(No Model.)

4 Sheets—Sheet 1.

G. H. LASAR.

BARB WIRE MACHINE.

No. 294,885. Patented Mar. 11, 1884.

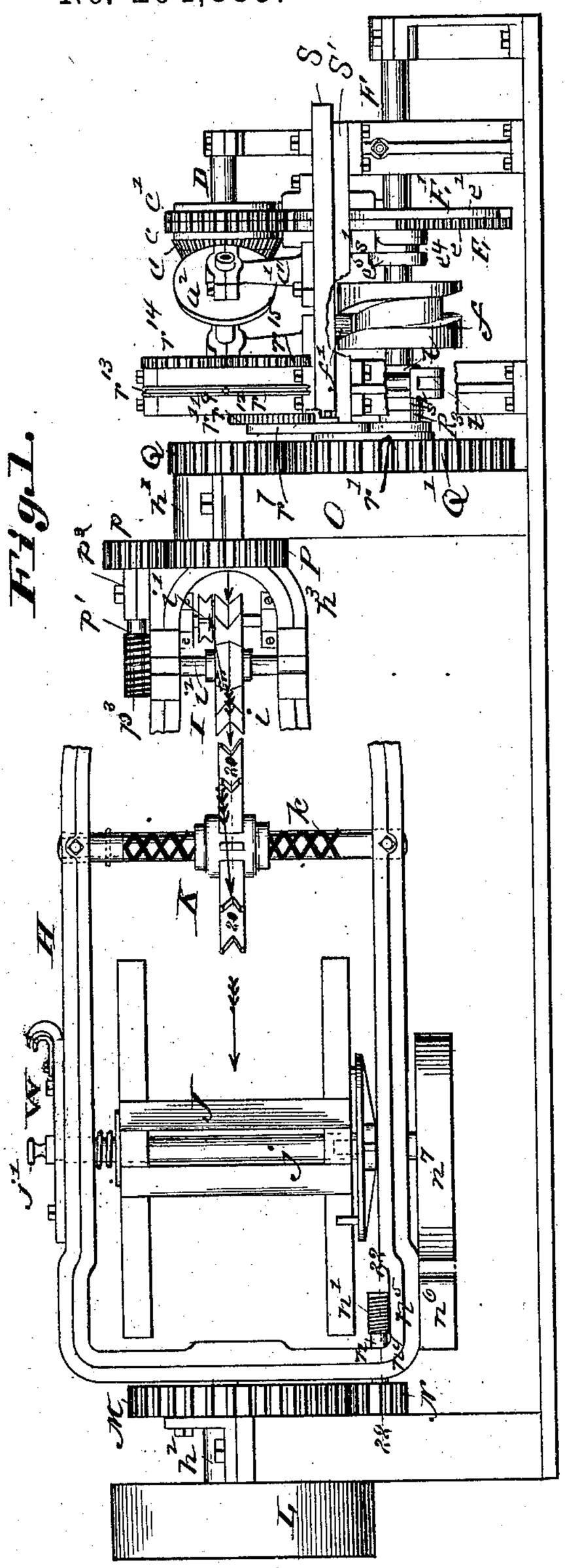

Fig. 1.

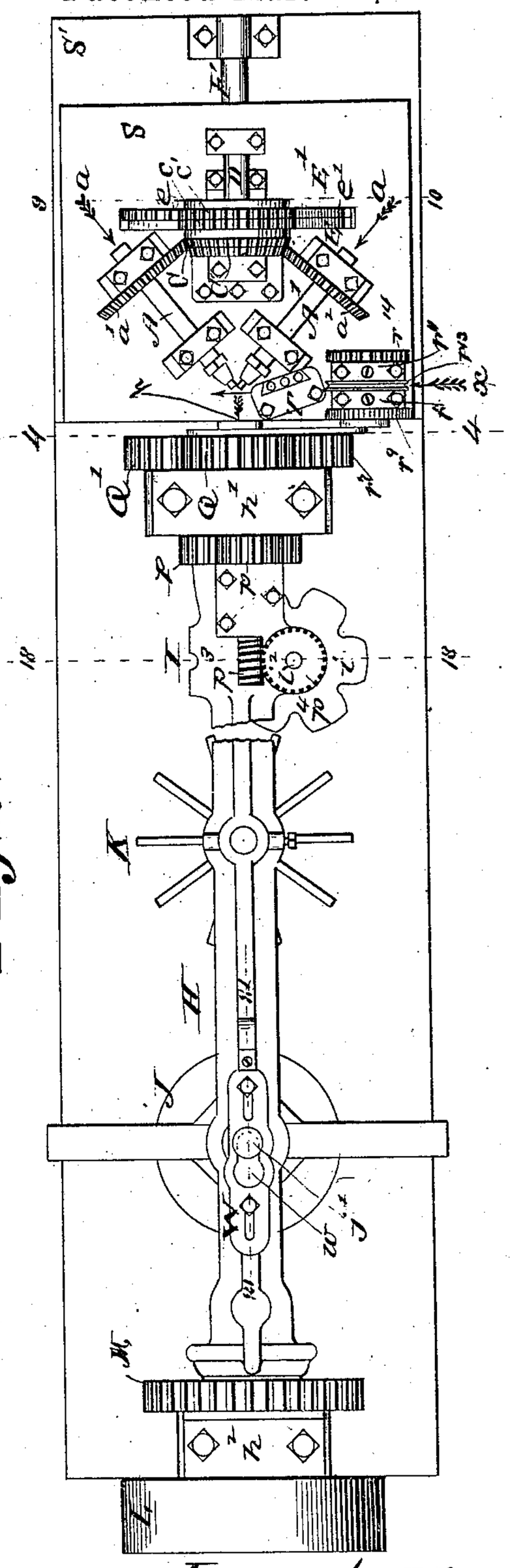

Fig. 2.

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Fig. 5.

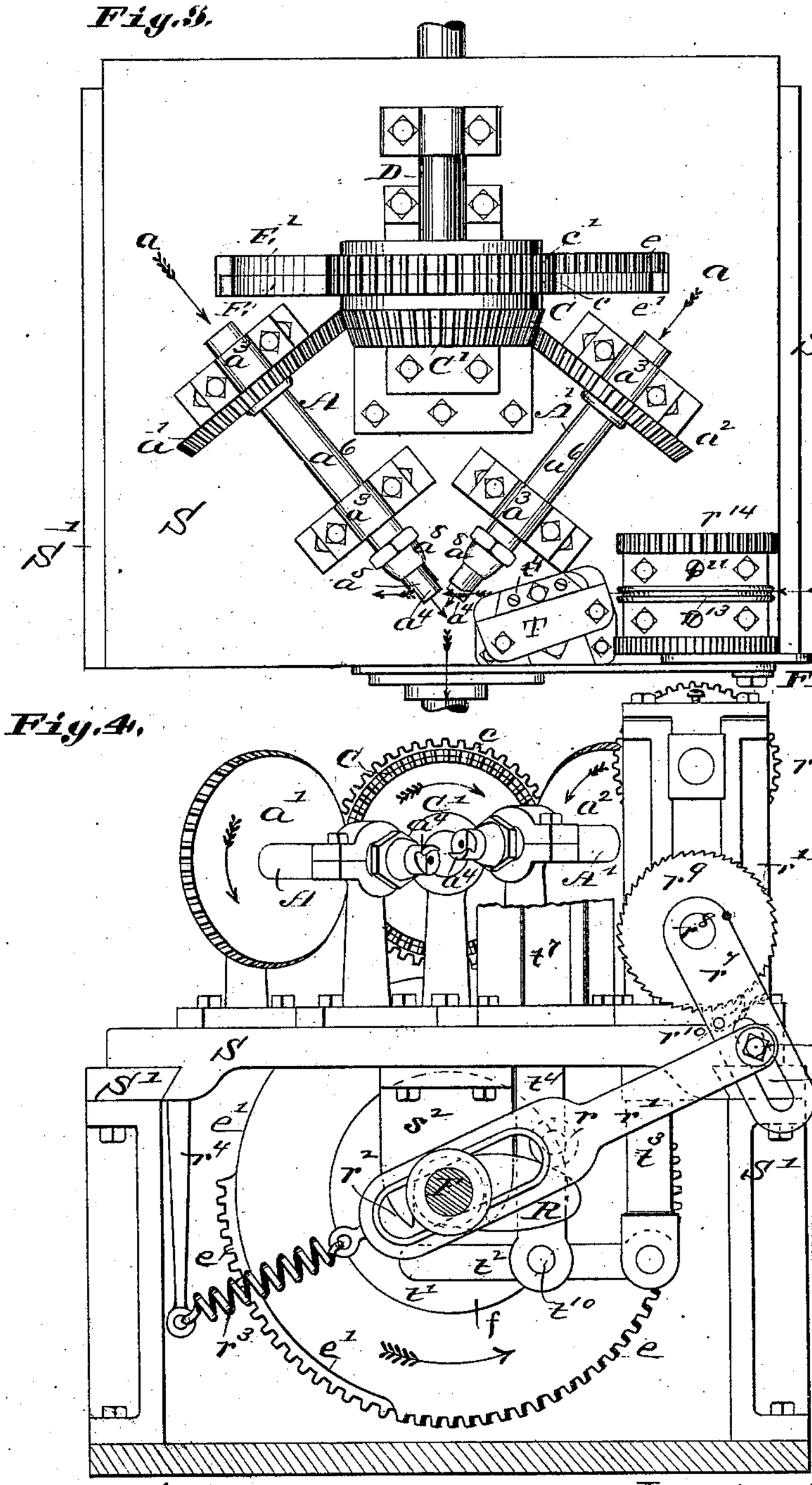

Fig. 7.

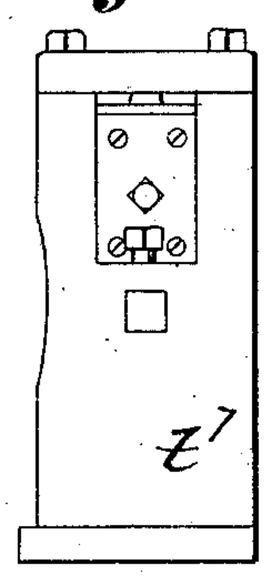

Fig. 6.

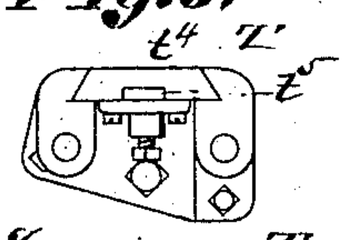

Fig. 4.

Fig. 8.

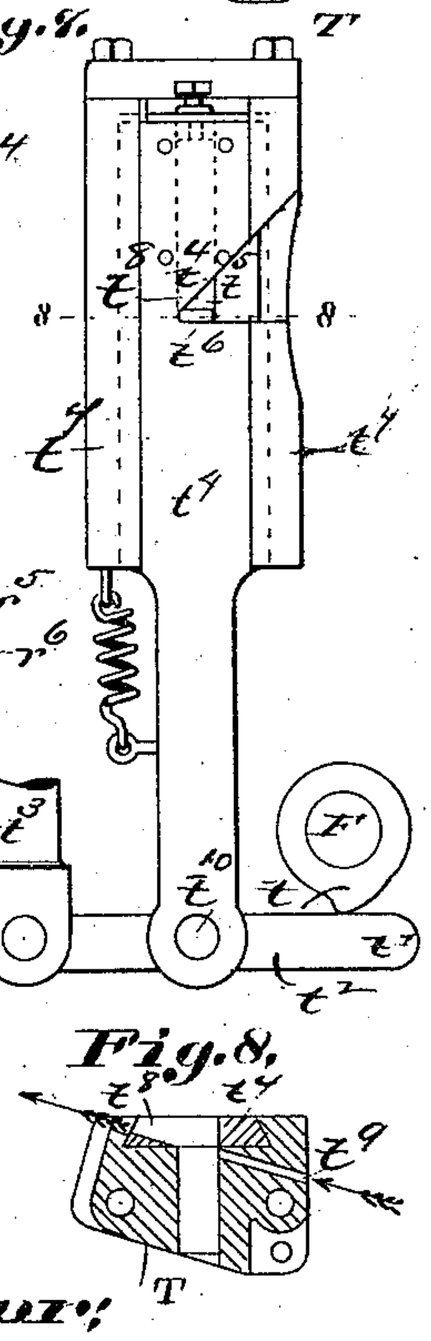

Fig. 8.

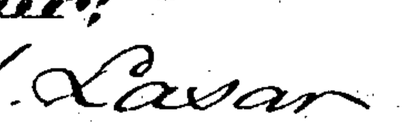

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Fig. 12.

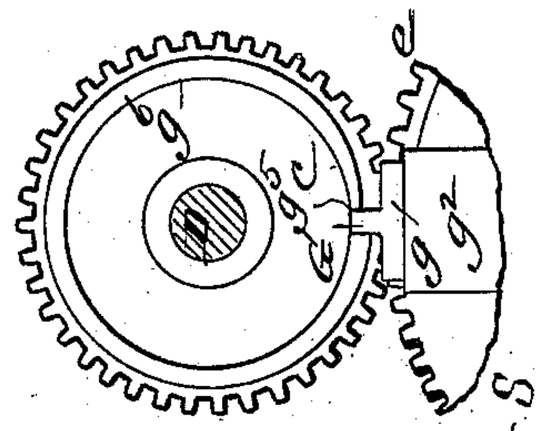

Fig. 11.

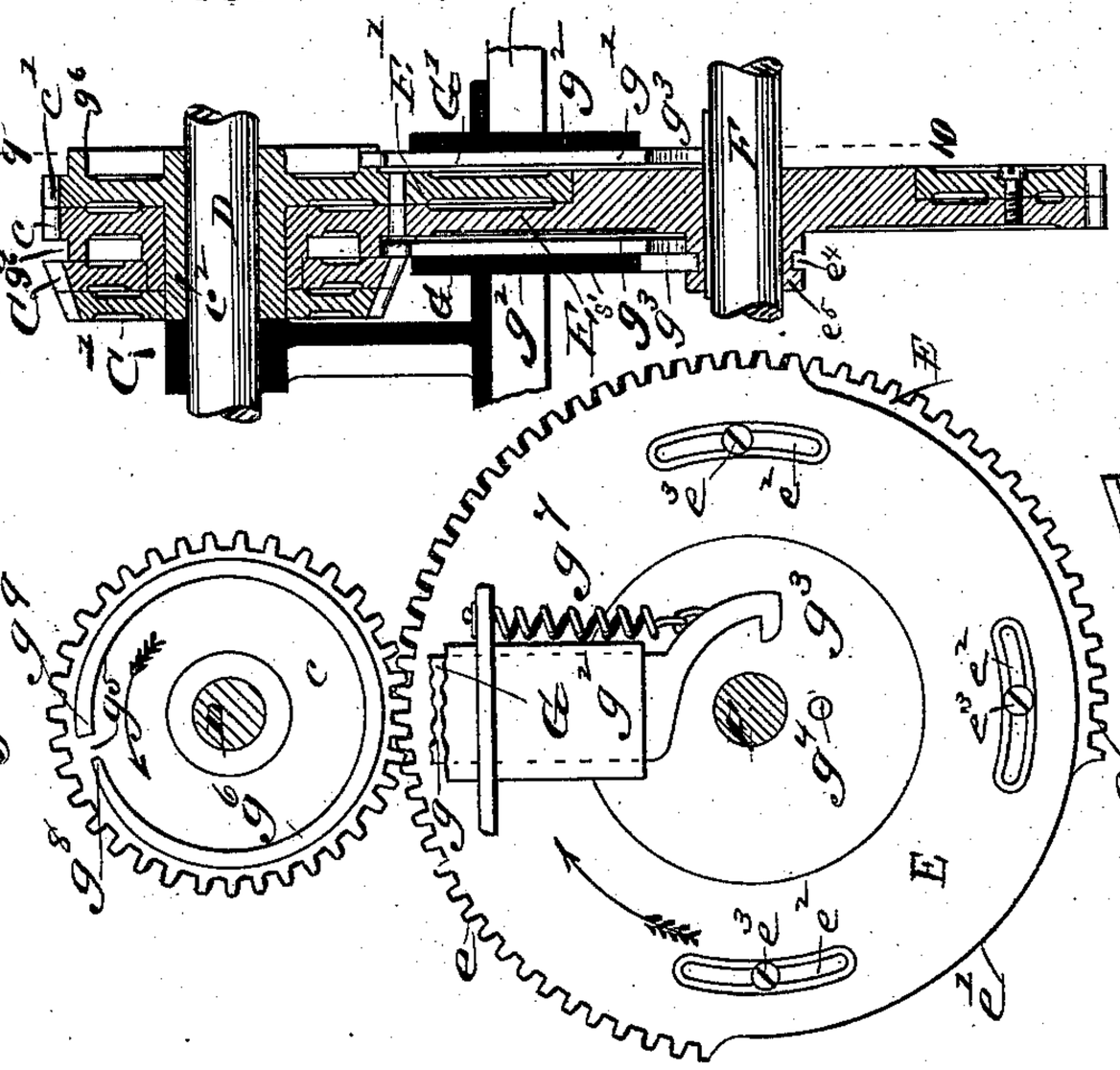

Fig. 10.

Fig. 9.

Fig. 13.

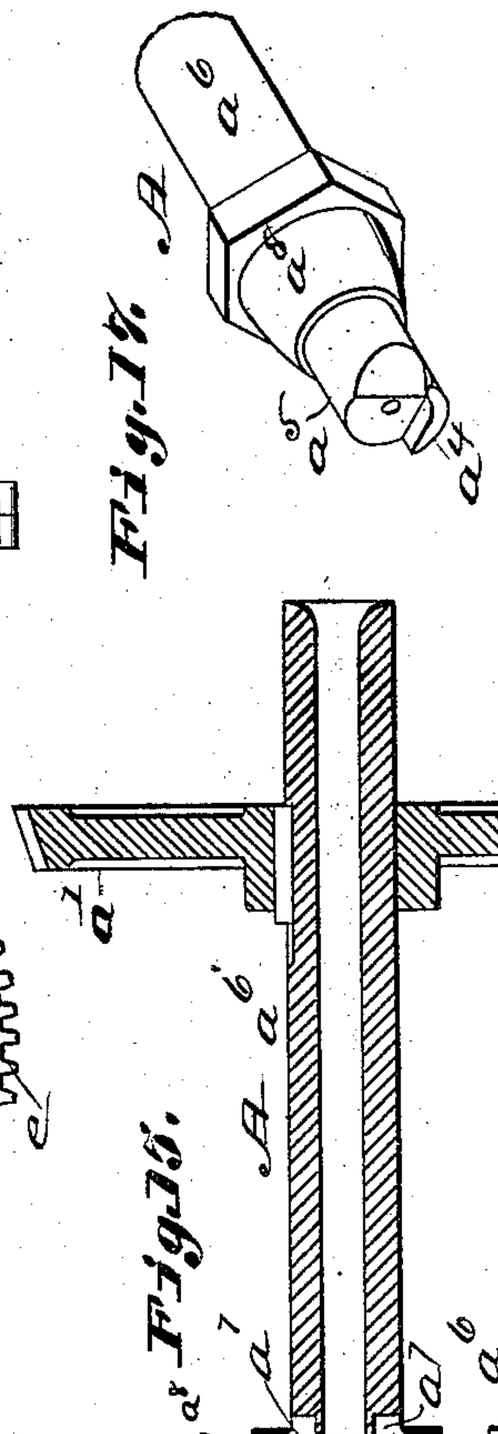

Fig. 15.

Fig. 14.

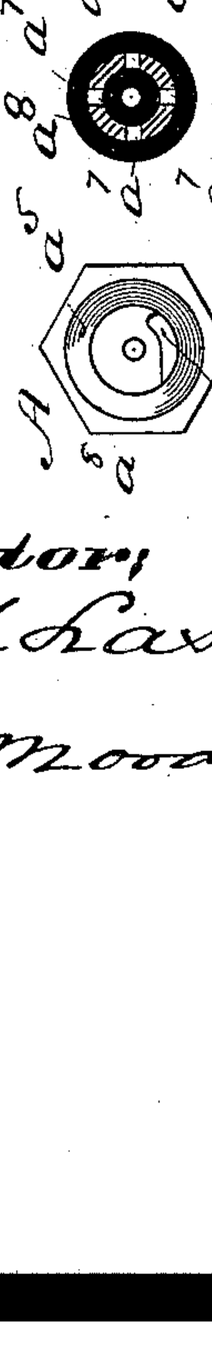

Fig. 16.

Fig. 17.

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Fig. 23.

Fig. 24.

Fig. 25.

Fig. 26.

Fig. 27.

Fig. 19.

Fig. 22.

Fig. 18.

Fig. 28.

Fig. 29.

Fig. 30.

Fig. 20.

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UNITED STATES PATENT OFFICE.

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BARB-WIRE MACHINE.

SPECIFICATION forming part of Letters Patent No. 294,885, dated March 11, 1884.

Application filed March 12, 1883. (No model.)

To all whom it may concern:

Be it known that I, GODFREY H. LASAR, of St. Louis, Missouri, have made a new and useful Improvement in Barbed-Wire Machines, of which the following is a full, clear, and exact description, reference being had to the annexed drawings, making part of this specification, in which—

Figure 1 is a side elevation of the improved machine; Fig. 2, a plan; Fig. 3, a plan upon an enlarged scale of the barb-forming mechanism; Fig. 4, a vertical transverse section upon the line 4 4 of Fig. 2, the view being upon a larger scale than that of Fig. 2; Fig. 5, a rear elevation of the knife-standard; Fig. 6, a plan of the knife-standard, the cap being removed; Fig. 7, a front elevation of the knife-standard and the movable knife and slide; Fig. 8, a horizontal section taken on the line 8 8 of Fig. 7; Fig. 9, a section, looking rearward, on the line 9 10 of Figs. 2, 11; Fig. 10, a similar section, the parts being in a different position; Fig. 11, a section on the line 11 11 of Fig. 9; Fig. 12, a view showing the upper portion of the parts shown in Figs. 9, 10, the lock being engaged; Fig. 13, an end view of one of the strand-wire tubes; Fig. 14, a section on the line 14 14 of Fig. 15; Fig. 15, a longitudinal section taken through a strand-wire tube; Fig. 16, a side elevation of the delivery end of a strand-wire tube; Fig. 17, a view in perspective of the construction shown in Fig. 16; Fig. 18, a transverse section taken on the line 18 18 of Fig. 2; Fig. 19, a longitudinal section taken on the line 19 19 of Fig. 18; Fig. 20, a longitudinal section on the line 20 20 of Fig. 1; Fig. 21, a longitudinal section on the line 21 21 of Fig. 2; Fig. 22, a longitudinal section on the line 22 22 of Fig. 1; Figs. 23 to 27, diagrams illustrating the forming of the barbs, Fig. 23 showing the barb-wire fed between the strand-wires, Fig. 24 showing one (the left-hand one, as seen) of the strand-wire tubes turned half a revolution around, as indicated by the arrow, and the barb-wire bent accordingly, Fig. 25 showing the left-hand tube turned around a three-quarters and the right-hand tube a quarter revolution, and the barb-wire bent accordingly, Fig. 26 showing the left hand turned a full and the right-hand tube a half revolution, and Fig. 27 showing the left-hand tube turned a little more than, and the right-hand tube also turned a little more than, a full revolution, and barb-wire bent accordingly; Fig. 28, a section on the line 8 8 of Fig. 7, and also showing the strand-wire tubes and wires in the position corresponding to the diagram of Fig. 24; Fig. 29, a view similar to that of Fig. 28, the tubes and wires being in the position corresponding to the diagram of Fig. 26; and Fig. 30, a view in perspective, showing the movable knife-slide.

The same letters of reference denote the same parts.

In this machine the strand-wires are respectively fed through two tubes, which are inclined to each other, and have their delivery ends in proximity to each other. The barb-wire is fed crosswise between the strand-wires just in rear of the tubes. The tubes rotate and cause the barb-wire to be intertwined upon the strand-wires, the tubes being supplied with projections, which encounter and carry the barb-wire around the strand-wires. The tube on the opposite side from the barb-wire-severing apparatus first acts to partially attach the barb-wire upon the strand-wire in that tube. The severing apparatus then acts to cut off a barb length of wire, and the attachment of such barb length to the strand-wires is completed. The barbs are attached to the strand-wires at suitable intervals, and the twist is put into the cable and the barbed wire drawn rearwardly in the machine and wound upon a spool journaled in a revolving frame.

A A′ represent the strand-wire tubes.

B B′, Figs. 23 to 27, represent the strand-wires, which are fed through the tubes A A′, respectively, and in the direction indicated by the arrows *a a*, Fig. 2. The tube A is provided with the gear *a′*, which engages with the gear C, and the tube A′ is similarly furnished with a gear, a^2, which engages with the gear C′. Both tubes are adapted to be rotated in the bearings a^3 a^3. The axis of gears C C′ turn about the bearing D, Figs. 1, 3, 11. The gear C is fastened to or made part of the gear *c*, so that when the last-named gear is rotated the gear C rotates with it. The gear C′, by means of the sleeve c^2, is connected with the gear *c′*, so that when the last-named gear is rotated the gear C′ rotates with it. The gears *c c′*, as shown

in Fig. 11 more distinctly, are sustained upon the bearing D. The object of the mechanism last above described is to provide for rotating the tubes A A′ independently of each other and at certain times. To this end the gears *c c′* are driven, respectively, by the gears E E′. These gears E E′ are, in effect, a double gear, attached to and rotating as one piece with the shaft F. In both of the gears E E′ a portion of the teeth is omitted, as shown more distinctly in Figs. 9, 10—that is, the teeth *e* extend half way around the gears, and around the other half, *e′*, the teeth are omitted. The gears E E′ are relatively arranged, so that the teeth *e* of one of the gears lap upon the part *e′* of the other gear. As shown, the gears E E′ are proportioned to the gears *c c′* as two to one, and the teeth *e* lap half-way upon the part *e′*. Each gear *c* and *c′*, therefore, is in motion just half the time, making a revolution and then stopping; but the two gears are simultaneously at rest only during one-fourth of a revolution of the gears E E′.

The gears E and E′ can be relatively adjusted by means of the slots e^2 and screws e^3, so as to make the teeth *e* to lap upon the part *e′*, as desired. The aim, as stated, is to cause the tubes to be rotated during certain fixed intervals, and then to be at rest during certain fixed intervals. To effect this with more certainty each gear E and E′ is provided with a lock, G and G′, respectively, which locks are attached to slides *g g′*, respectively, that work upward and downward in a guide, g^2, against the sides respectively of the double gear E E′, substantially as shown in Figs. 9, 10, 11, 12. The locks, each of them, are provided with hooks g^3, which, as the gears E E′ are rotated, are caught by the studs g^4, (one on each side of the double gear,) causing the locks to be drawn downward and to be disengaged from the openings or notches g^5 in the circular flanges g^6, with which the gears *c c′* are respectively provided. When the locks are thus disengaged, the gears *c c′* are free to be rotated by the gear E E′, and during the rotation the locks bear upward against the flanges g^6. As soon as the openings g^5 come around again, springs g^7 act to lift and thrust the locks into the openings, where they remain until the studs g^4 are brought into engagement with the hooks g^3. To insure the entrance of the locks into the openings g^5 the flanges are shaped so as to bring the end g^8 a little within the opposing end g^9 of the flange, and as the springs g^7 keep the lock against the flange the lock cannot pass the opening. The flanges g^6 are arranged upon the gears *c c′*, so as to bring the openings g^5 opposite the locks as the teeth *e* become disengaged from the gears *c c′*, respectively.

The tubes A A′ are provided with extensions a^4 a^4, the office of which is to effect the bending of the barb-wire around the strand-wires. As these extensions are liable to wear, it is desirable to make them detachable from the main part of the tubes, and this is preferably carried out as follows: The extension is made part of a tube, a^5, which is attached to the rear end of the main tube a^6. The main tube is slotted at a^7 a^7, Figs. 14, 15. A nut, a^8, is screwed onto the slotted portion, causing it to be contracted upon the tube a^5. The last-named part is provided with studs a^9 a^9, which project into the slots a^7 a^7, and prevent the tube a^5 from being turned around in the tube a^6. The strand-wires pass from the tubes A A′ into and through the central opening, *h*, in the flier H. The flier is held and adapted to be rotated in the bearings h' h^2. It supports and carries with it in its rotation the feed device I, the spool J, and the guide K. The wires having the barbs attached pass first around the sprocket-wheel *i* of the feed device, and thence partially around the small sprocket-wheel *i′*. From the last-named wheel the barbed wire passes over the guide-wheel K, and then to the spool J, onto which it is wound. Motion is imparted to the flier and to the machine by belting onto the pulley L, Figs. 1, 2, which is attached to an extension of the rear flier-journal. (Not shown.)

M is a fixed gear, with which engages a pinion, N, Figs. 1, 2, 22, that is upon a shaft, *n*. This last-named shaft is journaled at n^4 in the flier, and is provided also with a worm, *n′*, that engages with the gear n^2. The gear n^2 is attached to the shaft n^3, which is also journaled in the flier at n^5, and is provided with a pulley, n^6. A belt connects the pulleys n^6 and n^7, the last-named pulley being upon the spool-shaft *j*. By this means the rotary motion of the flier is communicated to the spool, causing the spool to rotate and the wire to be wound upon it. At the forward end, h^3, of the flier, encircling the opening *h*, and fixed to the frame O of the machine, is a stationary gear, P, with which engages a pinion, *p*, Figs. 1, 2, 19, that is upon the shaft *p′*. This shaft *p′* is journaled at p^2 in the flier, and is provided with a worm, p^3, which worm engages with the gear p^4, Fig. 2, that is attached to the shaft i^2 of the sprocket-wheel *i*. By this means the rotary motion of the flier is transmitted to the shaft i^2 and the feed device I set in operation, causing the wire to be drawn steadily and positively through the flier-opening *h*. The guide K is upon a right-and-left hand threaded shaft, *k*, for the purpose of properly delivering the wire to the spool J, the guide moving to the right and left upon the shaft *k* in the usual manner as the wire is wound upon the spool. Upon the forward side of the standard O the flier is provided with the gear Q. This gear engages with the gear Q′ upon the shaft F, Figs. 1, 2, 19, 18, and serves to transmit the motion of the flier to the shaft F, and ultimately to all the mechanism employed in delivering the strand-wires and forming the barbs.

R, Figs. 4, 1, represents a cam on the shaft F. It operates in connection with the roller *r*

upon the pitman r'. This pitman is slotted at r^2 to pass around the shaft F, and at one end is connected by means of the spring r^3 to a fixed part, r^4, of the machine, and at its forward end is made to engage, by means of the pin r^5, passing through the slot r^6, with the slotted arm r^7. The part r^4 is preferably a pendant attached to the slide S and moving with it. The arm r^7 is attached loosely to the shaft r^8, upon which is fastened the ratchet r^9. The cam R, turning with the shaft F, causes the arm r^7 to vibrate, and through the pawl r^{10} to turn the ratchet r^9 and shaft r^8. This last-named shaft turns in the bearing r^{11}, and is provided with the grooved wheel r^{12} and the gear r^{15}. The wheel r^{12} works in connection with the grooved wheel r^{13} upon a shaft above and parallel with the shaft r^8, and having the gear r^{14}, which is in engagement with the gear r^{15}. The wheels serve to feed the barb-wire through the barb-wire-severing device and in rear of the tubes A A′, as indicated by the arrow x in Fig. 2.

T represents the device for cutting the barb-wire. A cam, t, Fig. 7, upon the shaft F operates to depress the free end t' of the lever t^2. This lever is jointed to a pendant, t^3, that is attached to the slide S, and the movable knife-slide t^4 is jointed to the lever t^2 at t^{10}, and when the lever t^2 is depressed, as described, the movable knife t^5, that is attached to the slide, is drawn down past the fixed knife t^6, Fig. 30, severing a barb length of wire, Figs. 23, 27. The movement of the knife t^5 is suitably timed to cut the wire in the proper lengths. The stationary knife t^6 is held in the slide-standard t^7. The knife-slide and standard are cut away at t^8 t^9, to provide for the passage of the barb-wire to the knife and to the strand-wires. The movement of the barb-wire, as it is, by means of the tubes A A′, attached to the strand-wires, is illustrated in Figs. 23 to 27, and also in Figs. 28, 29. The tube A, by means of the projection a^4, first acts and initiates the bending and attachment of the barb-wire. The knife then severs the barb-wire, and then the two tubes A A′ jointly act to complete the barb.

The slide S is movable longitudinally upon the bed-plate S′ of the machine, to enable the barbs to be formed without arresting the movements of the wires. All of the parts above the slide move with it, as well as those parts beneath the slide, saving the cam f, Fig. 1, which is fast upon the shaft F, and is grooved to receive the stud f', which is attached to the slide. The rotation of the shaft F, therefore, causes the slide and all the parts resting upon the slide to reciprocate longitudinally upon the bed-plate S′. The latter is provided with a hanger, s', which engages in a groove, e^4, in the hub e^5 of the gear E E′, causing the last-named gear to slide upon the shaft F. A feather (not shown) causes the shaft F and gear E E′ to rotate together. The slide S is also furnished in a hanger, s^2, which engages in a groove between the cams t R. These last-named parts are, in practice, united, and move as one piece upon the shaft F, and the groove spoken of is the space between the two cams.

The device shown at W, Fig. 21, is for holding the removable shaft j in place in the flier H. When it is desired to remove the spool J, the slide W is drawn longitudinally upon flier until the opening w is opposite the shaft j, whereupon the shaft, by means of the handle j', is withdrawn through the opening w from the flier.

I claim—

1. The combination of the tubes A A′ and the barb-wire-severing device T, and a slide, S, substantially as described.

2. The combination of the tubes A A′ and a device for feeding the barb-wire across the rear ends of the tubes, and a slide, S, for the purpose described.

3. The combination, in a barbed-wire machine, of the strand-wire tubes A A′ and the gears a' a^2 C C′, the gear C being mounted on the hub of wheel c, and the gear C′ being mounted on the hub of wheel c', substantially as described.

4. The combination, in a barbed-wire machine, of the tubes A A′, the gears a' a^2 C C′ c c' E E′, and the shafts D F, substantially as described.

5. The combination of tubes A A′, arranged in different horizontal planes on a slide, S, with the shaft D, the gears C C′ c c' on this shaft, and the gears a' a^2 on the said tubes, substantially as described.

6. The combination of the tubes A A′, the gears a' a^2 C C′ c c', and shaft D on the broken gears E E′, adjustably connected and applied on shaft F, substantially as described.

7. The combination of the tubes A A′, the gears a' a^2 C C′ c c', the latter having broken flanges g^6, the gears E E′, and the automatic locking devices G G′, substantially as described.

8. The tubes A A′, having slots a^7, a removable tube, a^5, projection a^4, and pins a^9 on the latter, and the nuts a^8, substantially as described.

9. The combination of the slotted and threaded tube a^6, the tube a^5, having twisting-lug a^4, and the nut a^8, as and for the purpose described.

10. The combination, in a barbed-wire machine, of a pair of strand-wire tubes, through which the strand-wires are delivered, and a device for feeding the barb-wire across the rear ends of the strand-wire tubes and severing it, as desired, into barb lengths, said strand-wire tubes being respectively provided with projections for bending the barb-wire around the strand-wires, and a supporting-slide, S, substantially as described.

11. The combination, in a barbed-wire machine, of the tubes A A′, a barbed-wire feeder, a slide, S, and the flier H, substantially as described.

12. The combination, in a barbed-wire machine, of the tubes A A′, a slide, S, the flier H, and the feed device I, substantially as described.

13. The combination, in a barbed-wire machine, of the tubes A A′, a feeder for the barb-wire, a slide, S, the flier H, and the spool J, substantially as described.

14. The combination, in a barbed-wire machine, of the tubes A A′, the slide S, the flier H, the feed device I, the guide K, and the spool J, substantially as described.

15. The combination, with the angularly-arranged tubes A A′, a barb-wire-feeding device, and a slide, S, of the shaft F, the cam R, the pitman r', the spring r^3, the arm r^7, the ratchet r^9, and the feed-rollers r^{12} r^{13}, substantially as described.

16. The combination, with the angularly-arranged tubes A A′, constructed as described, and mounted on a slide, S, of the shaft F, the cam t, the lever t^2, and the knife-slide t^4, as and for the purpose described.

17. The combination, with the tubes A A′ and the slide S, of the slide t^4, the movable knife t^5, and the knife t^6, the said slide and slide-standard being cut away and perforated at t^8 t^9, substantially as described.

18. The combination of the slide S, the tubes A A′, and the severing device T, the bed-plate S′, the shaft F, and the cam f, substantially as described.

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Witnesses:
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