A drawback incident to the use of a horizontal packing screw, or, indeed, any similar screw, is that the machine has more parts, and necessarily more gearing or driving means, and hence, greater opportunity for the explosive gelatin to reach rotating or moving machine elements and thus the danger factor is heightened, beside which, the cost of manufacture and maintenance of the machine is increased.

An object of the present invention is to entirely dispense with the horizontal packing or pressing screw which has heretofore been commonly employed, thereby rendering the machine safer in operation, beside dispensing with the additional moving parts incident to the use of such screw, and to carry out this object I employ a hopper and a packing screw case and nozzle, all connected together with longitudinal axes in substantial coincidence, together with a feeder operating in the hopper and a forcing or packing screw directly

connected to the feeder and operating in the packing screw case to force the gelatin through the nozzle in the form of a continuous cartridge rope.

As the hopper, packing screw case, nozzle and feeder and packing screw are disposed in a substantially or generally upright position and because it is desirable to deliver the continuous cartridge rope horizontally onto the table where it is cut or severed into proper lengths for subsequent wrapping, I employ a guide or abutment against which the cartridge rope bears as it issues or extrudes from the nozzle, said abutment or guide constituting a deflector which deflects the cartridge rope in a general lateral position on the table, and this guide or deflector constitutes another feature of the present invention.

In this invention I employ a driving mechanism for the feeder and packing or pressing screw which is fully set forth and claimed in an application executed by me of even date herewith (Serial No. 375,296), but this operating means which is regulable both automatically and by hand, possesses the added function in the present machine of controlling the action of the pressing or packing screw at the same time it controls the action of the feeder itself so that all parts of the machine that operate on the gelatin are controlled at the same time.

Other objects of the invention are to provide a machine of the class set forth which will be of simple and durable construction, comparatively inexpensive to make, and capable of being rapidly and easily taken apart for cleaning or repairs.

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

In the accompanying drawings:—Figure 1 is an elevation, partly in section of the complete machine; Fig. 2 is a left-hand end elevation; Fig. 3 is a right-hand end elevation; Fig. 4 is a detail of one of the adjustable bearings of the drive shaft; Fig. 5 is a detail of the driving friction-wheel and its shaft; Fig. 6 is a detail of the friction-wheel shifter; Fig. 7 is a detail of the detachable coupling of the feeder; and Fig. 8 is a detail plan view of the deflecting or guide member for the cartridge rope.



The base 1 of the machine may be suitably supported by a frame-work 1<sup>a</sup>, and a table 2 onto which the continuous cartridge of explosive gelatin is eventually delivered for cutting into commercial lengths, is located at a lower level.

Rising from base 1 and suitably bolted thereto are a yoke-upright 19 and a standard 20, the latter being substantially bolted to a horizontal frame-piece 21, which in turn is bolted to the cross-piece 19<sup>a</sup> of upright 19. This construction affords a rigid bracing for the yoke-upright 19 and also a support for certain parts described presently.

Secured detachably by bolts 60 to the upper and lower parts of a horizontal extension 1<sup>b</sup> of base 1, which has an aperture 1<sup>c</sup>, are a tubular packing screw case 61 and a nozzle 62, the former being preferably of Babbitt metal or suitable alloy, while the latter is preferably of bronze.

Detachably bolted to the top of the packing screw case 61 by bolts 63, is a conical hopper 22, whose upper part 23 is in the form of a cylindrical ring, 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.

Detachable shaft boxes or bearings 25 and 26 are provided on cross-piece 19<sup>a</sup> and apex of the yoke-upright 19, the said boxes being vertically alined in the vertical axis of the hopper.

The numeral 27 designates the feeder shaft, which is journaled in the boxes or bearings 25 and 26, said shaft carrying collars 28 and 29 above and below the bearing 25, the collar 28 suspending or sustaining the feeder shaft and the feeder, and the collar 29 holding the feeder shaft against vertical movement except such slight or minimum endwise play of said shaft as is usual in any shafting to prevent binding where collars are employed. These collars are held to the shaft by suitable set screws and turn with said shaft.

The feeder is made 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 31 having a detachable screw-threaded coupling 32, with interposed rubber or paper gasket or washer, with the lower end of shaft 27.

The coupling 32 is set forth and claimed in another application on a machine for forming a cartridge rope from explosive gelatin executed of even date herewith (Serial No. 375,296).

Formed integral with the shaft 30 and also

made of bronze, is a pressing or packing screw 64 which is contained within the case 61 and has its tip projecting into the nozzle 62.

The detachability of the ring 23, together with the detachability of the feeder and packing screw from the shaft 27, in connection with the removable nature of the packing screw case 61 and nozzle 62, makes it possible to remove any of these parts to gain access to any element or part of the feeder, hopper, packing screw case, or nozzle which may be in need of cleaning or attention and it will be observed that merely the paddles 31 may be exposed, or the packing screw case and nozzle may also be removed to expose the packing screw.

The collar 28 so suspends the feeder within the hopper that the feeder does not touch the sides of the hopper, but may be adjusted to work nearer to or farther from the hopper walls, according to the wish of the operator, this being accomplished by shifting the collars 28 and 29 and re-clamping them in the desired position.

Rigidly secured to shaft 27 by the key 33 is a friction-wheel 34, the lower face of the friction-wheel 34 being by preference perfectly flat.

Mounted upon and connected to the frame piece 21 are bearing standards 35 which have vertically and horizontally adjustable bearings 36, made so by the four screws 36<sup>a</sup>, mounted in which is a horizontal shaft 37. Splined upon the projecting end of shaft 37 by a feather 40 carried by the 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 frame-piece 21 at 42, said lever having a slot and pin connection 41<sup>c</sup> with a shifter 41<sup>a</sup> slidable on a stationary guide 41<sup>x</sup> and having a fork 41<sup>b</sup> engaging a groove 41<sup>e</sup> in the hub of the wheel 39. The friction-wheel 30 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 44 on shaft 37 with a clutch-pulley 13, which is controlled by a hand-lever 13<sup>a</sup> so that the entire machine may be stopped or started at will.

As it is quite desirable to deliver the con-



tinuous cartridge rope of explosive gelatin (shown in dotted lines at A) in a general horizontal manner on the table 2, the cartridge rope being delivered in a general downward direction as it issues from nozzle 62, I provide a deflecting or guide member or abutment 65 having a curved groove 66, against which the cartridge rope A gently impinges and glides from a generally vertical to a generally horizontal position. With this arrangement all the advantages of a horizontal delivery of the cartridge rope of gelatin are obtained without the necessity of employing the horizontal packing screw, its case and operating mechanism, heretofore used, and I thereby simplify the machine and render it much cheaper of manufacture.

In the operation of the machine, the explosive gelatin is introduced into the hopper 22 by hand or by any suitable feed and it is thereupon acted upon by the paddles or blades 31 which, with a cam-like action, force the gelatin downward into the packing screw case 61, and the packing screw 64 then acts upon the gelatin and presses it through the said case, the opening 1<sup>c</sup>, and the nozzle 62, whence it issues and is deflected by the groove 66 to the generally horizontal position heretofore described and shown at A, and the cartridge rope is then severed into marketable lengths of about eight inches and afterward 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 and packing screw 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 and packing screw then resume their rotation. This action is entirely automatic and is radically distinct from any feeding mechanism which merely slows down as has been the case heretofore.

In the present machine, a decided advantage is gained by having the packing screw and the feeder proper, the shaft 30 and pad-

dles 31, connected directly together, as combined with the automatically-acting and hand-regulable friction gearing employed, for by this arrangement both the packing screw and the feeder are stopped or regulated at the same time and this minimizes the danger from overfeeding and any undue pressure on the gelatin.

The friction gearing set forth in this application I do not claim herein as it is fully set forth and claimed in another application for a machine for forming a cartridge rope from explosive gelatin which I have executed, of even date herewith (Serial No. 375,296).

I am aware that other forms of automatic and hand-regulable means could be employed controlling the rotation of the connected feeder and screw.

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 packing screw and a feeder connected together and adapted to force the gelatin through said mouth, and means automatically actuated by the reactionary pressure of the gelatin adapted to stop the operation of the feeder and screw when the pressure becomes too great.

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 packing screw and a feeder connected together and adapted to force the gelatin through said mouth, and means automatically actuated by the reactionary pressure of the gelatin on the feeder and screw adapted to stop the operation of said feeder and screw when the pressure becomes too great.

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 packing screw and a feeder connected together and adapted to force the gelatin through said mouth, and operating means for said feeder and screw comprising a driving member and a driven member, the latter being adapted for actuating the feeder and screw, said driving and driven members being adapted for disengagement to stop the operation of the screw and feeder when the reactionary pressure of the gelatin becomes too great.

4. In a machine for forming a cartridge rope from explosive gelatin, the combination with a tapered hopper having a delivery mouth, of a packing screw case in communication with said delivery mouth and having



an extrusion opening, a feeder in the hopper having blades or paddles with inclined faces, a packing screw in the case and connected to and rotatable with the feeder, a wheel rotating with said feeder and screw, and a driving wheel normally engaged with the first-named wheel but disengageable therefrom, said screw and feeder and driven wheel being adapted for shifting, whereby when the reactionary

pressure of the gelatin on the screw and feeder becomes too great, the wheels will be thrown out of operative engagement.

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

HENRY AUCHU.

Witnesses:

C. T. LOGAN,  
GEO. P. JONES.