No. 695,553. Patented Mar. 18, 1902.

J. A. HEANY.

FABRIC CUTTING MACHINE.

(Application filed June 24, 1901.)

(No Model.) 4 Sheets—Sheet 1.

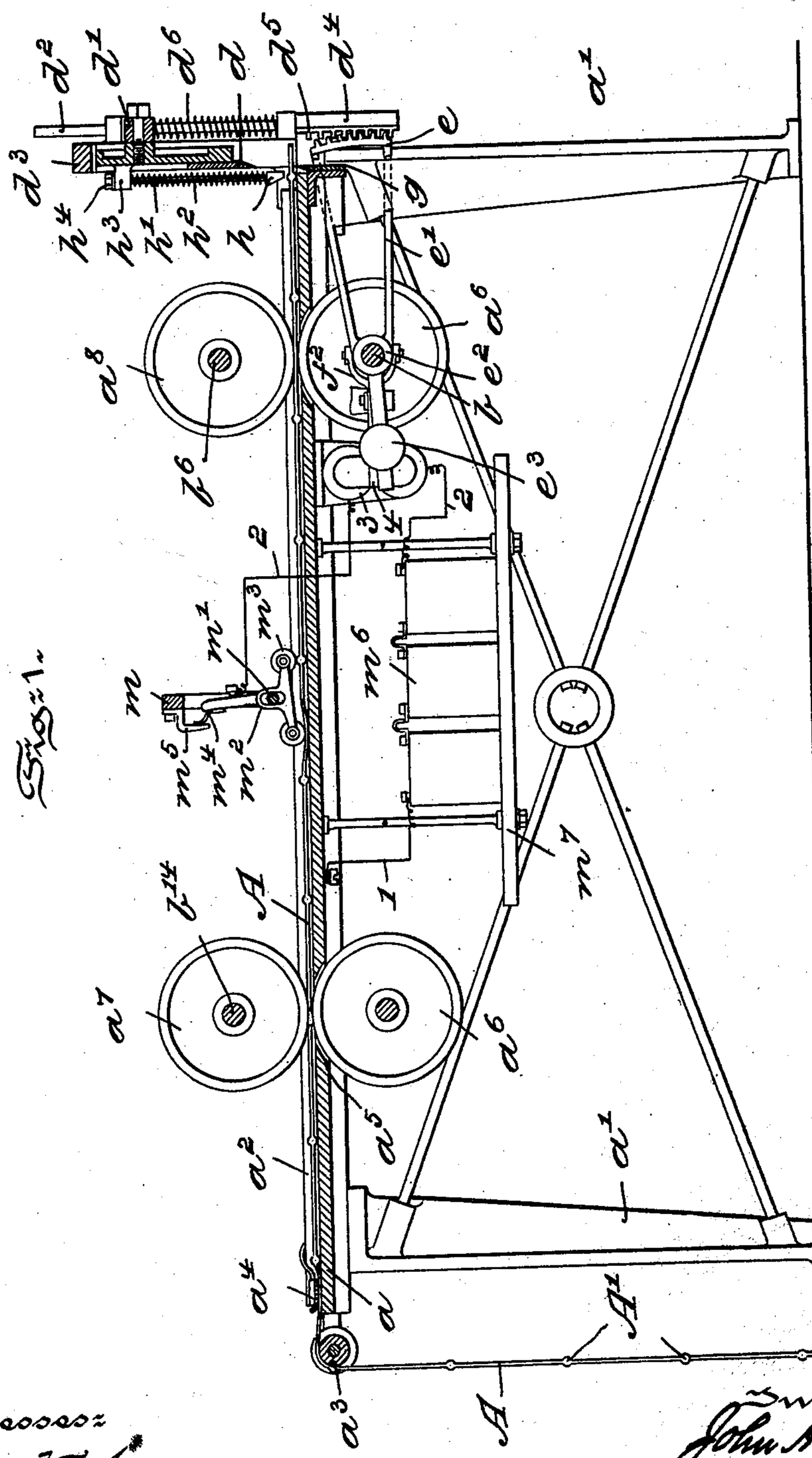

Fig. 1.

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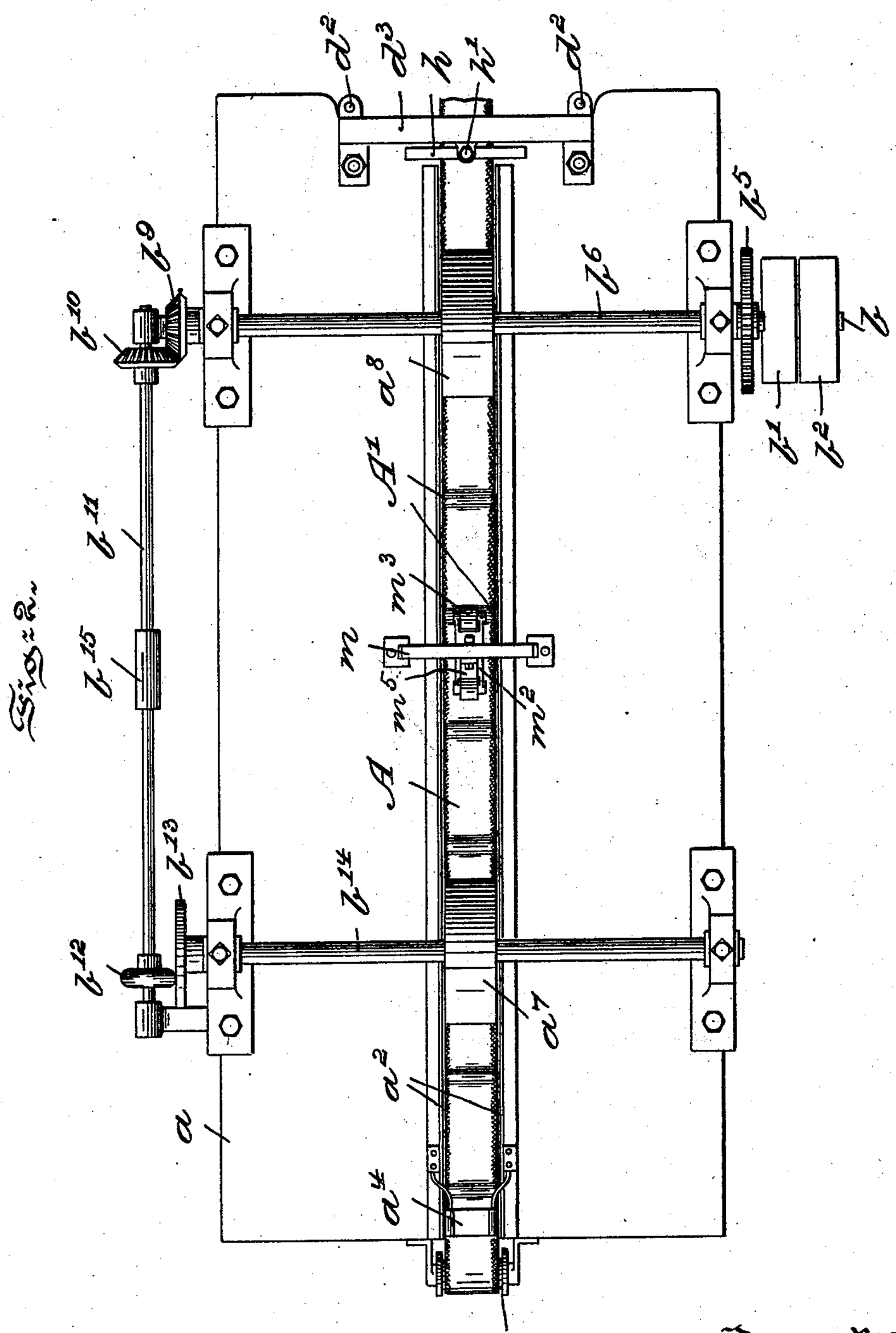

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(No Model.) 4 Sheets—Sheet 3.

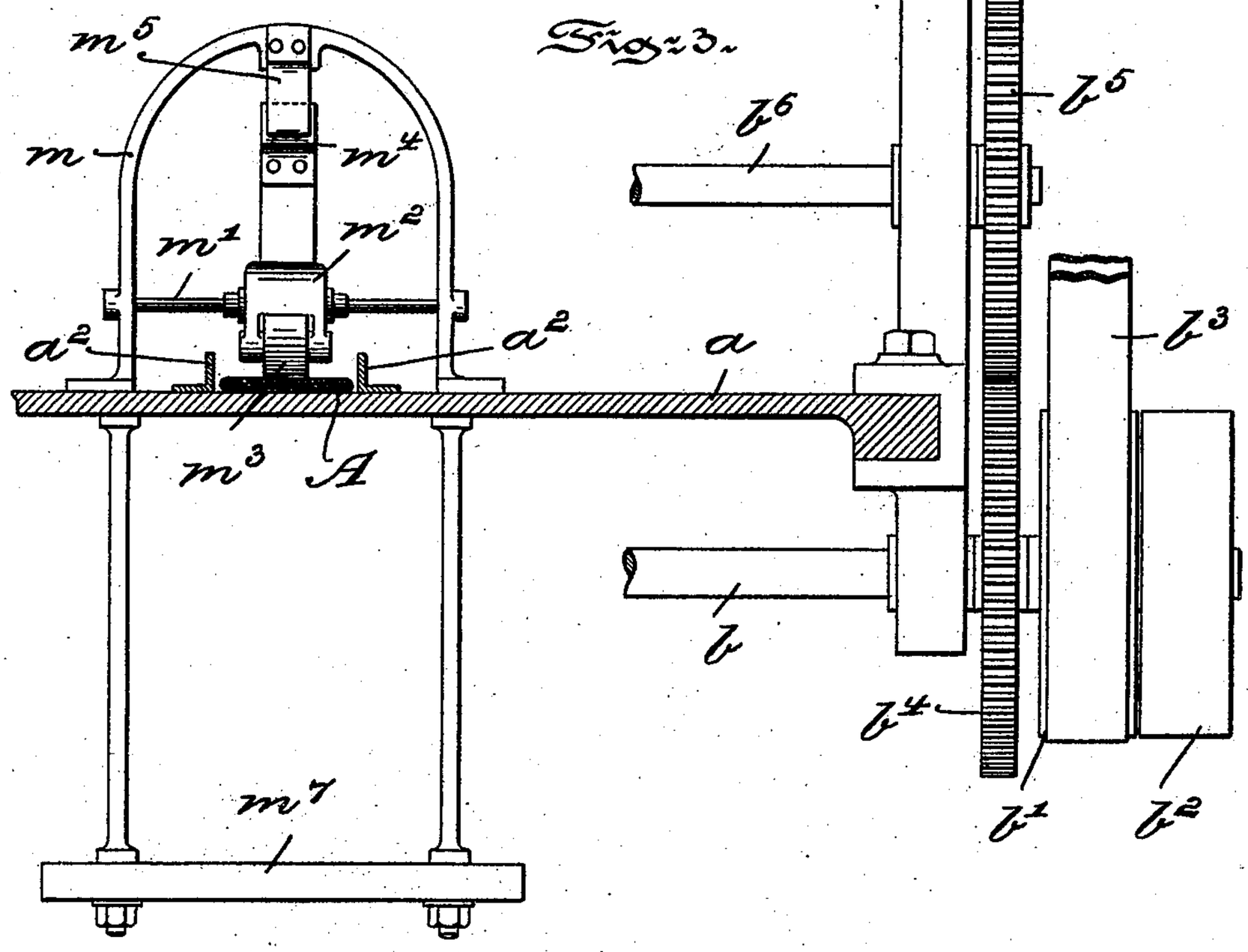

Fig. 3.

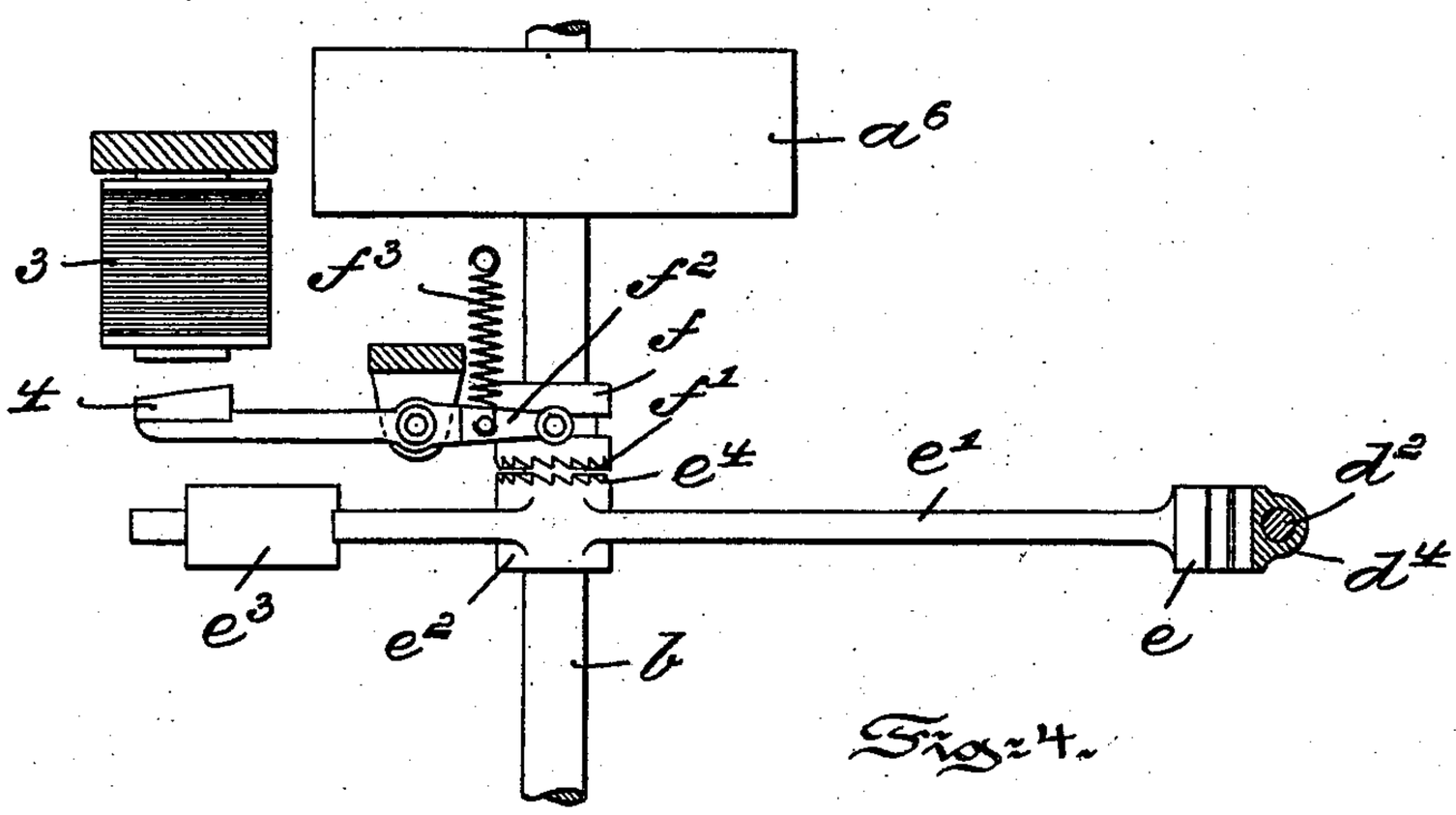

Fig. 4.

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(Application filed June 24, 1901.)

(No Model.) 4 Sheets—Sheet 4.

Fig. 5.

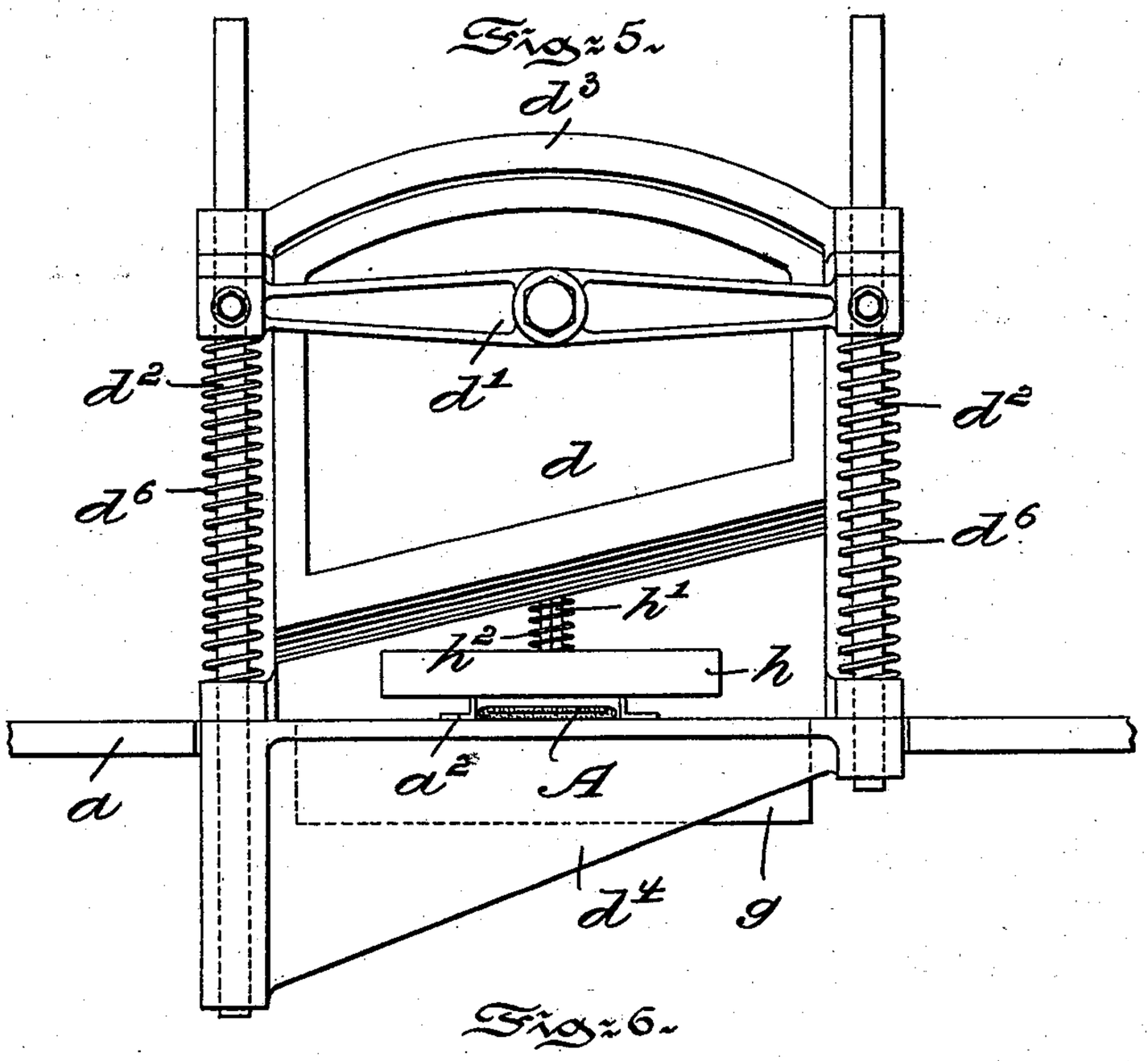
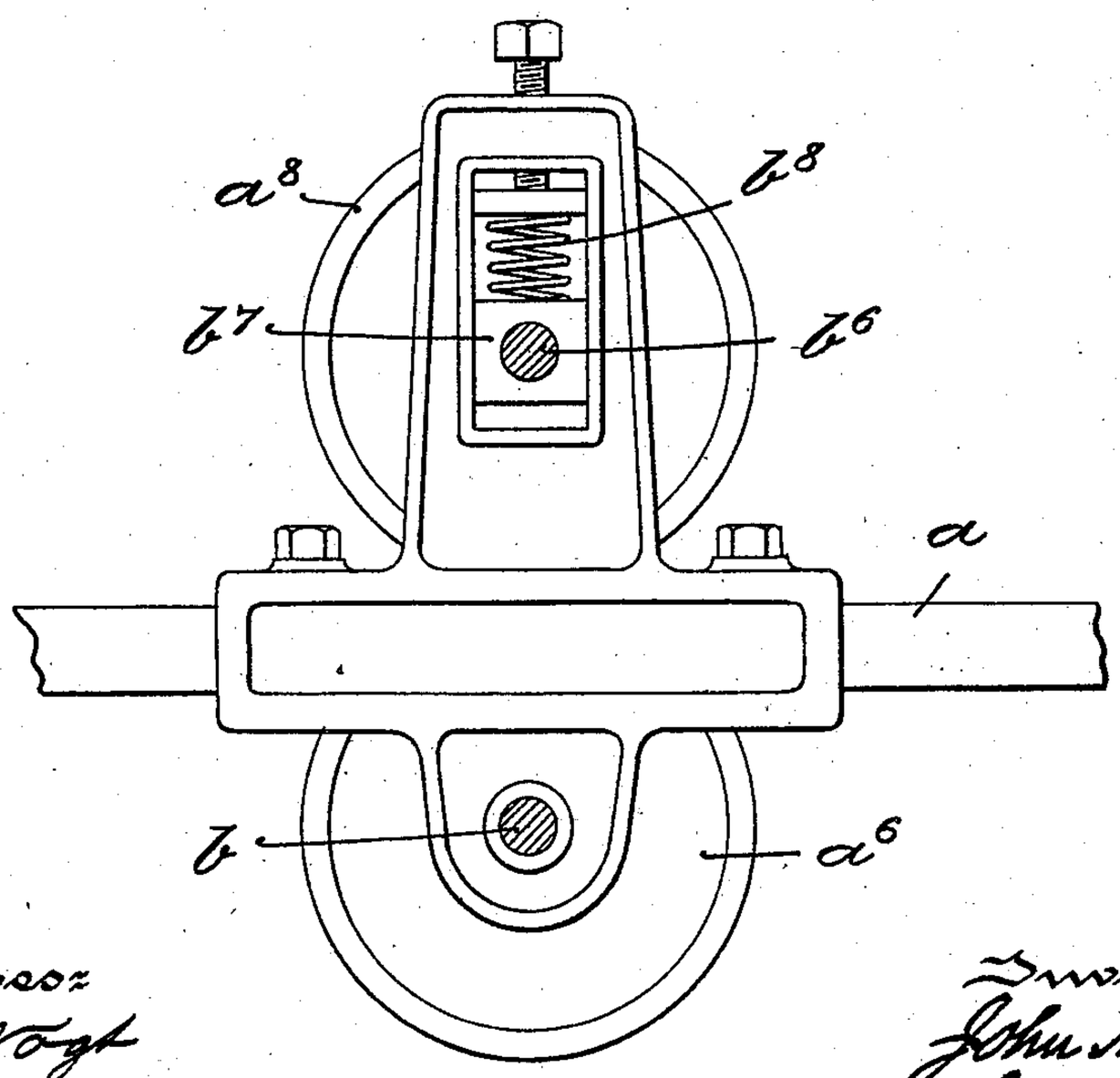


Fig. 6.



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UNITED STATES PATENT OFFICE.

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FABRIC-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 695,553, dated March 18, 1902.

Application filed June 24, 1901. Serial No. 65,749. (No model.)

To all whom it may concern:

Be it known that I, JOHN ALLEN HEANY, a citizen of the United States, residing at the city of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Fabric-Cutting Machines, of which the following is a specification.

My invention has relation to a mechanism for cutting a continuous strip of tubular knit or woven hose or similar fabric into required lengths, said mechanism being automatically controlled by the movement of the hose or fabric toward the cutting tool or knife; and in such connection it relates to the construction and arrangement of such a mechanism.

Heretofore in the manufacture of stockings, for instance, it has been customary to knit a continuous length of tubular fabric spaced off into points at which it was to be cut by welts. In some instances the points of severance were indicated by two parallel welts. After the continuous length had been knit the operator stretched the hose over a table and with a pair of shears or other sharp instrument severed the hose on a line with the single welt or where two welts were formed between said welts.

The principal object of my present invention is to provide a machine wherein the continuous hose may be accurately and automatically severed into the required lengths.

The nature and scope of my invention will be more fully understood from the following description, taken in connection with the accompanying drawings, forming part hereof, in which—

Figure 1 is a longitudinal sectional view of a hose-cutting machine embodying main features of my invention. Fig. 2 is a top or plan view of the machine. Fig. 3 is an enlarged detail view illustrating in rear elevation the circuit making and breaking device for controlling the knife-operating mechanism. Fig. 4 is an enlarged detail view illustrating in top or plan view the sector and controlling mechanism therefor for operating the knife. Fig. 5 is an enlarged front elevational view of the knife and auxiliaries, and Fig. 6 is a side elevational view enlarged of one set of rollers for feeding the hose toward the knife.

Referring to the drawings, a represents the bed or table of the machine, suitably supported upon the frame or standards a'. Along the table a is formed a trough or guideway a^2, in which the hose A is guided. This hose A passes over an end roller a^3 and under a tension-finger a^4, designed to spread or flatten out the hose before it enters the trough a^2. At suitable intervals the floor of the trough a^2 is cut away, as at a^5 a^5, to permit the periphery of the lower feed-rollers a^6 a^6 to enter the trough a^2 and to rest under the hose A. In the preferred form of the machine there are two sets of feed-rollers, in the rear set of which only one roller, preferably the upper roller a^7, is positively driven, whereas in the forward set both rollers a^8 and a^6 are positively driven. A preferred means of driving the positively-driven feed-rollers is as follows: The lower roller a^6 of the forward set of feed-rollers is keyed or otherwise secured directly to the main or power shaft b, on which the fast pulley b' and loose pulley b^2 are arranged. A belt b^3 communicates power from any suitable source to the fast pulley b' when the machine is in operation, and this belt b^3 may be shifted in any well-known manner to the loose pulley b^2 when the machine is thrown out of operation. Upon the power-shaft b is also secured a gear-wheel b^4, meshing with a gear-wheel b^5, secured to a shaft b^6, upon which the upper roller a^8 of the forward set of rollers is secured. This shaft b^6, by preference, is mounted in sliding bearing-blocks b^7, held down under tension of the spring b^8, as clearly shown in Fig. 6, since this construction permits the roller a^8 and its shaft b^6 to slightly rise if an obstruction, such as a welt A′ in the hose A, passes under the roller a^8 and yet permit the roller a^8 to rest with required tension upon the hose. If desired, the shaft carrying the upper roller a^7 of the rear set of feed-rollers may be similarly arranged. On one end of the shaft b^6 of the roller a^8 is secured a miter-gear b^9, meshing with a similar gear b^{10}, arranged on a shaft b^{11}, extending at right angles to the

shaft b^6. The rear end of the shaft b^{11} is provided with a friction-wheel b^{12}, pressing against a friction-disk b^{13}, carried by the shaft b^{14}, upon which the upper feed-roller a^7 of the rear set is secured. The shaft b^{11} is adjustable by means of a sleeve b^{15}, so that the wheel b^{12} may be moved toward or away from the center of the disk b^{13}, and thereby cause the disk b^{13} and the shaft b^{14}, and consequently the feed-roller a^7, to rotate at varying speeds. The speed of this roller a^7 should be less than the speed at which the positively-driven rollers a^8 and a^6 rotate, so as to maintain the fabric under tension before it is presented to the knife. The hose A after it enters the trough a is fed forward by the feed-rollers until it reaches the far end of the machine, at which it is presented to the cutting mechanism. This cutting mechanism comprises, essentially, a knife d, having its shank bolted or otherwise secured to a cross head or frame d'. The cross-head d' at its ends is bolted or otherwise secured to two vertical shafts or rods d^2, having a range of movement in a stationary framework d^3, wherein the knife d is adapted to slide in a vertical plane. The lower ends of the rods or shafts d^2 are secured to a substantially triangular bracket d^4, and on one side of this bracket is formed a rack d^5. Springs d^6, interposed between the cross-head d' and the framework d^3 and coiled around the rods or shafts d^2, serve under tension to hold the cross-head d' and knife d and also the rods d^2 and bracket d^4 in an elevated position. In the teeth of the rack d^5 meshes a sector e, carried by the bracket-arms e', extending from a sleeve e^2, loosely mounted upon the power-shaft b. These bracket-arms e' and sector e are counterbalanced on the shaft b by a weight e^3. One face of the sleeve e^2 is notched or toothed, as at e^4, and adjacent to this face upon the shaft b is splined a grooved collar f, having its face adjacent to the notches e^4 of the sleeve e^2 also notched, as at f'. A clutch or forked arm f^2 serves to shift the sleeve f toward or away from the sleeve e^2, to thereby lock the sleeve e^2 to the shaft b or to disengage said sleeve e^2 from said shaft b. The forked arm or clutch f^2 is normally held under tension of a spring f^3, which serves to retract the sleeve f and to thereby uncouple the sleeves e^2 and f. When the sleeve e^2 of the sector e is momentarily coupled to the shaft b, the sector e is moved through an arc of a circle and in moving engages the rack d^5 to depress the rods d^2, cross-head d', and knife d. The table a below the knife-edge is recessed or cut away, and below and in cutting position with respect to the movable knife d is arranged a stationary knife g. When the fabric A enters between the knives d and g and the knife d is depressed, the fabric will be cut or shorn off. To firmly bind the fabric A in the trough a^2 while the knives are cutting through said fabric, a presser-bar h is arranged to the rear of the knife d and travels therewith. This bar h is provided with a rod h', around which a spring h^2 is coiled, the spring being arranged between the bar h and an eye h^3, in which the rod h' is adapted to slide. This eye h^3 projects from the back of the knife d and rests under a nut h^4, secured to the upper end of the rod h'. As the knife d descends, the eye h^3 compresses the spring h^2, and this in turn first forces the presser-bar h down upon the fabric and then holds it down under the increased tension of the spring. When the knife moves upward, the eye h^3 carries the rod h' and the presser-bar a with it by engaging the nut h^4.

To control the movement of the sector e, and consequently the movement of the cutting mechanism automatically by the feeding of the hose A, is one of the main features of my present invention. As has been hereinbefore described, the fabric A has cross welts or ribs A', and these ridges or ribs A' are utilized to throw the sector e into and out of operation by means of the following preferred mechanism: To the rear of the far set of feed-rollers a^8 and a^6 upon the table a is secured a yoke-shaped frame m, of metal. In this frame m is secured a cross-rod m', to which is slottedly connected a rocking carriage m^2, having on its base the wheels or rolls m^3. The upper end of this carriage m^2 is provided with a contact spring or arm m^4, adapted when the carriage is tilted in one direction to contact with a fixed spring m^5, suspended from the frame m. A battery or other source of electricity m^6 is located upon a shelf m^7, arranged below the table. One pole of this battery m^6 is connected directly by wire 1 with the bed-plate or table a and consequently through the frame m with the fixed contact-spring m^5. The other pole of the battery m^6 is connected by wire 2 with an electromagnet 3, the wire 2 passing from said magnet to the carriage m^2 and to the contact-arm m^4 on said carriage. It follows that when the carriage m^2 is tilted in one direction to bring the arm m^4 into contact with the fixed contact m^5 a circuit is completed and the current passes through the magnet 3. The armature 4 for this magnet 3 is secured to the free end of the clutch or forked arm f^2, which, as hereinabove described, controls the sector e. It follows that when the magnet 3 is energized by the passage of current therethrough the armature 4 will be attracted and the clutch f^2 operated to throw the sector e into operation, and to thus actuate the knife d. When, however, the carriage m^2 tilts in an opposite direction, the circuit is broken and the magnet 3 is demagnetized. In this instance the armature 4 is released, and the forked arm or clutch f^2 to the tension of its spring f^3 and the sector e is thrown out of operation. Now in the feeding of the fabric or hose A the welts A' will tilt the carriage m^2 to complete the circuit each time the welts A' pass under the forward wheels m^3 of the

carriage m^2, as illustrated in Fig. 1, whereas at all other times the carriage m^2 fails to make the circuit.

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

1. In a machine for cutting hose or similar fabrics, a knife and its operating mechanism, combined with means for feeding the hose to the knife, and means controlled by the feeding of the hose and adapted to throw the operating mechanism for the knife into and out of action.

2. In a machine for cutting hose or similar fabrics, a knife and mechanism for reciprocating said knife during the cutting of the hose, combined with means for feeding the hose to the knife, and electrical means controlled by the feeding of the hose and adapted to throw the reciprocating mechanism of the knife into and out of action.

3. In a machine of the character described, a knife, mechanism for reciprocating said knife, mechanical means for feeding the hose, and electrical means controlling the reciprocating mechanism for the knife, said electrical means being automatically and periodically set in operation during the feeding of the hose.

4. In a machine of the character described, a knife, mechanism for reciprocating the knife and a table upon which the fabric is fed toward the knife, electrical means for periodically actuating the reciprocating mechanism for the knife, means for positively feeding the fabric toward the knife, and a circuit making and breaking device controlling the electrical means and adapted to be operated by the travel of the fabric.

5. In a machine of the character described, a main or power shaft, a sector adapted to be coupled to or uncoupled from said shaft, a frame, a knife carried by said frame, a rack secured to said frame and in mesh with said sector and electric means controlled by the travel of the fabric to the knife and adapted to couple or uncouple the sector and shaft.

6. In a machine of the character described, a cutting mechanism, comprising a knife, a cross-head to which the knife is secured, two vertical rods secured to the ends of said cross-head, a stationary framework in which the rods have a range of reciprocatory movement, said framework adapted to be traversed by the knife, a bracket to which the lower ends of said rods are secured, a rack formed on one side of said bracket, a sector engaging said rack, and means controlled by the travel of the fabric for periodically oscillating said sector and thereby operate said knife.

7. In a machine of the character described, two sets of feed-rollers, between opposite rollers of each of said sets the fabric is adapted to be advanced, means for positively driving both feed-rollers of that set adjacent to the cutting mechanism, and means for driving either of the feed-rollers of the other set at a speed less than the speed of the first feed-rollers.

8. In a machine of the character described, a bed, a guideway formed therein for the reception of the fabric, a reciprocatory knife located at the discharge end of the guideway, a tension-finger located at the entrance end of said guideway and under which the fabric passes as it enters said guideway, and one or more sets of feed-rollers arranged intermediate of the ends of the guideway, the lowermost feed-roller of each set extending upward through the bottom of the guideway to engage the fabric.

In testimony whereof I have hereunto set my signature in the presence of two subscribing witnesses.

JOHN A. HEANY.

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