(No Model.) 4 Sheets—Sheet 1.

S. THOMPSON.

BARB WIRE MACHINE.

No. 305,865. Patented Sept. 30, 1884.

Fig. 1

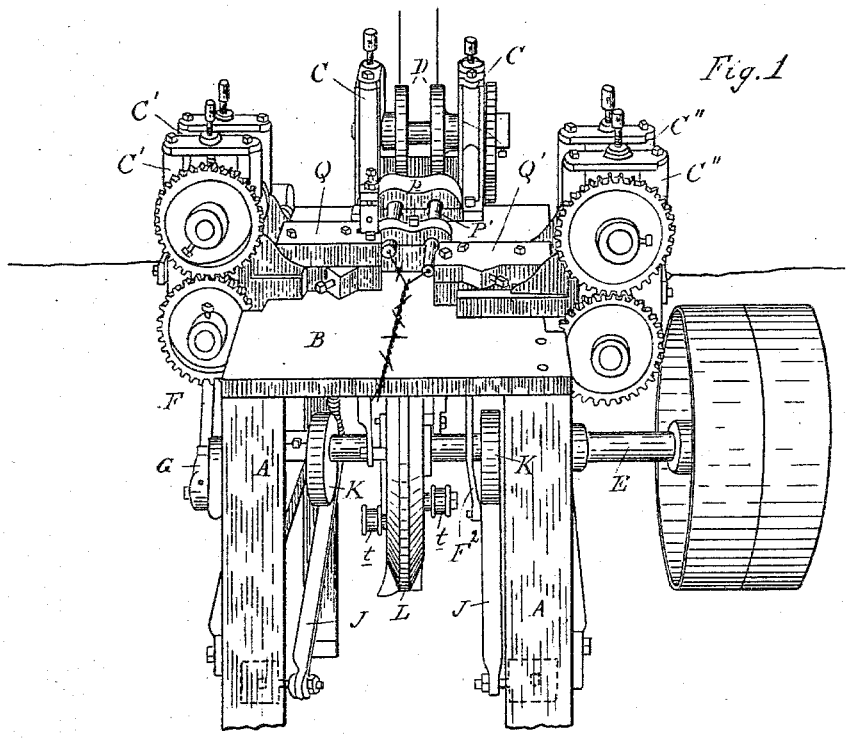
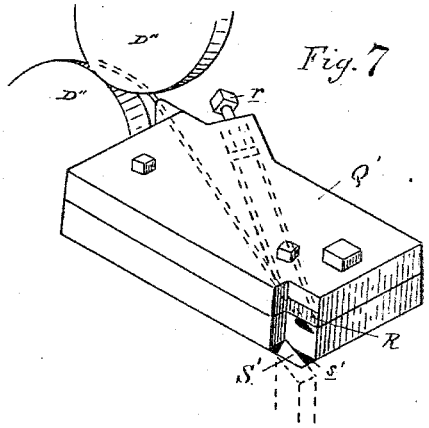


Fig. 7



Attest
J. Paul Mayer
T. J. Sprague

Inventor
Salmon Thompson
By Thos. J. Sprague Atty

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S. THOMPSON.

BARB WIRE MACHINE.

No. 305,865. Patented Sept. 30, 1884.

Fig. 2

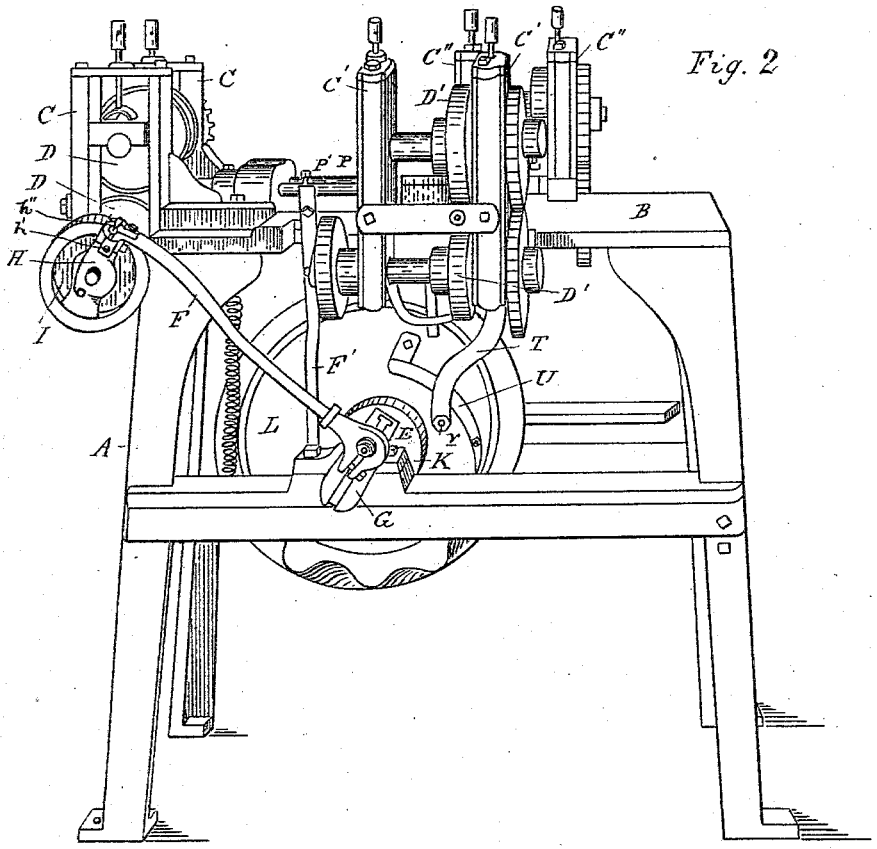


Fig. 8

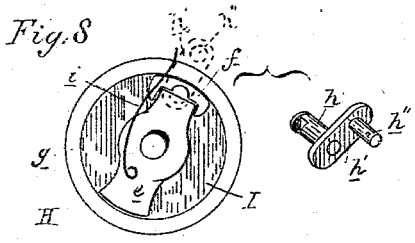


Fig. 9

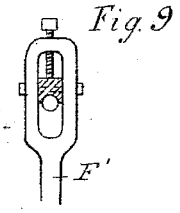
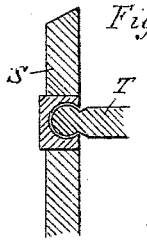


Fig. 10



Attest

J. Paul Mayer

Inventor

Salmon Thompson

By Thos. L. Sprague

Atty

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S. THOMPSON.

BARB WIRE MACHINE.

No. 305,865. Patented Sept. 30, 1884.

Fig. 3

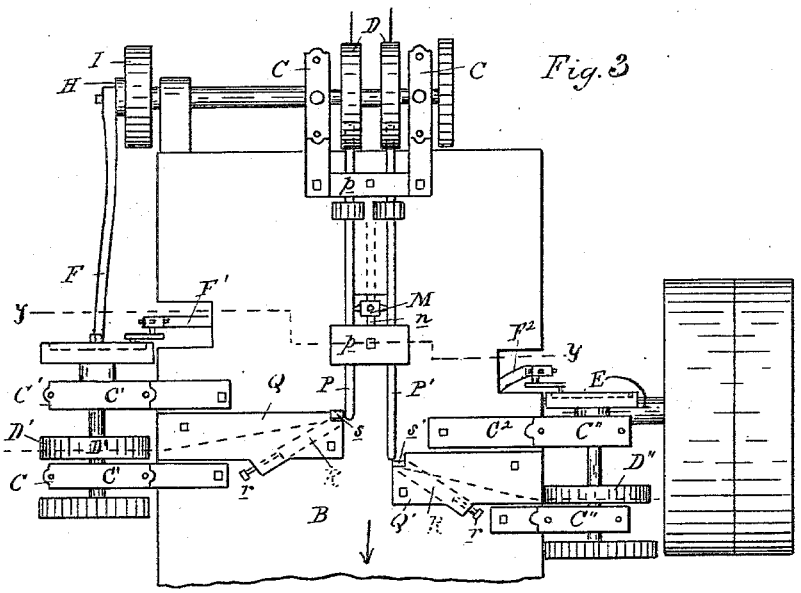


Fig. 4

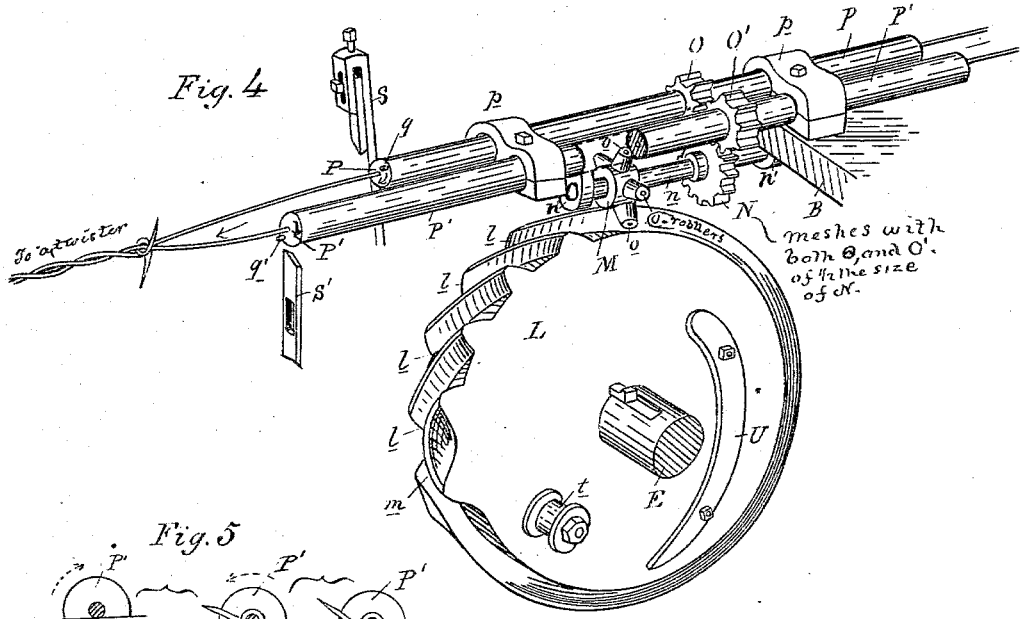
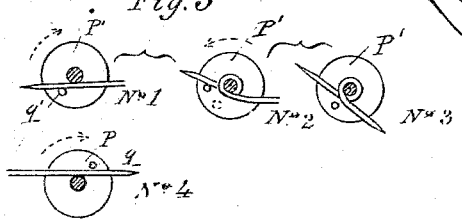


Fig. 5



Attest
J. Paul Mayer
[illegible]

Inventor
Salmon Thompson
By Thos. S. Sprague Atty

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S. THOMPSON.

BARB WIRE MACHINE.

No. 305,865. Patented Sept. 30, 1884.

Fig. 6.

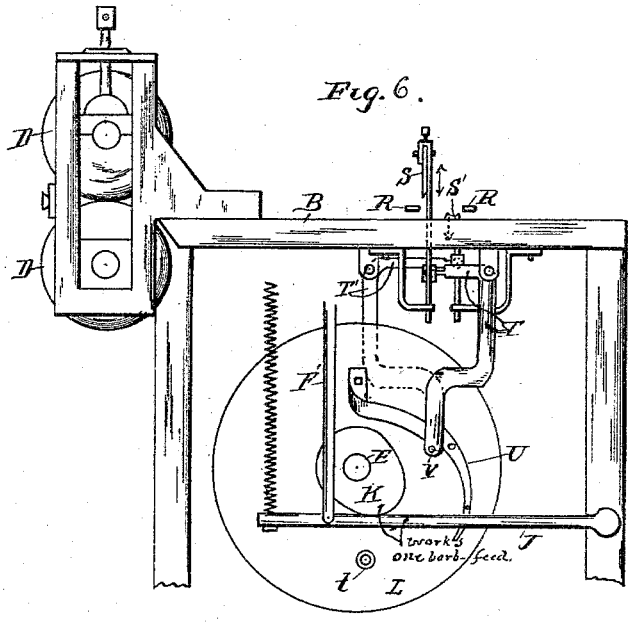


Fig. 11.

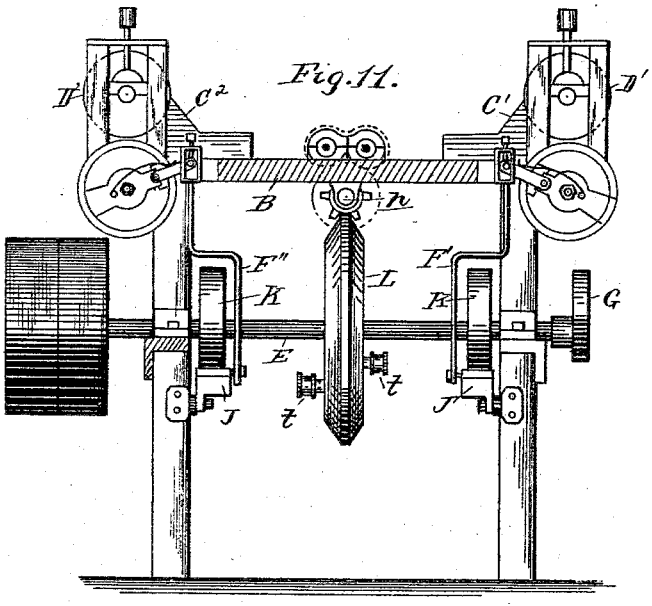


Fig. 12.

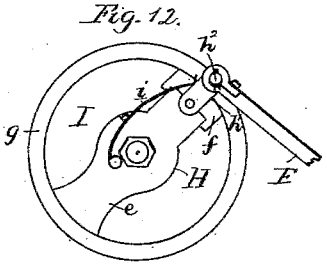
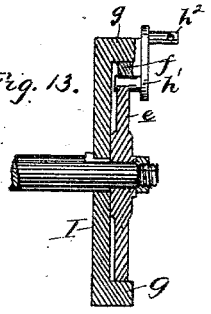


Fig. 13.



WITNESSES:

W. T. Robertson

E. A. Bond.

INVENTOR

Salmon Thompson

BY T. J. W. Robertson

ATTORNEY

UNITED STATES PATENT OFFICE.

SALMON THOMPSON, OF MANCHESTER, IOWA.

BARB-WIRE MACHINE.

SPECIFICATION forming part of Letters Patent No. 305,865, dated September 30, 1884.

Application filed March 5, 1884. (No model.)

To all whom it may concern:

Be it known that I, SALMON THOMPSON, of Manchester, in the county of Delaware and State of Iowa, have invented new and useful Improvements in Barb-Wire Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to certain new and useful improvements in barb-wire machines, such as are ordinarily used for two-strand wire, with barbs at regular intervals and secured, alternately, to one of the strands.

The invention consists in the peculiar combinations and the construction and arrangements of parts, as hereinafter more fully described, and then pointed out in the claims.

In the drawings, Figure 1 is a perspective view of the machine, looking at the rear end thereof. Fig. 2 is another perspective view, looking at the side of the machine. Fig. 3 is a plan of the table. Fig. 4 is a detached perspective view of the devices for forming the barbs upon the two main wires. Fig. 5 shows diagrams illustrating the operation of forming the barbs. Fig. 6 is a detached elevation showing the devices for operating the knives which cut off the barbing-wires after the formation of the barbs. Fig. 7 is a detached perspective of one of the knife-blocks which guide the wire to the knives, and hold it while being cut. Fig. 8 is a detail view of the friction-feed employed for feeding the wires. Fig. 9 is a detail showing the device for adjusting the friction-feed of the barbing-wires. Fig. 10 is a detail showing the loose pivot-connection between the cutting-off knife and its operating-lever. Fig. 11 is a cross-section on line *y y* of Fig. 3, showing the friction-feed for the barbing-wires. Fig. 12 is a detached elevation of the friction-feed for the main wires. Fig. 13 is a cross-section on line *z z* of Fig. 12.

A is the frame of the machine, which supports the operating parts. B is a table supported by the frame. C C, C′ C′, and C″ C″ are three sets of brackets secured to the table B. The brackets C C are secured to the front end of the table, and have journaled between them two sets of feed-rolls, D D—one for each of the two main wires. The brackets C′ C′ and C″ C″ have each journaled between them one set of feed-rolls, D′ D′ and D″ D″, for each of the two barbing-wires. These feed-rolls are upon opposite sides of the table, and one is nearer the rear of the machine than the other.

The motion given to these feeding devices is intermittent, and is obtained from the main shaft E in the following manner: A crank, G, is secured upon one end of the main shaft E. To this is adjustably secured one end of the pitman F, the other end of which is secured to the loose friction-crank H, which is shown in detail in Fig. 8. This crank is loosely secured within the rim *g* of the disk I, which latter is secured upon the end of the shaft of the lower set of feed-rolls D D.

The loose crank H consists of two pieces, *e f*, the part *f* of which is provided with a half-rounded recess, in which the half-rounded portion of the crank-pin *h* is inserted. This crank-pin *h* is secured to a plate, *h′*, which is provided upon the opposite side, near its opposite end, with a wrist-pin, *h″*, and to which the head of the pitman is secured. *i* is a spring bearing against the plate *h′*.

In operation the revolutions of the crank G impart motion to the pitman F, which vibrates the loose crank H within the disk I, and whenever the pitman F pulls, the action of the crank-pin *h* wedges the two parts *e f* of the crank H apart, causing said disk I to revolve a small part of a revolution; but whenever the pitman pushes, the action of the spring *i* prevents the parts *e f* from being wedged apart, thus keeping the disk I quiescent. Thus the positive and continuous motion of the shaft E is transformed into an intermittent friction-feed. The feed for the feed-rolls D′ D′ and D″ D″ is obtained in a similar manner, with this exception, that the lower end of their respective pitmen F′ F″ are secured to levers J J, which are vibrated by means of cams K K, secured upon the shaft E. The upper ends of these pitmen are adjustably secured to the wrist-pins, as shown in Fig. 9, thus getting the same facility for adjusting the lengths of stroke of the pitman which is obtained in the case of the pitman F by its adjustable connection with the crank G.

L is a cam-wheel secured upon the shaft E, and shown in detached perspective view in Fig. 4. Part of its peripheral face is V-shaped in cross-section, while the rest of the same is

provided with grooves *l*, which traverse the said face obliquely. The last one of these grooves is provided with a return-groove, *m*.

M is a pinion secured to a shaft, *n*, which is journaled in boxes *n'* in the under side of the table B. The pinion M has, instead of the usual cogs, a number of conical anti-friction rollers, *o*, secured to it.

I am aware that cam-disks performing the same function have been used heretofore in this class of machiney; but the oblique or cam grooves extended radially instead of across the periphery of the disk. By my construction the greatest power of the cam is at once utilized and remains uniform, whereas, constructed as heretofore proposed with the cam extending radially across the disk, the power exerted at the beginning of its action is less than the power exerted at the completion thereof, consequently the power is not uniform, but varying. Another advantage lies in the cheapness of construction of the cam-disk, as the grooves can be milled in the periphery at a much less expenditure of time and labor than they could radially on the side of the same; and, again, having the periphery Λ-shaped in cross-section for a part way involves much less expense than a groove cut in the side of the disk for the same purpose, as has also been proposed.

The parts last described are so arranged that the cogs *o* of the pinion M can straddle the V-shaped face of the cam-disk L, and lock thereby the pinion M in position, and by the engagement of the rollers or studs *o* into the oblique grooves *l* a rotary motion of the pinion M is produced. The return-groove *m* reverses the motion of the pinion M for a small part of a revolution. Thus the continuous rotary motion of the cam-disk L is transformed into an intermittent rotary motion of the pinion M, which makes a little more than one-half a revolution in one direction, and then reverses so much as to make its former revolution just one-half, while during its position of rest it is firmly locked by the V-shaped face of the cam-disk.

Secured upon the shaft *n* is another pinion, N, which meshes with two pinions, O O', which latter are secured upon the tubes P P'. The pinions O O' are half as large as the pinion N, so that one-half of a revolution of the pinion N gives a whole revolution to the pinions O O' and tubes P P'. The tubes P P' are secured to the top of the table B, aside of each other, in journals *p p*. They are centrally perforated their whole length, so that the main wires can pass loosely through them. The tube P' is longer than the tube P, the difference representing the distance at which the barbs are spaced upon the main wires. The rear ends of the tubes are slightly rounded off and are provided with short pins or studs *q q'*.

Q Q' are two blocks secured to the table B, near the rear ends of the tubes P P'. Each of these blocks consists of two corresponding plates superimposed upon each other. Upon the top of the lower plate, and diagonally across it, is formed a groove through which the barbing-wire can loosely pass. Between the two plates, and secured in a proper recess therein, is a steel bar, R, which can be adjusted lengthwise by means of a set-screw, *r*. The inner corners of the blocks Q Q' are cut away, as shown in Figs. 3 and 7. This cut-away portion forms a guideway for the vertically-reciprocating knives S S', which pass through proper slots, *s s'*, in the table B. The knives S S' work in connection with the steel bars R to effect the cutting off of the barbing-wire, which passes obliquely through the blocks Q Q' and passes obliquely across the path of the knives.

In Fig. 6 the knives S S' are shown in elevation. The knife S works from above, while the knife S' works from below. Both are operated in a similar manner by the elbow-levers T T', which are pivoted beneath the table B, their short arms being in loose engagement with the knives S S', while their other or free ends are provided with anti-friction rollers *v*, and are arranged to be struck by the pins *t* on the opposite face of the disk L. These pins knock the levers to one side, and the cams U, which are likewise attached to the disk L, engaging the rollers *v*, return said levers to their normal position. This vibrating movement, by reason of the connections just described, imparts a reciprocating movement to the knives.

In practice the main wires are fed to the machine through proper guide-holes, which guide them between the feed-rolls D D. Then, passing through the tubes P P', they pass out at the rear ends of these tubes and are led to the twister. The barbing-wires, of which there are also two, pass through proper guide-holes between the feed-rolls D' D'' and through the blocks Q Q', which lead these barbing-wires toward the rear ends of the tubes P P'. The position of these tubes is shown in Fig. 5, where No. 1 shows the position of tube P', and No. 4 the position of tube P, before the beginning of the operation of barbing.

The feed of the barbing-wires is so gaged that their ends will be pushed in and between the main wires and the studs *q q'* sufficiently far to form one of the points of the barb. Upon the operation of the cam-disk L and its connection the tubes P P' will then be revolved a little more than one revolution, showing the formation of the barb by diagram No. 2. Then, upon the tubes reversing enough to make their revolution just one turn, the barb is freed from the studs *q q'*. Now the operation of the knives severs the barb from the barbing-wire at a distance from the main wire long enough to form the other point of the barb. Owing to the obliquity of the path in which the barbing-wire lies across the path of the knife, the cutting off will produce a sharp point upon both of the severed ends, the remaining one forming one of the points of the next succeeding barb. As the tubes P P' re-

volve both in the same direction, it is of course necessary, in order to form the barbs alike, to pass one of the barbing-wires above and the other below the main wire, and for that reason the knives S and S′ work in opposite directions.

It will be seen that by the operations of the cam-disk L, in combination with the pinion M, a very powerful and positive motion is obtained, which allows to form the coil of the barb very close and tight upon the main wire, so that the necessity of more than one coil to steady the barb is obviated.

All the parts, where desired, are provided with proper adjustments, and the grip of the feed-rolls may be, as usual, adjusted by springs and set-screws which operate upon the movable boxes of the upper feed-rolls.

One great advantage of my machine is that I can run it at very high speed without the least detriment to the work or to the operating parts of the machine. This is owing, in a large measure, to the devices employed for obtaining the required intermittent motions, especially of the devices for forming the barbs. The main shaft and the parts secured to it are continuously revolving, and the momentum acquired by the intermittent parts under high speed is too small to be of any consequence.

As the machine, besides its adaptability to run at very high speed, also forms two barbs simultaneously, it is obvious that the machine must have a large capacity for work, and as a matter of fact the latter depends solely upon the ability of the twister to take care of the work.

The advantage of the friction-feed employed for the different wires lies in the fact that it is practically positive, while at the same time it admits of a very close adjustment and is free from disagreeable noise, even at the highest rates of speed.

Tubes P P′ for guiding the main wires to the barbing devices have been employed heretofore in similar machines of this class; but one of these tubes was always placed convergent to the other, whereas in my machine they are placed parallel to each other with the necessary distance between them to form the barbs. This construction allows me to make the two barbing devices simply duplicates of each other, while at the same time it facilitates and improves the operation of the twister.

What I claim as my invention is—

1. In a barb-wire machine, the combination of the following devices: intermitting feeding devices for two main wires, intermitting feeding devices for two barbing-wires, and intermittingly and simultaneously operating devices for forming two barbs—one upon each main wire—substantially as set forth.

2. In a barb-wire machine, the combination of an intermittent feeding device for the two main wires, with two barb-forming devices—one for each main wire—operated simultaneously, and so located in regard to each other that they produce the spacing of the barbs, substantially as set forth.

3. In a machine for barbing wire, the combination of the main shaft, the main-wire feeding mechanism, the barb-wire feeding mechanism, and the shearing and barb-forming mechanism thereof, with the crank G, cams K K, and the cam-disk L, all secured to said main shaft, and operating on said mechanism, respectively, substantially as described.

4. In a barb-wire machine, and in combination with the wire-feeding devices thereof, the loose crank H, disk I, provided with rim *g*, cap *f*, loose wrist *h h′ h″*, spring *i*, and pitman F, substantially as and for the purpose described.

5. In a barb-wire machine, the combination of the disk L, provided with striker-pins *t*, retracting guide-bars *u*, elbow-levers T T′, and knives S S′, substantially as and for the purpose described.

6. In a barb-wire machine, the combination of the disk L, provided on its periphery with the traversing cam-grooves *l* and reverse groove *m*, of the pinion M, adapted to engage with said grooves, and thereby receive a uniform rotary motion in one direction and a reversal in an opposite direction, and of intermediate mechanism for communicating said motion to a tube or tubes, P P′, substantially as set forth.

7. In a barb-wire machine, the combination of the disk L, V-shaped on part of its peripheral face, and provided with the traversing cam-grooves *l m* on the rest of the same, of the pinion M, provided with conical roller-teeth *o*, and of intervening positive mechanism, as pinions N′ O O′, for communicating its motion to the tubes P P′, substantially as set forth.

8. In a barb-wire machine, the combination of the disk L, having its peripheral face partly V-shaped and partly provided with the traversing cam-grooves *l m*, of the pinion M, provided with conical rubber teeth *o*, of the shaft *n*, and pinion N, and of the tubes P P′, provided with pinions O O′, and eccentric pins *q q′*, substantially as and for the purposes set forth.

9. In a barb-wire machine, the combination of the disk L, having its face partly V-shaped and partly provided with the traversing cam-grooves *l m*, and having secured on its sides striker-pins *t t*, and reversing guide-bars *u u*, of the elbow-levers T T′, having knives S S′, and of the pinion M, engaging with the face of the disk L, and imparting its motion to the tubes P P′, substantially as and for the purpose described.

10. In a barb-wire machine, the combination of the two rotary tubes P P′, provided with eccentric pins *q q′*, and placed parallel to each other and projecting at different lengths, substantially as and for the purposes described.

Witnesses: SALMON THOMPSON.
H. S. SPRAGUE,
E. SCULLY.