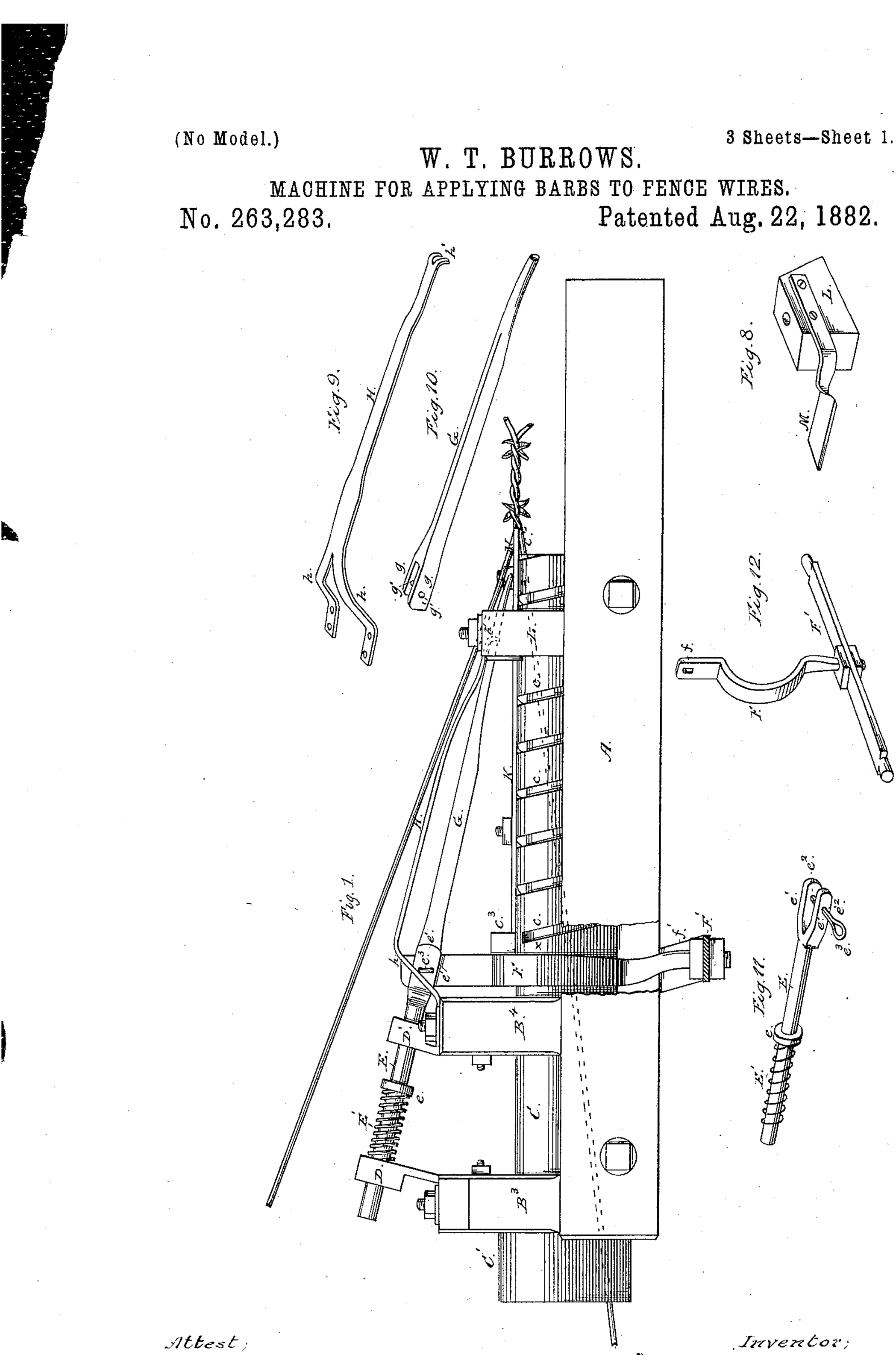
(No Model.) 3 Sheets—Sheet 1.

# W. T. BURROWS.

## MACHINE FOR APPLYING BARBS TO FENCE WIRES.

No. 263,283. Patented Aug. 22, 1882.

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F. N. Hall

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Attys

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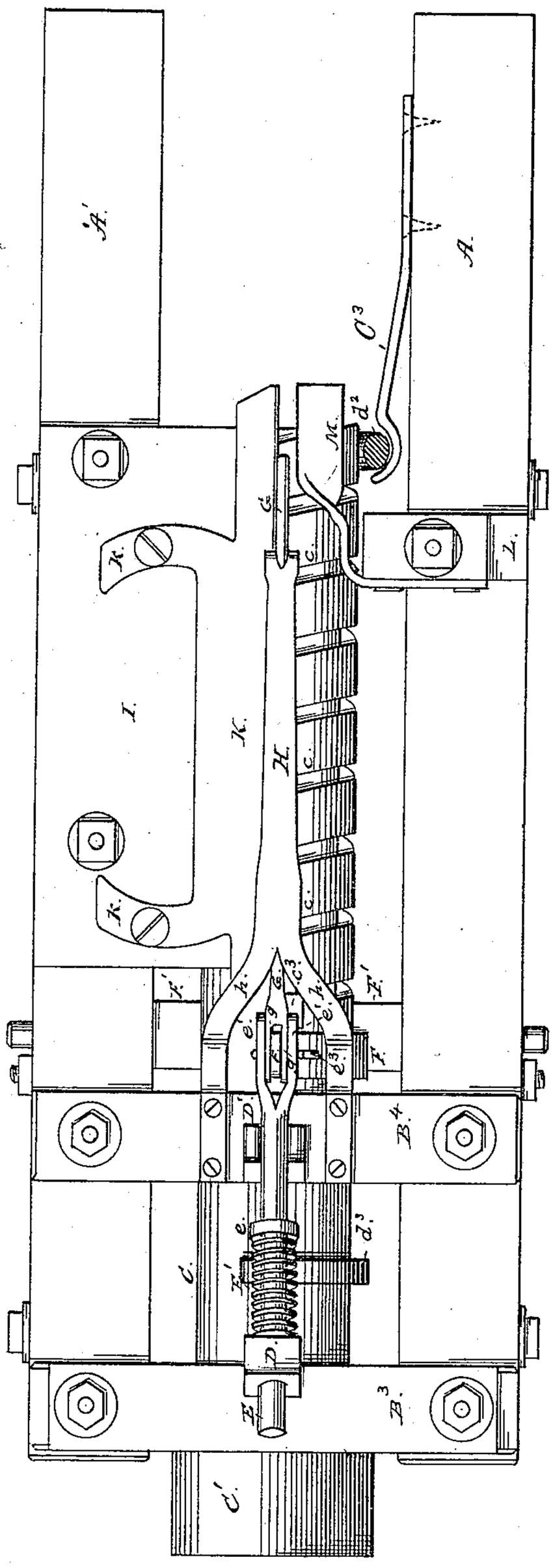
Fig. 2.

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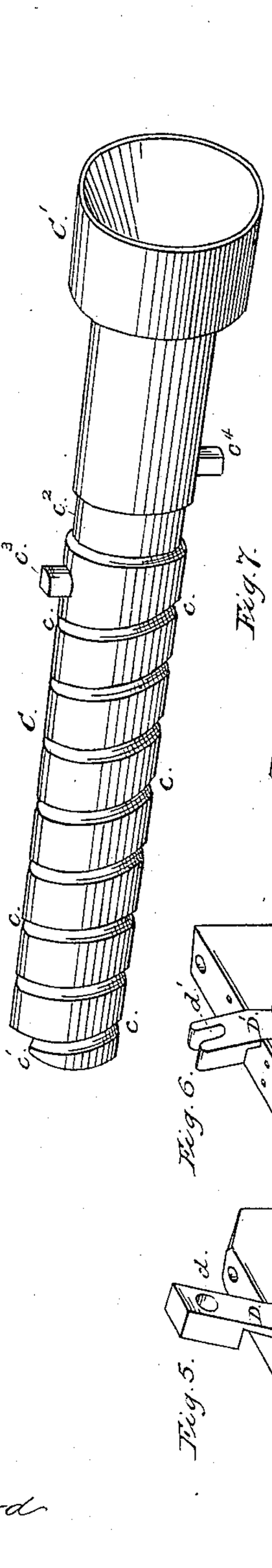

Fig. 4.

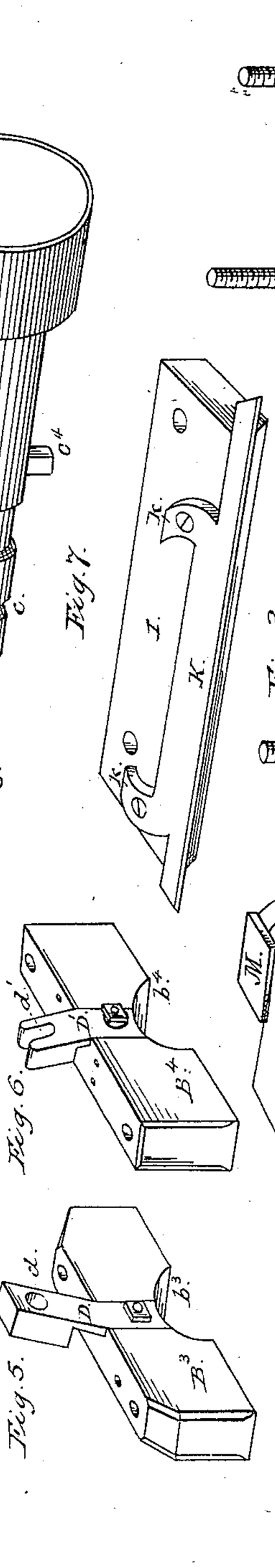

Fig. 7.

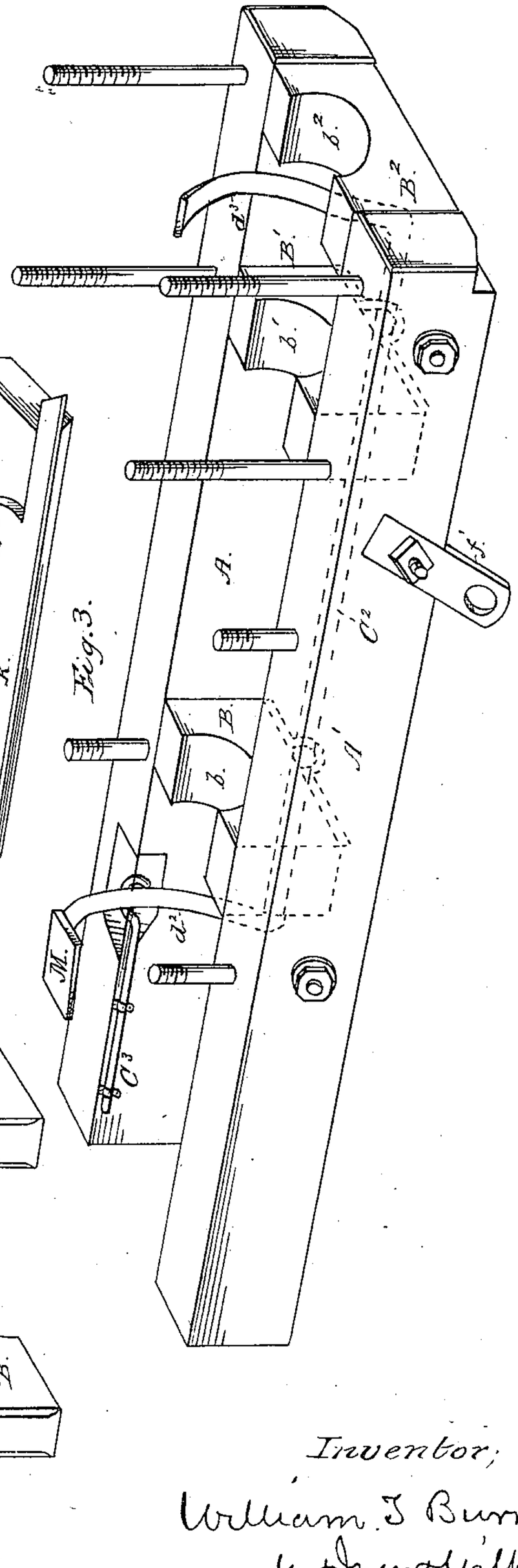

Fig. 3.



Fig. 6.



Fig. 5.

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# UNITED STATES PATENT OFFICE.

WILLIAM T. BURROWS, OF EAST DUBUQUE, ILLINOIS.

## MACHINE FOR APPLYING BARBS TO FENCE-WIRES.

SPECIFICATION forming part of Letters Patent No. 263,283, dated August 22, 1882.

Application filed June 22, 1881. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM T. BURROWS, of East Dubuque, in the county of Jo Daviess and State of Illinois, have invented a new and useful Machine for Applying Barbs to Fence-Wires; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The objects of my invention, which relates to the manufacture of barbed fence-wire, are to provide means whereby the barbs—such as the "Frentress" barb—may be more accurately and rapidly fed to and more securely inserted between the twisting strands of wire than has heretofore been done. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 represents a side view of a machine constructed according to my invention with the fence-wire being fed with barbs; Fig. 2, a plan view of the same; Fig. 3, a perspective view of the frame-work for supporting the operative parts of the machine, said parts being removed; Fig. 4, a perspective view of the tube for conveying the barbs to the wires; and Figs. 5 to 12 detailed views respectively of the several other component and operative parts of the machine.

Similar letters refer to similar parts throughout the several views.

In the drawings, A A′ represent the side pieces, and B B′ $B^2$ the cross-pieces, forming the frame-work of the machine, said cross-pieces having their ends terminating in tenons which fit into corresponding mortises cut into the inner faces of the side pieces, and the said parts being secured firmly together by means of bolts passing transversely through the frame-work at points just forward the cross-pieces B and $B^2$. These cross-pieces form bearings for the tube which conveys the barbs to the wires, and to be adapted to that purpose their upper surfaces are formed with semicircular recessess *b b′* $b^2$, respectively, said recesses being of the proper size and depth to inclose one-half of said tube at its bearing-points. These recesses are centrally arranged between the side pieces, A A′, and are in a direct line with each other, and when the barb-feeding tube is properly placed therein it occupies a central position between said pieces, with its sides parallel thereto and extending one-half above and one-half below the upper surface of the frame-work.

C represents the tube for conveying the barbs to the wires. This tube is made preferably from steel, and for ordinary purposes its length is about two feet; diameter, three inches, and thickness one-half an inch. Screw-threads or spiral groove *c* are cut into and around the exterior surface of the tube, said threads commencing at about the center of the tube and extending to one end thereof, where they terminate in an open screw, with a sharp defined point, *c′*. These screw-threads have a width of about one-fourth inch and depth of about three-eighths inch, with a space between the threads of about one and one-half inch. The open screw, at the end of the tube, is formed by reaming out the interior of the tube until the two threads next the end cut through. The part of this tube which has its bearings upon the cross-piece B′ is turned out to form a right-sided groove, $c^2$, passing entirely around the tube. This part $c^2$ fits into the semicircular recess *b′*, and thus prevents any longitudinal movement of the barb-feeding tube. Between this groove $c^2$ and the point where the screw-threads *c* begin the tube is provided with a lug or projection, $c^3$, the object of which will be hereinafter explained. The end of the tube opposite that on which the screw-threads are formed, and which is lettered C′, extends some distance beyond the end of the frame-work, and is made of a greater diameter than the rest of the tube. By means of a wheel (not shown) fitting upon this end and connecting by belting with the mechanism employed for feeding and twisting the wires motion is imparted to the barb-feeding tube. At this end the interior of the tube is gradually increased in diameter in an outward direction, assuming a funnel shape. The object and purpose of this construction will be hereinafter explained.

$B^3$ $B^4$ represent cross-pieces, which are arranged directly over and in vertical line with the cross-pieces B′ $B^2$. These pieces have their ends flush with the outside surfaces of the side pieces, A A′, of the frame-work, and are firmly secured thereto by means of bolts

passing vertically through said parts, as shown in Figs. 2 and 3. The construction of these pieces is shown in detail in Figs. 5 and 6. Semicircular recesses $b^3$ $b^4$ are made in their under sides, so that the pieces may fit nicely over the barb-feeding tube, and thus securely hold it in proper position for operation. These pieces extend for some distance above the frame-work, and serve as supports for other operative parts of the machine, presently to be described.

To the inside surface of $B^3$ is properly secured, by a bolt or any other suitable means, a metal upright or arm, D, provided at its upper end with a transverse hole, *d*. This arm has the part which extends above its support bent slightly forward. To the inner surface of $B^4$ is secured in the same manner the metal arm D′, provided at its upper end with a U-shaped slot, *d′*. This arm is also bent slightly forward above its support. These arms are arranged in the same straight line lengthwise the machine and at the centers respectively of the cross-pieces supporting them. The arm D is a little longer than the arm D′, so that when the spring-bolt E is inserted through the hole *d*, with its inner end resting in the U-shaped slot *d′*, it will assume a slightly-inclined position, as shown in Fig. 1. This spring-bolt is shown in detail in Fig. 11; and it is provided at or near its center with a spring-retaining ring or ferrule, *e*, and at its inner end with jaws *e′*, provided with holes $e^2$, through which a pin, $e^3$, is designed to pass, so as to secure the spring-bolt both to the mechanism which it operates and to that by which it is operated, as will be hereinafter described.

Between the inner face of the arm D and the ferrule *e* upon the spring-bolt is placed a spiral spring, E′, of suitable size and strength to properly operate the parts of the machine for which it is intended.

A crank-arm, F, having its body bent to conform to the contour of the side of the feeding-tube, extends upwardly from the center of a rocking shaft, F′, arranged beneath the frame-work, and having bearings in hangers *f′ f′*, secured by means of bolts to outside surfaces of pieces A A′ just forward of the cross-piece B′ and at points diametrically opposite. The construction of this crank-arm and its rocking shaft is shown in detail in Fig. 12. This crank-arm is provided at its upper end with an oblong aperture, *f*, and is made of sufficient length to fit between the jaws of the spring-bolt and allow the aperture *f* to register with the holes in said jaws, where it is secured by means of the pin $e^3$. The lower end of the crank-arm is secured to the rocking-shaft in any suitable manner to render the connection strong and firm and allow the parts to be removed from each other when desired.

G represents the arm or punch for inserting the barbs between the wires and holding them in proper position while the wires are being secured about them. This arm is shown in detail in Fig. 10, and it has one end formed into jaws *g*, provided with holes *g′*, by which means it is secured within the jaws of the spring-bolt by passing the pin $e^3$ through the connecting parts and the crank-arm, as shown in Fig. 2. The free end of the arm rests upon the barb feeding-tube at a point a little short of the end where the barbs are transferred to the wires, when the spring-coil which actuates it is compressed; but when the spring-coil is released the arm is forced forward for some distance beyond the end of the tube. This end of the arm is made round for some distance, and is slightly bent in a downward direction.

In the construction of arm G, to compensate for wear the outer end of the arm may be made a separate piece, fitted upon the main arm with screw-threads, so as to be lengthened as desired; also, may be harder metal. For the purpose of holding this arm in proper position and keeping its free end properly pressed against the tube, a spring-arm, H, is employed, the construction of which is shown in detail in Fig. 9. This spring-arm is made of metal, suitably adapted to the purpose, and has one end divided to form legs *h h*, bent at a sufficient angle to be secured to the upper part of the cross-piece $B^4$ on each side of arm D′, and allow the free working of the parts connected with the spring-bolt, and at the same time give a proper tension and spring to the arm G. The free end of the spring-arm is provided with a claw or clutch, *h′*, adapted to fit over the round part of arm G.

Upon the upper surface of the side piece, A′, of the frame-work is secured properly by bolts a piece, I. This piece is rectangular in form, of a sufficient thickness to have its upper surface flush with the top of the feeding-tube, and of a sufficient length and width to allow its inner edge, which is beveled, to nearly approach that part of the tube upon which the screw-threads are formed. A steel plate, K, of the proper thickness is secured to piece I by means of screws passing through arms *k k*, with which the plate is provided. This plate, with its connecting-piece, is shown in detail in Fig. 7, and it is so arranged thereon that its inner edge, which is beveled, shall extend over the screw part of the feeding-tube some considerable distance, yet not quite over the center, and be parallel with a line drawn lengthwise and along the center of the top of the tube. This plate should extend some distance beyond the end of the feeding-tube, as shown in Fig. 2. Upon the opposite side of the feeding-tube, and near its screw-threaded end, a piece, L, is properly secured to the upper surface of the side A. To this piece is secured, by means of screws or bolts, a steel plate, M, the construction of which and the manner of securing to piece L being shown in detail in Fig. 8. This plate is so arranged as to have its inner edge, which is beveled, parallel to that of plate K. The plate is of a thickness

corresponding to that of plate K, and extends beyond the end of the feeding-tube in a similar manner as plate K, as shown in Fig. 2. The space between the plates K and M should be equal to the thickness of a barb, or a little more, and the part connecting this plate M with the piece L should be made of spring-steel. These plates serve respectively as a main and an auxiliary guide for advancing the barbs along the feeding-tube and keeping them in proper position for insertion within the twisting wires, as will hereinafter be explained.

The axiliary guide, instead of being stationary, may be made automatically movable in a lateral direction, so that when the barb approaches the guide said guide will be drawn back a sufficient distance to allow the barb to advance a short way, and then be caught by the guides closing upon it and firmly held until the punch G forces it between the wires. This is accomplished by means of a lug arranged upon the side of the feeding-tube, an arm provided with the auxiliary guide made integral therewith, and adapted to be forced away from the main guide automatically by its engagement with said lug at every revolution of the feeding-tube, and a spring-arm operating upon the auxiliary guide to force it forward against the advancing barb the instant the arm operated by the lug is released. The mechanism by which this is accomplished is as follows:

Upon the side of the tube C next its enlarged end, as shown in Fig. 4, is secured a lug, $c^4$, which at every revolution of the feeding-tube engages with an arm, $C^2$, centrally located, as shown in solid and dotted lines, Fig. 3, between the two side pieces, A A′, of the frame. This arm has bearings in suitable brackets secured to the under surface of the cross-pieces B B′, and has its two ends, $d^2$ $d^3$, bent semicircularly in the same direction to conform with the contour of the feeding-tube, around one-half of which they extend. The end $d^2$, terminating at the smaller end of the feeding-tube, is provided with the auxiliary guide M, made integral therewith, which approaches the main guide K within a distance equal to the thickness of a barb, and there remains until forced away by the pressure of the lug $c^4$ upon the inner surface of the bent end $d^3$ of the arm $C^2$ to admit the approaching barb.

On the inner surface of the side piece A, at a point shown in Figs. 2 and 3, is secured a spring-arm, $C^3$, having one end hook-shaped to receive the end $d^2$ of the arm $C^2$. When the lug $c^4$ is released from its engagement with the arm $C^2$ this spring-arm throws the auxilary guide forward against the barb, and holds it until it is forced between the twisted strands. The same operation is repeated automatically at every revolution of the feeding-tube. By this means it is quite impossible for a barb to get away from the barb-feeding arm while being fed into the wires; also, any liability of the barbs catching upon the guide and doubling at the point or rolling it over, and thus leaving it in bad condition for insertion between the twisting wires, is avoided. Therefore I do not wish to limit myself to constructing the guide M in a stationary manner, for I desire to claim also constructing said guide so as to be automatically adjustable, as above described, as a part of the invention which forms the subject-matter of this application.

The machine is sustained properly by supports (not shown in the drawings) arranged beneath the frame-work at either end thereof, and is designed to be about centrally located between the mechanism for feeding and twisting the wires and that for taking up and receiving the completed fence-wire. One of the untwisted strands of the wires passes through the feeding-tube of the machine in a diagonal direction from the lower to the upper sides thereof, while the other strand passes outside and above the feeding-tube, both meeting at a point just at the open screw end of said tube, centrally located between the barb-guides K and M, and where the barbs are to be inserted at the proper distances between the wires while they are being twisted.

The twisting and feeding mechanism forms no part of this invention, and therefore need not be described.

The machine having been arranged as above stated, and the strands of wire properly adjusted, motion is imparted to the feeding-tube and the other operative parts by means of a belt passing around a wheel attached to its larger end and connecting with a wheel on the same shaft that operates the twisting mechanism. This belt is so arranged that every time the barb-feeder revolves once the wires are twisted for six inches, and thus the barbs are fed into the wires at every six inches. If it is desired to feed the barbs at every seven or eight inches, the speed of the twister is increased or that of the feeder correspondingly diminished. In other words, the belting is so arranged that the barbs may be fed between the wires at any distance from three to twelve inches apart by the relative speed of the barb-feeder and the mechanism for twisting the wires. The barbs are fed by hand into the spiral grooves on the exterior of the feeding-tube at the point X, one point of the barb being inserted therein. The revolving tube carries the barb around until it strikes against the main guide K. By continued revolutions of the feeding-tube the barb is advanced by means of the spiral grooves along the inner edge of said guide, one point of the barb resting thereon. When the barb reaches the auxiliary guide M one of its points opposite that resting on the main guide is caught by the guide M and held in a similar manner thereon. The barb then moves along upon the two guides until it reaches the sharp defined point $c'$ at the end of the tube from where it is intended for the twisting wires to receive it. Six revolutions of the

feeder are necessary to convey the barb to the point where it is to be inserted within the twisting wires. The barbs should be fed to the feeder at every revolution. While the barbs are being fed to and advanced along the feeding-tube the punch or arm G is performing the duty of inserting them into the twisting wires and firmly holding them there until they have been properly secured within the twist of said wires. This arm is operated automatically at every revolution of the feeding-tube by means of the lug $c^3$. This lug, as the tube revolves, catches against the inner edge of the crank-arm F, and, advancing along the same, causes it to be drawn back, carrying with it the spring-bolt E and arm G, and at the same time compressing the spiral spring E′. Just as the tube completes a revolution and a barb is advanced to the proper point for insertion between the wires the lug passes beyond the crank-arm, and the spiral spring, being thus released, operates to throw arm G suddenly forward, and with sufficient force to drive the barb quite firmly between the twisting wires and hold it until properly secured. When this is done the arm is again drawn back by the revolving lug and held till a completion of the tube's revolution again releases the mechanism for throwing it forward and inserting in a similar manner the next succeeding one of the barbs advancing along the tube.

It will be observed, by consulting Fig. 2, that the advancing barbs will begin to pass under the free end of arm G just as their points commence to bear upon the two guides, and that as the barbs advance the spring-arm H, pressing upon arm G, will hold said arm with a proper pressure against the barb while passing under it toward the twisting wires, and keep it properly adjusted for insertion between said wires. As soon as the barbs pass from under the end of arm G they are forced forward by said arm and properly held between the wires until secured therein, as described above.

Although this machine is specially adapted to feeding and inserting the Frentress barb, it may without material change feed and insert barbs of different shape, which, like the Frentress, are adapted to be held between the twisted strands of fence-wire.

I might state here that the object of having the interior of the larger end of the feeding-tube of a gradually-increasing diameter is to allow the ready passing of the strand of wire through it without the wires being affected by the revolving of the tube; and, further, that the object of cutting the threads entirely through at the end of the tube, thus forming a regular open screw with the sharp defined point $c'$, is for the following purpose: It is necessary that the wires to be twisted should come together very closely at the end of the feeder, in order that they may the more readily catch the barbs, and also in order that the arm G may the more readily insert them between the twisting-wires and not allow their slipping. If the tube were made very thin at this end—say one-eighth of an inch—it would perhaps do quite as well as the open screw at the end; but this way of leaving it an open screw avoids making it thin, and renders it more firm and less liable to break, there being considerable strain on the point of the feeder when inserting the barbs, and especially so if they happen to be not made exactly true.

Among the advantages obtained by using my improved barb-feeder in the application of barbs to fence-wire, might be mentioned the following:

First. The machine is very simple in the construction and arrangement of its operative parts, not easy to get out of repair, and can be readily made, and repaired when necessary by any machinist of ordinary skill.

Second. The machine feeds the barbs regularly, accurately, and much more rapidly than has been done heretofore, and this without any danger of injuring the hands of the operator.

Third. If an imperfect barb should accidently be placed into the feeding-tube, it will readily be discovered before reaching the wires, and easily removed and a perfect barb substituted.

Fourth. The force of the arm on the top of the feeding-tube automatically inserts the barb and holds it so firmly between the wires that all liability of the barbs slipping and not being caught properly, even by the smoothest galvanized wires, is avoided.

Fifth. Any person with a few minutes experience can feed the barbs to the feeding-tube, the only things necessary to be observed being to feed the barbs regularly and see that no imperfect one gets to the wires.

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

1. In a machine for barbing fence-wire, the combination, with any suitable driving mechanism, of a hollow barb-feeding tube provided with spiral grooves upon its exterior surface, and constructed, arranged, and operating substantially as described, and for the purpose set forth.

2. In a machine for barbing fence-wire, the combination, with a hollow barb-feeding tube and suitable mechanism for operating it, of an arm constructed and arranged to automatically insert and firmly hold the barb between the twisting strands at each revolution of the feeding tube and retreat after delivering each barb, and means for operating such arm, substantially as described, and for the purpose set forth.

3. In a machine for barbing fence-wire, a main and an auxiliary barb-guide arranged respectively upon each side of the feeding-tube, as described, and adapted to guide the barbs along the top of said tube, substantially as set forth.

4. In a machine for barbing fence-wire, an auxiliary barb-guide adapted to be automatically and laterally adjusted at each revolution of the feeding-tube, substantially as and for the purposes set forth.

5. In the wire-barbing machine described, the combination, with arm G, of mechanism operating to automatically advance said arm along the top of the feeding-tube and withdraw it after the barb has been delivered between the twisting wires at each revolution of said tube, substantially as and for the purpose set forth.

6. In the wire-barbing machine described, the combination, with the auxiliary barb-guide, of mechanism operating to automatically and laterally adjust said guide at each revolution of the barb-feeding tube, substantially as described, and for the purposes set forth.

7. In the wire-barbing machine described, the combination, with the feeding-tube C, provided with spiral grooves *c*, of the main and auxiliary barb-guides K M, constructed and arranged substantially as set forth.

8. In the wire-barbing machine described, and in combination, the barb-feeding tube C, provided with spiral grooves *e*, and the main barb-guide K, constructed and arranged substantially as set forth.

9. In the wire-barbing machine described, and in combination, the barb-feeding tube C, provided with spiral grooves *c*, the stationary barb-guide K, movable barb-guide M, and mechanism, substantially as described, for operating said guide at each revolution of the feeding-tube, as and for the purposes specified.

10. In the wire-barbing machine described, and in combination, the barb-feeding tube C, provided with lug $c^3$, the barb-inserting arm G, constructed and arranged as described, and mechanism, substantially as described, adapted to operate said arm in the manner substantially as and for the purpose set forth.

11. In the wire-barbing machine described, the combination, with the barb-feeding tube C, provided with lug $c^3$, of the barb-inserting arm G, automatically operated at each revolution of said feeding-tube by means of the spring-bolt E, spring E′, and crank-arm F, substantially as set forth.

12. In the wire-barbing machine described, the combination, with the feeding-tube C, provided with spiral grooves *c* and lug $c^3$, and the main and auxiliary barb-guides K M, constructed and arranged as described, of the barb-inserting arm G, spring-bolt E, spring E′, and crank-arm F, constructed and arranged substantially as set forth.

13. In the wire-barbing machine described, the combination of the feeding-tube C and the barb-guides K M with the barb-inserting arm G, pressure-arm H, spring-bolt E, spring E′, crank-arm F, and rocking shaft F′, substantially as set forth.

14. In the wire-barbing machine described, and in combination with the frame-work thereof, consisting of the side pieces, A A′, and cross-pieces B B′ $B^2$, the barb-feeding tube C, provided with recess $c^2$, and having bearings in recesses *b b′* $b^2$, with which said cross-pieces are provided, and the cross-pieces $B^3$ $B^4$, provided with recesses $b^3$ $b^4$, and adapted to be secured to said frame-work, substantially as and for the purposes set forth.

15. In the wire-barbing-machine described, and in combination with the frame-work thereof, the cross-pieces $B^3$ $B^4$, provided with arms D D′, constructed and arranged substantially as and for the purpose set forth.

16. In the wire-barbing machine described, and in combination with the frame-work thereof, provided with cross-pieces $B^3$ $B^4$, having arms D D′, and the guide-supporting pieces I L, constructed and arranged as described, the barb-feeding tube C, barb-guides K M, barb-inserting arm G, pressure-arm H, spring-bolt E, spring E′, crank-arm F, and rocking shaft F′, substantially as set forth.

17. In the wire-barbing machine described, and in combination with the frame-work provided with hangers *f′ f′*, and the feeding-tube provided with lug $c^3$, the rocking shaft F′, crank-arm F, cross-pieces $B^3$ $B^4$, provided with arms D D′, spring-bolt E, spring E′, pressure-arm H, barb-inserting arm G, pieces I L, and barb-guides K M, the several parts constructed, arranged, and adapted to operate substantially as set forth.

This specification signed and witnessed this 26th day of May, 1881.

WILLIAM T. BURROWS.

Witnesses:

MONROE M. CADY,

R. E. ODELL.