Sheet 1 / 2Sheets.

S. D. Locke.

Grain Binder.

No. 97536 Patented Dec. 7, 1869.

Fig. 1.

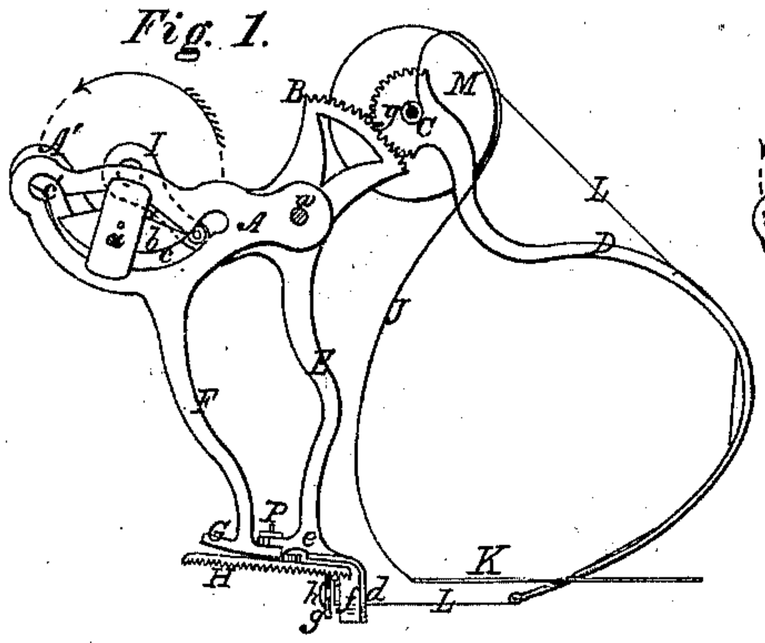


Fig 2

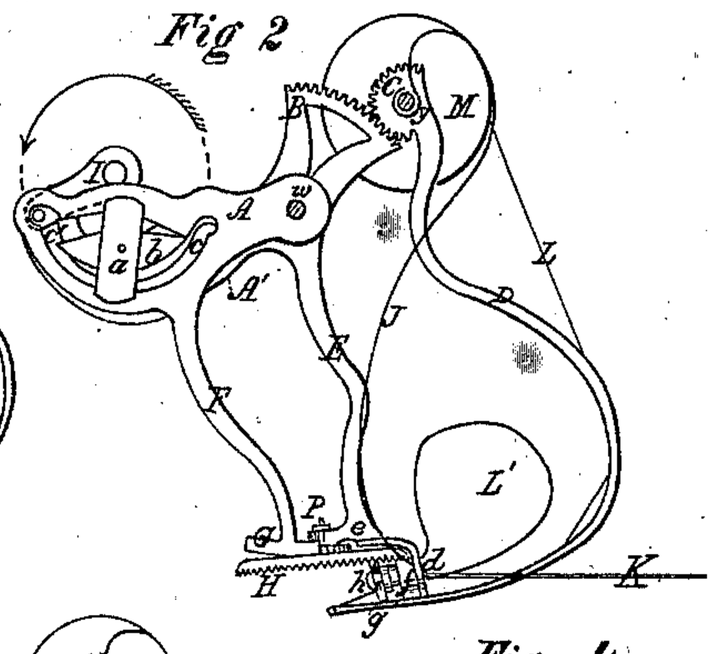


Fig. 3.

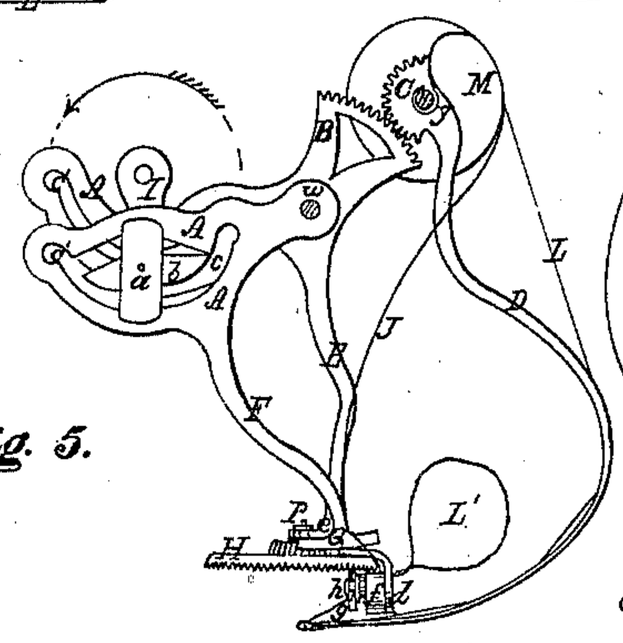


Fig. 4.

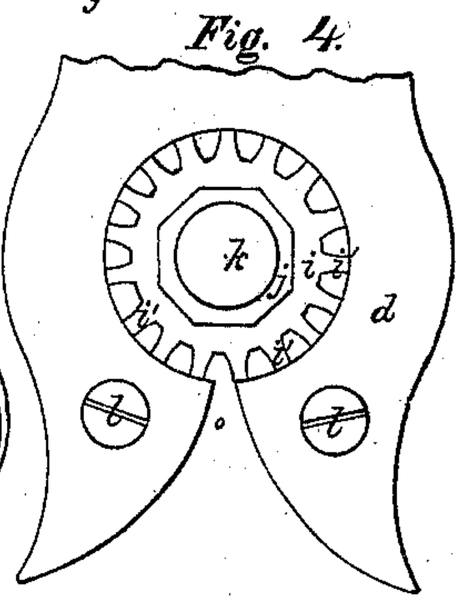


Fig. 5.

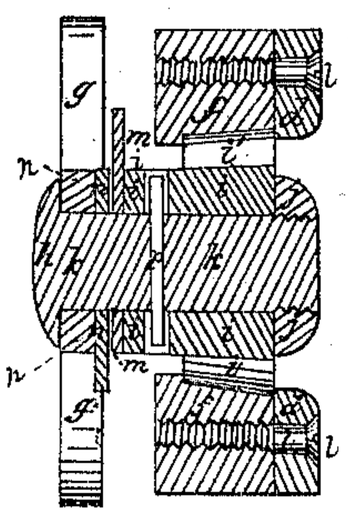


Fig. 6.

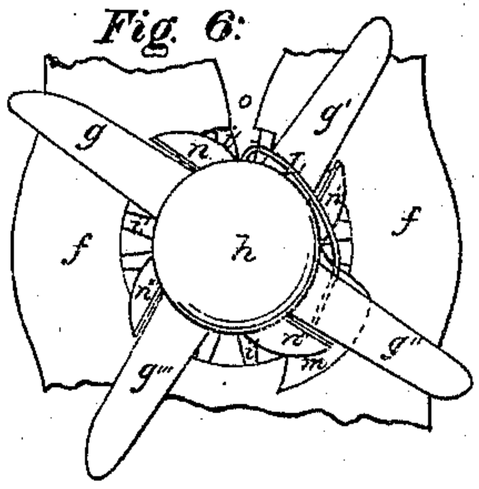


Fig. 7.

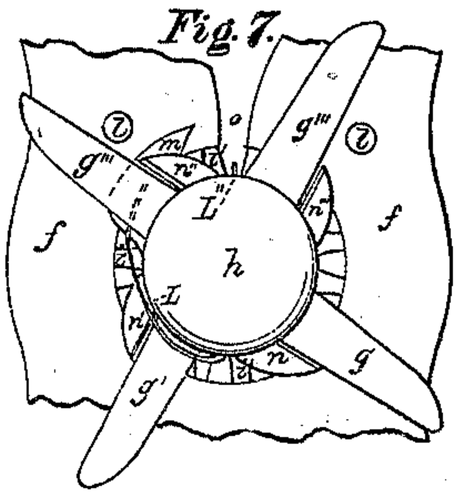


Fig. 9.

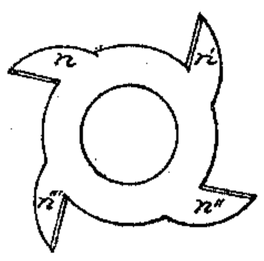


Fig. 8.

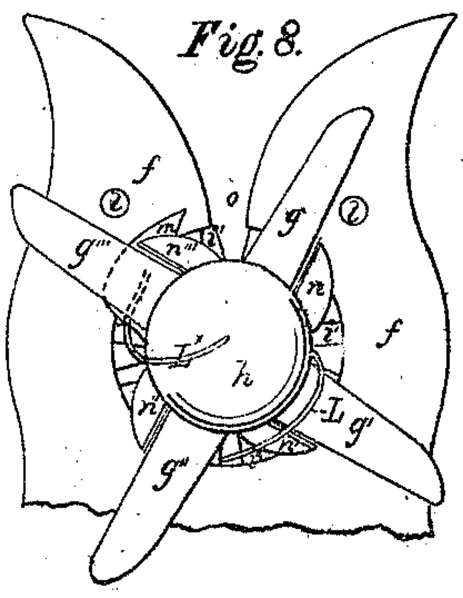
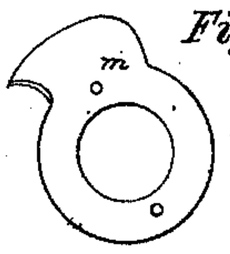


Fig. 10.



Witnesses

J. S. Lambert

S. A. Skinner

Inventor,

Sylvanus D. Locke.

Sheet 2 - 2 Sheets.

S. D. Locke.

Grain Binder.

No 97536 Patented Dec. 7, 1869.

Fig. 11

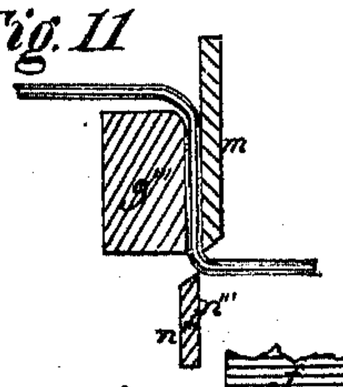


Fig 12.

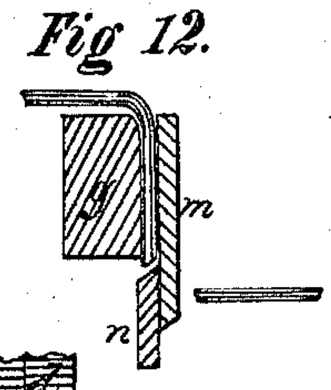


Fig. 15.

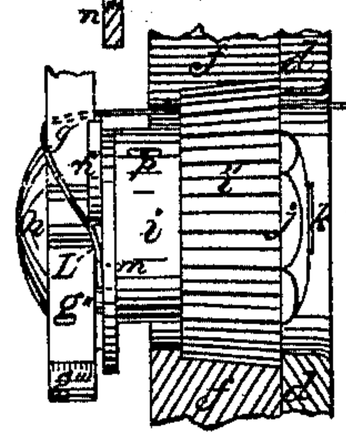


Fig. 13.

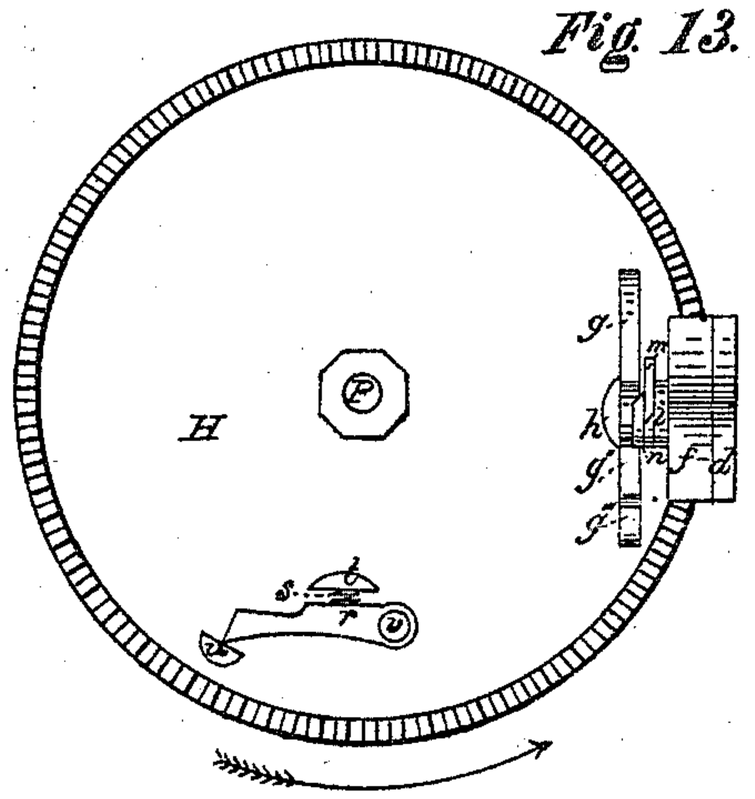


Fig. 14.

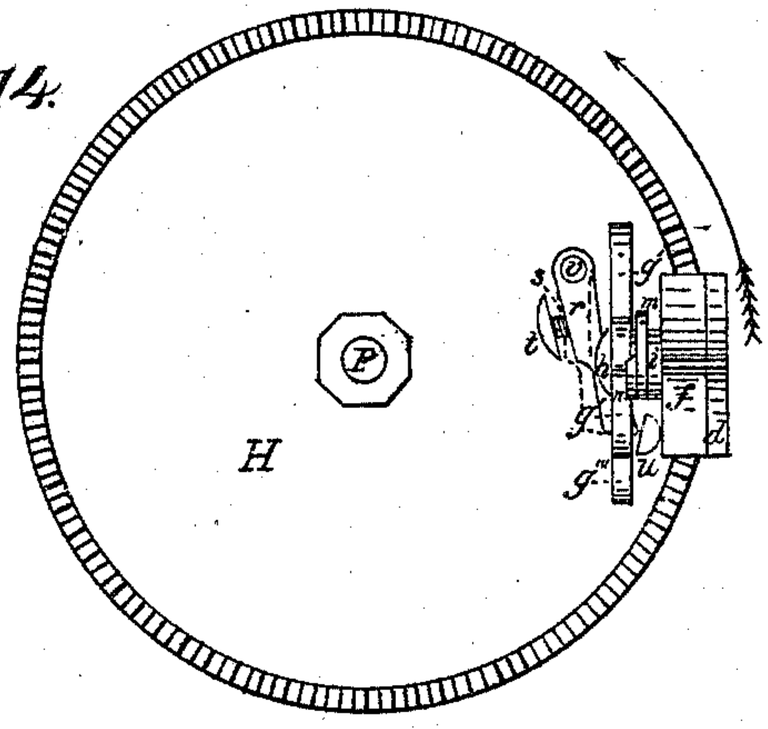


Fig. 16.

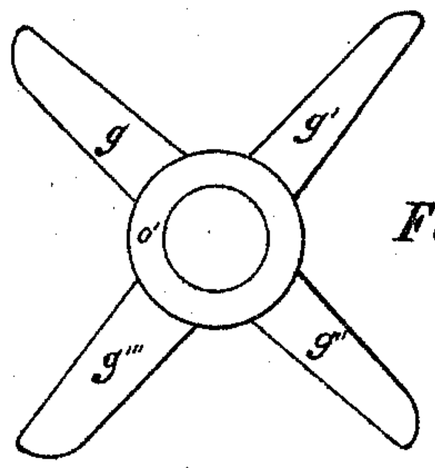


Fig. 17.

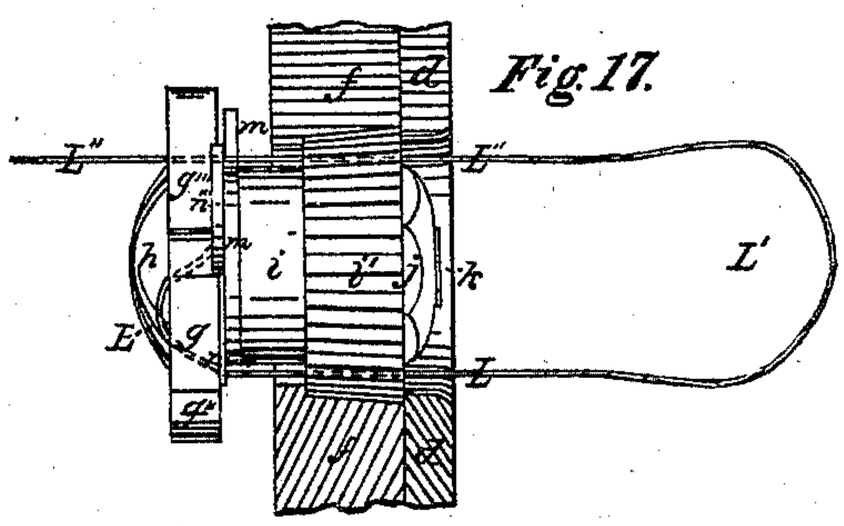
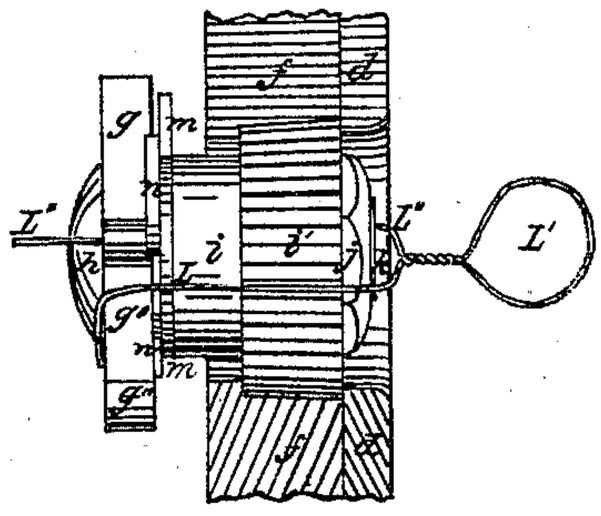


Fig 18.



Witnesses,

J. L. Lambert

L. A. Skinner

Inventor, Sylvanus D. Locke.

UNITED STATES PATENT OFFICE.

SYLVANUS D. LOCKE, OF JANESVILLE, WISCONSIN.

IMPROVEMENT IN GRAIN-BINDERS.

Specification forming part of Letters Patent No. **97,536**, dated December 7, 1869.

To all whom it may concern:

Be it known that I, SYLVANUS D. LOCKE, of Janesville, Rock county, State of Wisconsin, have invented certain new and useful Improvements in Grain-Binders; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figures 1, 2, and 3 are side views, showing one mode of constructing the mechanism for operating my improvement, together with the different positions which it and the binding-wire assume during the operation of binding. Fig. 4 is a front view of my improvement. Fig. 5 is a horizontal section of the same. Figs. 6, 7, and 8 are rear views of the same, showing the different positions of the several parts, and of the binding-wire, during the operation of binding. Fig. 9 is an elevation, in detail, of the rotary part of the cutting mechanism. Fig. 10 is an elevation, in detail, of the fixed part of the cutting mechanism. Figs. 11 and 12 are sections of the cutting and holding mechanism, showing how the binding-wire is cut and the end held. Figs. 13 and 14 are under-side views of my improvement as it appears when operated, as shown in Figs. 1, 2, and 3. Fig. 16 is an elevation, in detail, of the rotary part of the wire-holder; and Figs. 15, 17, and 18 are side views, with a section of the inclosing shell-support of my improvement, showing the different positions of the several parts, and of the binding-wire, during the operation of binding.

The nature of my invention consists, first, in the employment, on a grain-binding machine, of any pinion for twisting together the two ends of the binding-wire, after the same have been thrown around the bundle, the ends for that purpose being thrown directly into the teeth of the pinion; secondly, in so constructing the rotary twisting devices of grain-binders that the twisting-pinion shall take bearing only upon the ends or faces of its teeth, thereby dispensing with the shaft or ordinary bearings at its ends, and enabling it to be used without a central slot; thirdly, my invention further relates to the wire-holding and wire-cutting mechanism of grain-binders, and consists in the use of the devices hereinafter more particularly described.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

In the drawings, Figs. 1, 2, and 3 are introduced to show one mode of operating my invention, and therein A and A′ represent cam-arms that are pivoted at *w*, and that operate, respectively, the twisting-arm F and the binding-arm E. On the twisting-arm is a circular rack, G, playing in a pinion attached to the gear-wheel H, that turns on the stud P on the arm E. To the arm E is attached the segmental gear B that plays in the segmental pinion C that is pivoted at *y*, and to which is attached the third arm D. J is a grain-guard; K, the binding-platform; M, the reel, for bearing the binding material; and L the binding-wire. All are actuated by the crank I that plays in the cam-grooves *c c′* in the cam-arms A and A′.

The form of the cam-grooves is such as to give to the arms F E D the movements hereinafter described.

The twisting-pinion *i* may be a bevel or spur pinion, but is here shown as a bevel-pinion. It takes bearing only upon the ends of its teeth in the parts *d f* of the inclosing shell, which parts are attached together by screws, as shown, or otherwise, and secured, in any suitable manner, to the hand *e* of the binding-arm E. The form of this shell is such as to leave both ends of the pinion and the lower portion of the teeth fully exposed.

The twisting pinion is operated by the gear-wheel H, and has firmly attached to its outer end, by rivets or otherwise, a part, *m*, more fully shown in Fig. 10, that is, as to its edge, a stationary knife, against which the radial blades *n*, *n′*, *n″*, and *n‴*, of the rotary part of the cutting device, more fully shown in Fig. 9, alternately work, after the manner of shears, to cut or sever the wire, and which, as to its side face, is a stationary jaw, against which the radial arms *g*, *g′*, *g″*, and *g‴*, of the rotary part of the wire-holder, alternately press the binding-wire, so as to thereby hold the cut or free end.

The circular body of the rotary part of the wire-holder is recessed, as shown more particularly in Fig. 16, to receive the circular body of the rotary part of the wire-cutting device *n*, *n′*, *n″*, and *n‴*, and into which recess the latter is so far inserted as to leave between the radial arms *g*, *g′*, *g″*, and *g‴*, and

the jaw *m* a breadth of space slightly less than the diameter of the binding-wire to be held.

The rotary part of the cutting device may be held in the right position relative to the rotary part of the wire-holder, as shown by the drawings, in any desired manner, as by pins, or the form of the recess may be such as to hold them securely from turning.

The rotary parts of the wire-holding and wire-cutting devices turn freely upon a bolt, *h k*, that passes longitudinally through the pinion, as shown, and that, by means of its nut *j*, holds them firmly together, and pressed against the stationary part *m*.

On the face of the gear-wheel H is a dog, *r*, Figs. 13 and 14, that is pivoted at *v*, and that is held by the spring *s* against the lug or projecting portion *u* of the wheel.

The pin *p*, passing through the pinion *i* and the bolt *h k*, is used to prevent the pinion from turning on the bolt, and so loosening the nut *j*.

The bolt *k k* gives bearing to the rotary parts aforesaid, and allows the latter to be readily adjusted by means of the nut *j* and the use of washers between the parts, at any desired distance from the fixed part *m*, so as to permit the use of any desired size of wire.

When in operation the crank I, revolving in the direction shown by the arrow, and the various parts being in the position shown by Fig. 1, the end of the binding-wire L is carried from the reel M, on or along the arm D, as shown in Fig. 1, and then, being taken into and through the mouth *o* of the shell *d f*, and between the teeth *i'* of the pinion *i*, and placed around one of the radial arms, *g'*, of the rotary part of the wire-holder, it is inserted between another radial arm, *g''*, and the stationary part *m*, as fully shown in Figs. 1, 6, and 15.

The crank turning, as indicated, the arms D and E open or separate to allow the bundle to be brought in on the platform *k* against the guard J, when, the arms closing, the binding-wire is looped, L', around it, and again inserted in the teeth *i'* of the twisting-pinion *i*, as shown in Figs. 2, 7, and 17.

The form of the cam-grooves *c c'* must be like that shown in the drawings, so as to cause the two ends L L'' of the wire passing around the bundle to be inserted in the teeth on the opposite side of the twisting-pinion, as shown in the last-mentioned figures.

At this stage of the operation, both ends of the wire passing around the bundle being inserted in the teeth of the twisting-pinion, and the crank I continuing to turn, the latter is compelled, by the gravitating-block *b*, to pass in the upper groove in the cam-arm A, thereby driving down the cam-arm A, and, through the twisting-arm F and rack G, operating the gear-wheel H that, in turn, causes the twisting-pinion *i* and the attached wire-holding and wire-cutting mechanism to rapidly revolve, so twisting together the ends L L'' of the wire, as shown in Fig. 18.

The position of the wire-holding and wire-cutting mechanism, with their operating-dog *r*, is shown in Fig. 13.

During the latter part of the twisting-operation, the movement of the gear-wheel H, in the direction indicated by the arrow in last-named figure, carries the free end of the dog *r* underneath the revolving radial arms *g*, *g'*, *g''*, and *g'''*, in such a manner as to strike and drive backward one of the radial arms, *g'*, to the position before occupied by the arm *g*.

The relative position of the wire-holding and wire-cutting mechanism, and of the binding-wire, before this latter movement of the rotary part of the wire-holder, is shown in Figs. 7 and 17, and their relative position after this movement is shown in Figs. 8 and 18.

The movement of the radial arms is backward only relatively to the revolution of the twisting-pinion, as the real effect of the dog *r* is simply to stop the movement of the rotary parts of the wire-holding and wire-cutting devices until the movement of the twisting-pinion shall carry forward, over one of the spaces between the radial arms, the fixed part *m*.

The backward movement or stopping of the rotary parts of the wire-holding and wire-cutting mechanism, in causing the radial arm *g'''* and radial blade *n'''*, Figs. 7 and 17, to take the position, relative to the fixed part *m*, respectively shown by the arm *g''* and blade *n''*, in same figures, thereby first drives the arm *g'''* alongside of the fixed part *m*, and forcibly doubles between them the end L'' of the wire, as shown in Fig. 11, and then the blade *n'''*, following, cuts it off, as shown in Fig. 12.

The same movement that causes the arm *g'''* to seize and the blade *n'''* to cut off the new end L'', also causes the arm *g''* to release the old end L, as shown in Figs. 3, 8, and 18.

After the wire is twisted, seized, and cut off, as above described, the crank I, running out of the upper cam-groove in the cam-arm A, to its first-described position, causes all of the parts to assume the position shown in Figs. 1, 6, and 15, when the bundle can be removed and the operation repeated.

As the gear-wheel H runs back, carrying with it the dog *r*, the form of the latter is such as to enable the arms *g*, *g'*, *g''*, and *g'''* to swing it inwardly on its pivot, as shown by dotted lines in Fig. 14, without themselves being operated.

As the dog passes the arms it is driven back by the spring *s*.

What I claim is—

The central bolt *h k*, when used to hold and adjust the rotary parts of the wire-holding and wire-cutting mechanism against the face of the fixed part *m*, substantially as described.

Witnesses: SYLVANUS D. LOCKE.
J. L. LAMBERT,
S. A. SKINNER.