

P. F. HODGES.
Grain-Binder.

No. 223,805.

Patented Jan. 27, 1880.

Fig. 1.

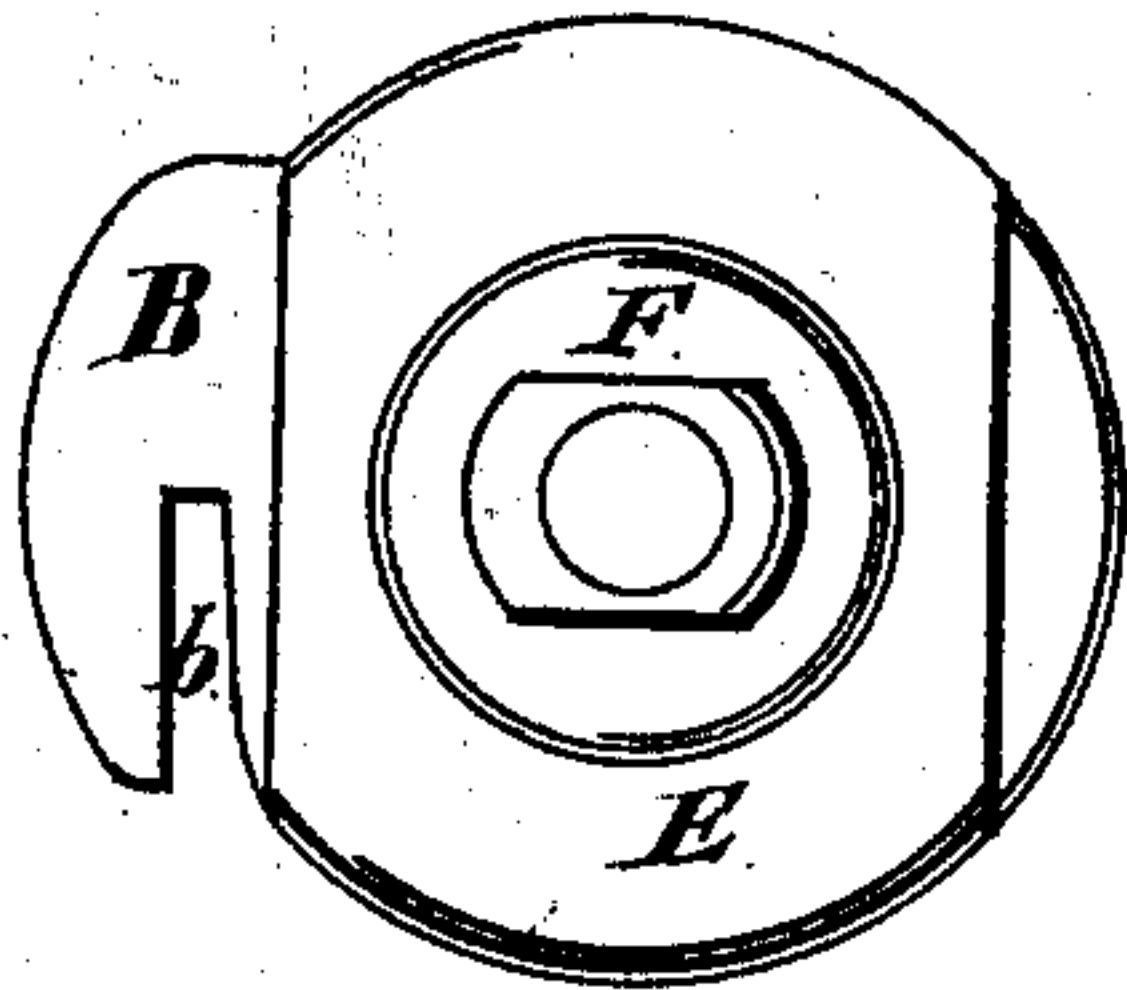


Fig. 4.

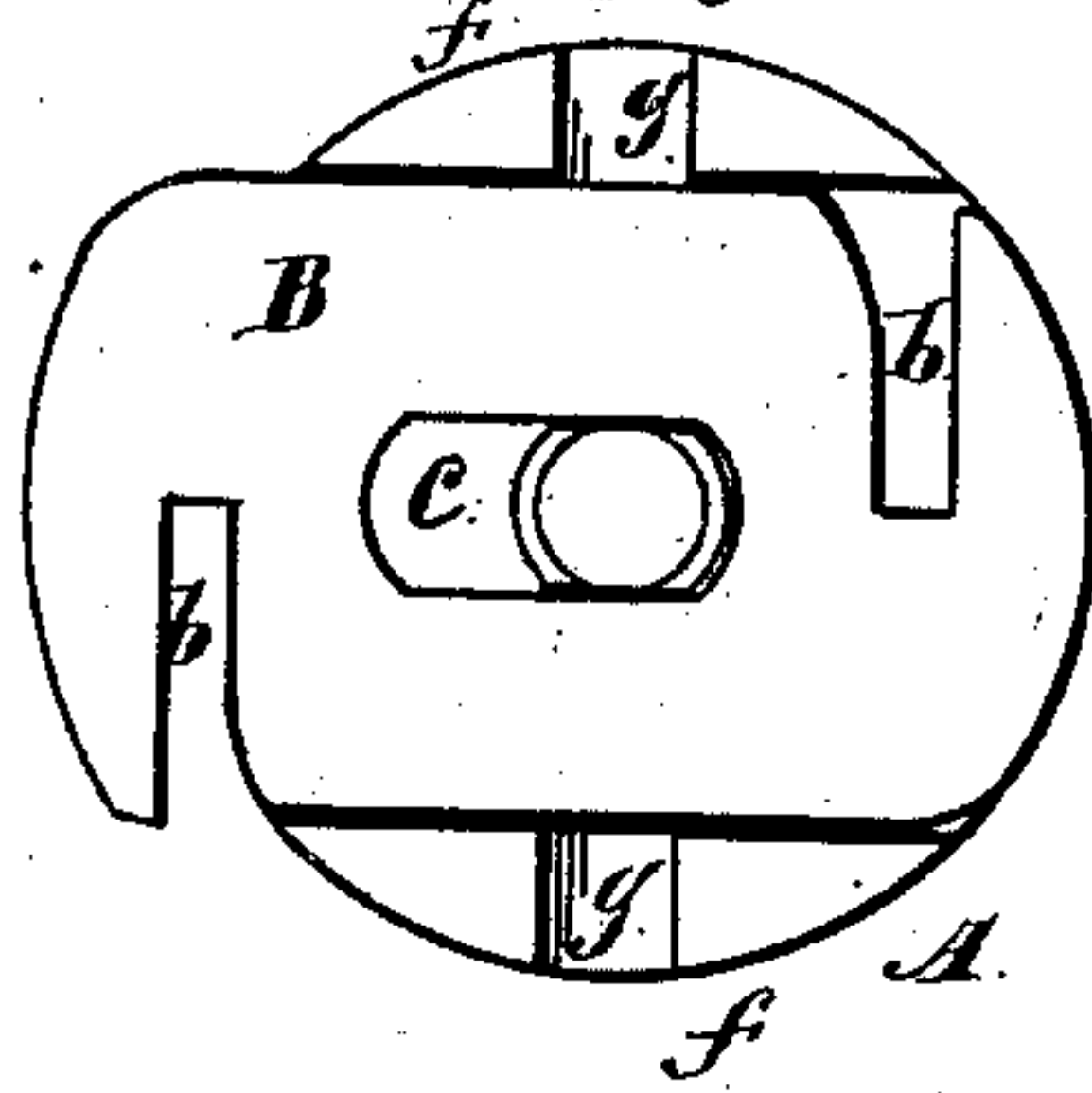


Fig. 9.

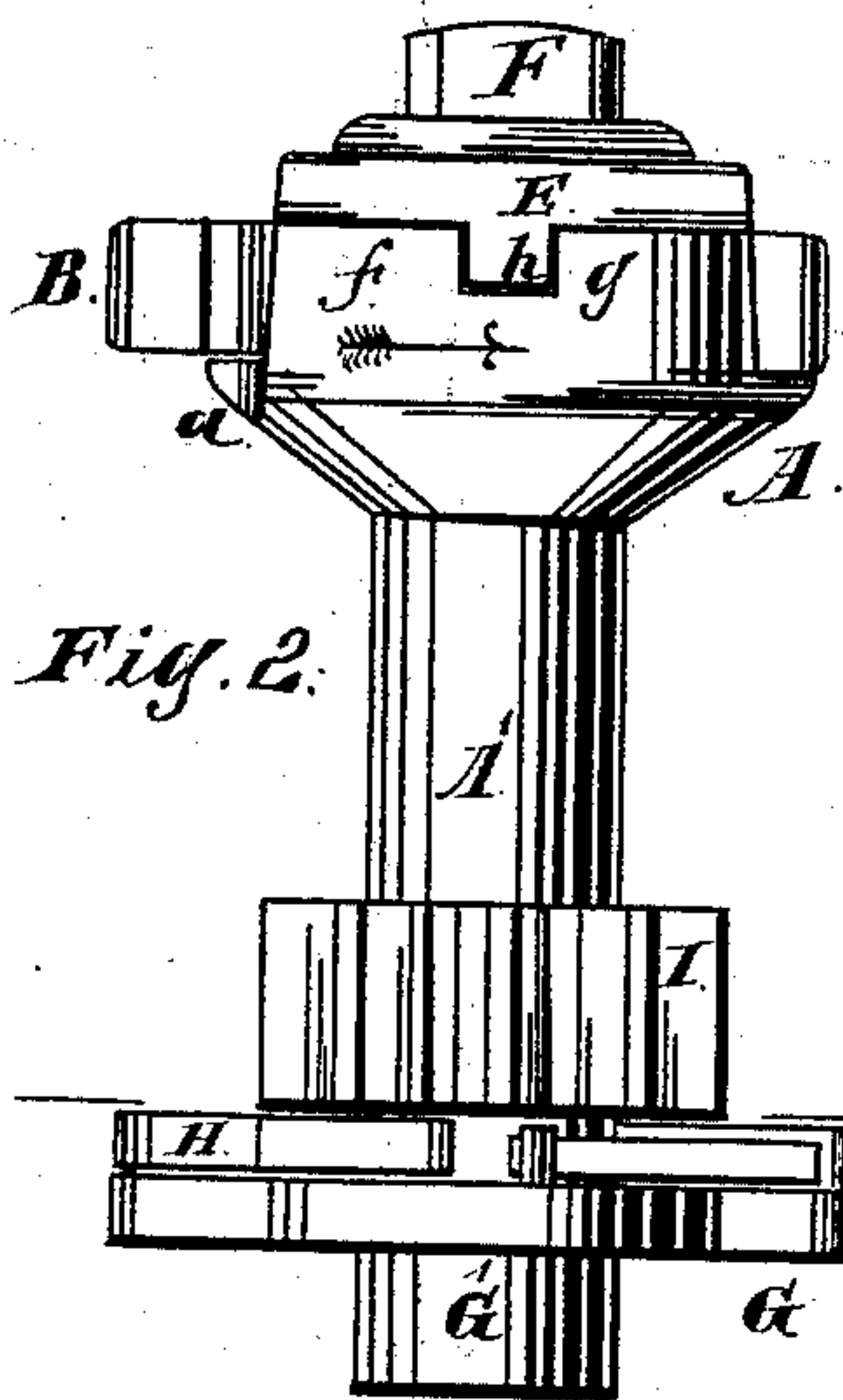
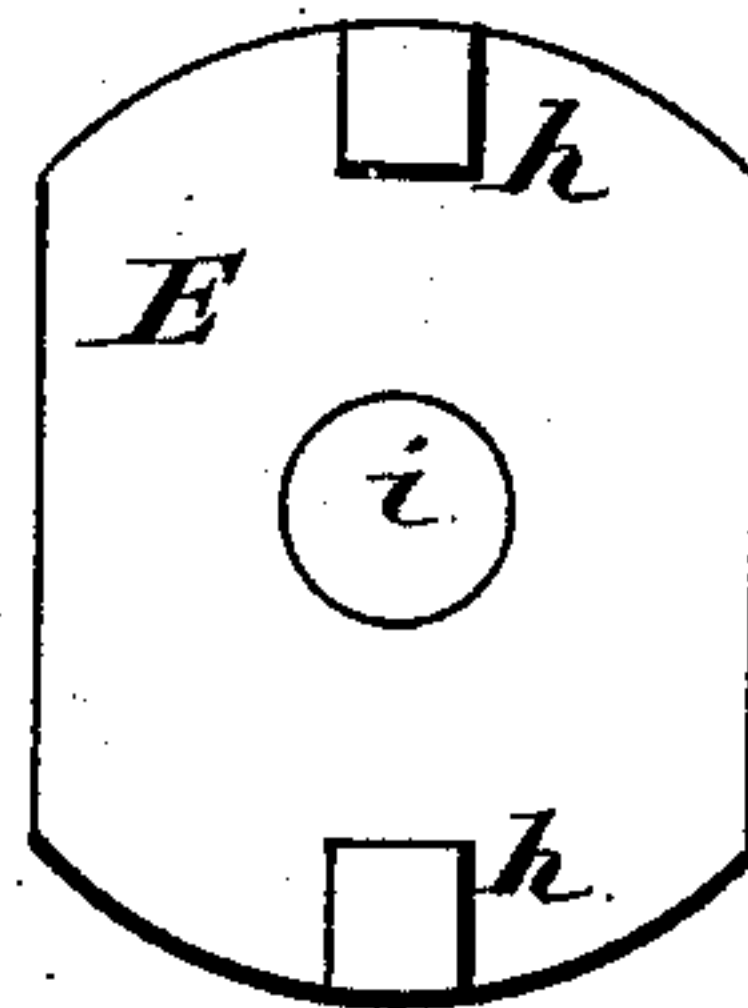


Fig. 5.

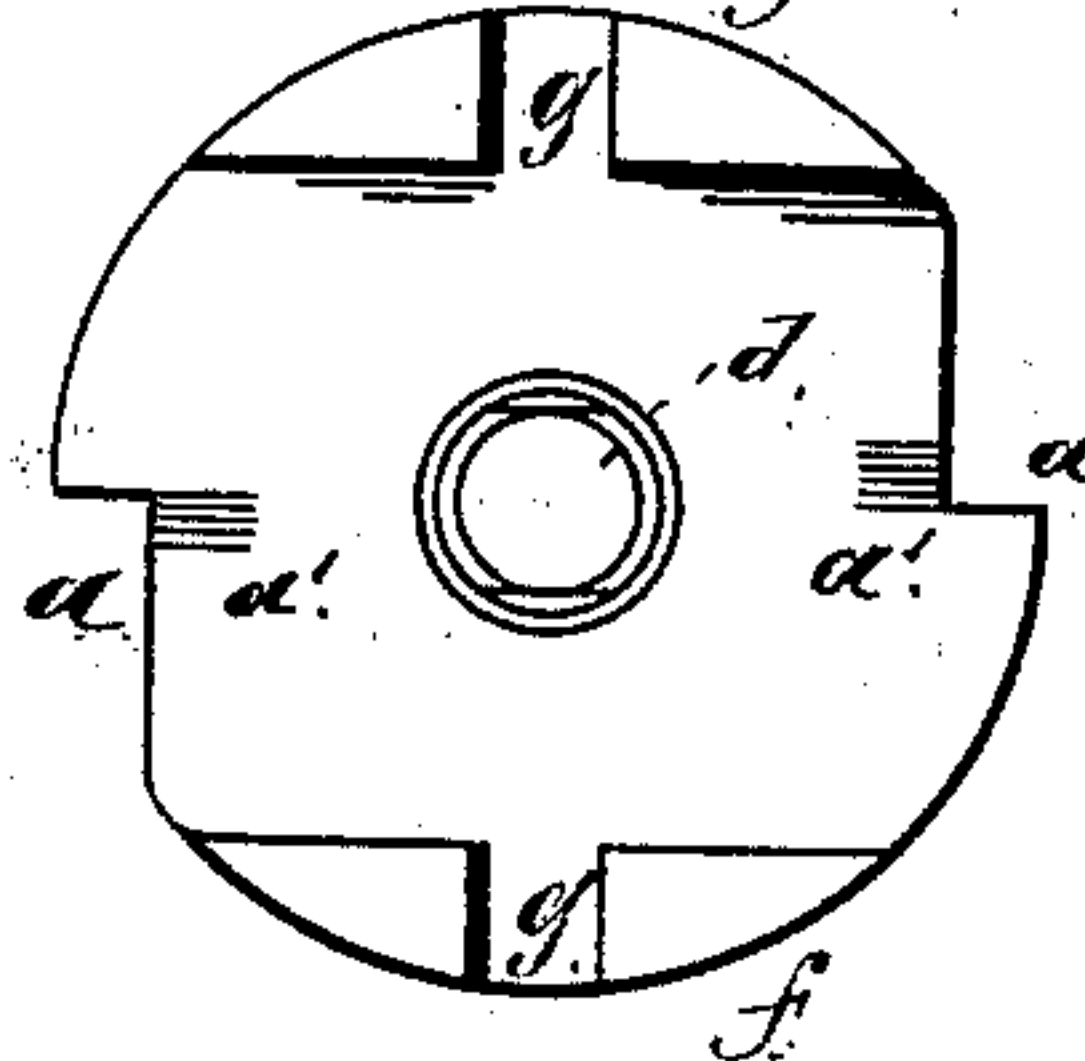


Fig. 7.

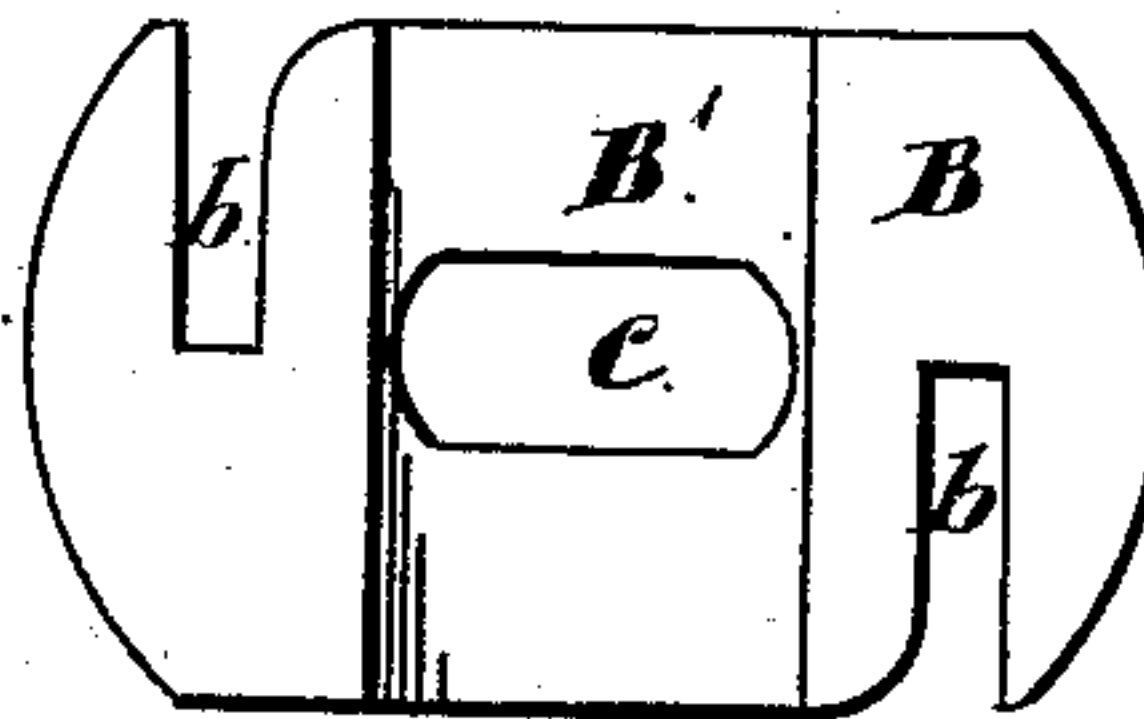


Fig. 6.

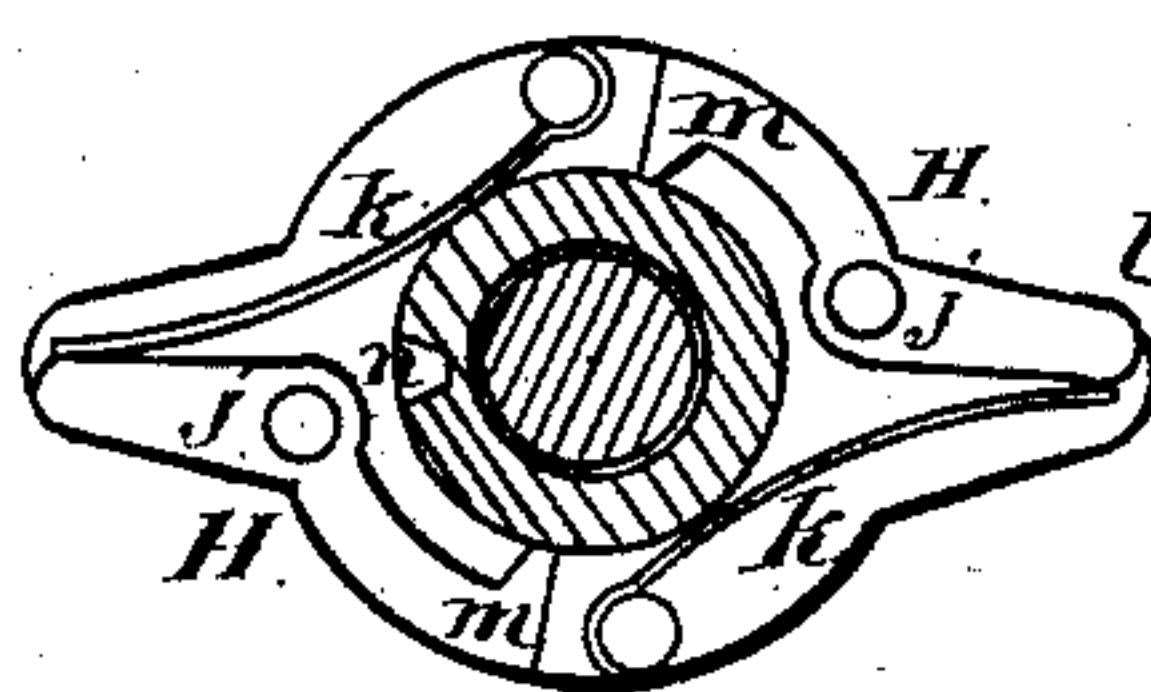


Fig. 10.

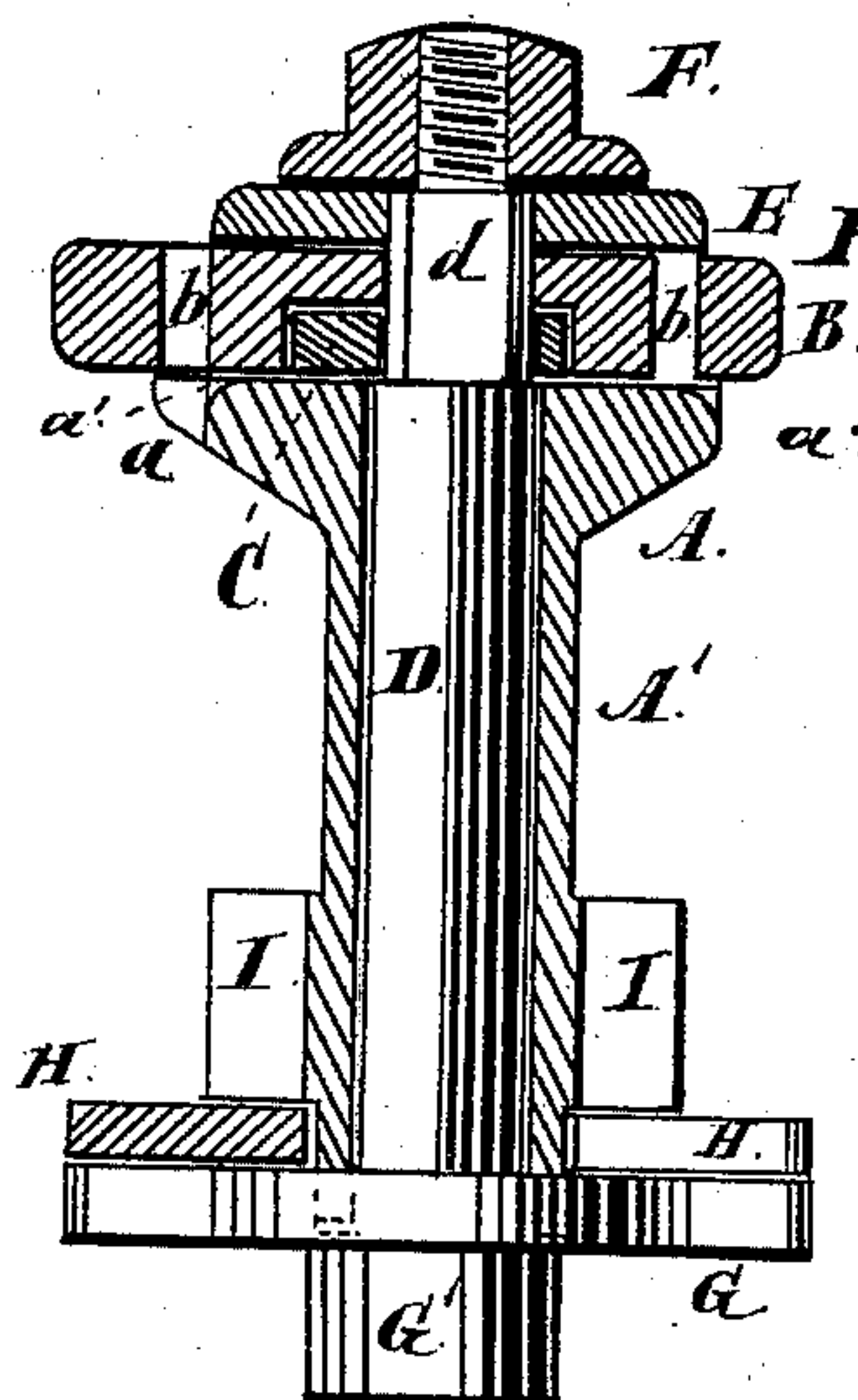


Fig. 3.

Witnesses:

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UNITED STATES PATENT OFFICE.

PLINY F. HODGES, OF CHICAGO, ILLINOIS, ASSIGNOR TO HIMSELF AND
WILLIAM DEERING, OF SAME PLACE.

GRAIN-BINDER.

SPECIFICATION forming part of Letters Patent No. 223,805, dated January 27, 1880.

Application filed March 25, 1879.

To all whom it may concern:

Be it known that I, PLINY F. HODGES, of the city of Chicago, Cook county, State of Illinois, have invented new and useful Improvements in Grain-Binders, of which the following is a full description, reference being had to the accompanying drawings, in which—

Figure 1 is a top or plan view; Fig. 2, a side elevation; Fig. 3, a vertical longitudinal section, showing the central shaft in elevation; Fig. 4, a top or plan view with the cap or upper plate removed; Fig. 5, a top or plan view of the supporting-head; Fig. 6, a detail view, showing the cam or eccentric for reciprocating the cutting and holding plate; Figs. 7 and 8, detail views, showing the wire cutting and holding plate; Fig. 9, an under-side view of the upper plate or cap; Fig. 10, a detail view, showing the devices for connecting and disconnecting the head and central shaft, as required.

This invention relates to that class of automatic grain-binders using wire for binding, the wire being carried around the bundle, the strands thereof twisted together, and the wire severed, the end of the main wire being caught as it is severed and held for the operation of binding the next bundle, and has for its object the performance of the several operations of twisting, cutting, and catching and holding the wire by means of devices constructed and arranged to operate as a single device, whereby their construction is greatly simplified and their operation rendered more efficient; and its nature consists in providing the reciprocating plate with slits or openings to receive the wire which is to be severed and caught; in providing a cutting-plate, which acts to hold the parts together; in constructing the upper face of the head, with which the reciprocating plate is in contact, so as to prevent the severing of the wire at that point; in providing a stationary cam for operating the reciprocating plate; in providing an intermittent rotary shaft, around which the head revolves to reciprocate the wire plate; in making the connection between the revolving head and the center shaft automatic in its operation, and in the several parts and combination of parts hereinafter set forth as new.

In the drawings, A represents the revolving head; A', the hollow shaft or bearing; B, the reciprocating plate; B', the cam-opening in B; C, the cam; D, the central shaft, having an intermittent rotary motion; E, the cap or plate for cutting the wire; F, the fastening-nut; G, the plate supporting the locking pawls or clutches; G', the collar of plate G; H, the locking pawls or clutches; I, the driving-pinion; *a*, the shoulders or wire stops; *a'*, the depression to prevent the severing of the wire; *b*, the slits or openings in the reciprocating plate; *c*, the shaft-opening in the reciprocating plate; *d*, the portion of the central shaft which receives the cam and plate; *e*, the shaft-opening in the cam; *f*, the flanges in the upper face of the head; *g*, the recesses or openings in the flanges *f*; *h*, the locking lugs or projections on the cap or plate E; *i*, the shaft-opening in the cap E; *j*, the pawl or clutch pivots; *k*, the springs for operating the clutches or pawls; *l*, the outer end or arm of the clutches or pawls; *m*, the hook or projection on the inner ends of the pawls; *n*, the notch in the hollow shaft or bearing.

The head A may be cast or otherwise suitably formed of steel, and is located on one end of a hollow shaft or bearing, A', on the other end of which shaft is a pinion, I, which gears with a reciprocating rack, wheel, or other mechanism (not shown) which will give the head a rotary motion in either direction, as required.

As shown, the head A, shaft or bearing A', and pinion I are made in a single piece; but the head A' and pinion may be made separate and secured to the shaft or bearing.

The head A is in the form of a circular disk, except that its periphery is notched or cut away, so as to leave two straight portions having vertical, or nearly vertical, faces diagonally opposite each other, with shoulders *a*, opposite each other, as shown in Fig. 5.

The plate B is made of steel, and is rectangular in form, with straight sides and circular ends, the arc of the circle for the ends corresponding to that of the head A. This plate is located in a suitable channel or bearing formed by the head, the flanges *f*, and the plate or cap E, and has a reciprocating movement. Near each end of this plate B, and on

opposite sides thereof, is a slit or opening, *b*, each of which extends a sufficient distance into the plate to bring their bottoms in line with the shoulders *a*, as shown in Figs. 4 and

5 7. The length of this plate *B* is such that when one end is flush or even with the side of the head, so as to complete the circle at that point, the other end will project beyond the side of the head, so as to bring the
10 slit or opening *b* therein at its inner edge in line with the straight portion of the head, which is immediately beneath it, as shown in Figs. 3 and 4, and the slits or openings are so arranged relatively to each other and to the
15 cut-away or straight portion of the head that when one slit is open or outside of the head the other will be closed or inside of the head, each slit being alternately opened and closed as the plate *B* is reciprocated. The under face
20 of this plate *B* is provided with a transverse groove, *B'*, located midway between the ends of the plate, and having perpendicular sides, which come in contact with the cam or disk *C*, by means of which the plate *B* is reciprocated as the head *A* revolves independently
25 of the shaft *D*.

The shaft *D* is provided with a portion, *d*, having two flat faces, and the cam or circular disk *C* has a corresponding opening, *e*, located to one side of its center, so that when
30 the cam *C* is placed on *d* it will be firmly held. The plate *B* is also located on this portion *d* of the shaft *D*, the opening *e* therefor being elongated to allow the plate to reciprocate, and at the same time preventing it from turning
35 on the shaft.

The shaft *D* extends through the bearing *A'*, head *A*, cam *C*, plate *B*, and cap *E*, suitable openings being provided for this purpose, and
40 the end which projects above the cap *E* is screw-threaded to receive a nut, *F*, by means of which the parts are secured together. The plate or cap *E* is provided with circular ends, corresponding to the arc of the circle for the
45 head *A*, and with perpendicular or straight sides, which, in conjunction with the plate *B*, form the means for severing the wire.

It will be seen that the construction and arrangement of the head *A*, plate *B*, and cap or
50 cutter plate *E* is such as to form a true circle when in position, except at the point where the plate *B* projects, so that the wire will slip on the periphery thereof to enter the slit *B*.

The location and arrangement of the parts
55 are clearly shown in Figs. 1 and 3.

The depression *a'* in the head *A* is to receive the strand of wire to prevent it from being severed.

The cap *E* is secured to the flanges *f* by the
60 lugs *h*, which enter recesses *g* in the flanges, and is provided with an opening, *i*, for the shaft *D*. On the end of the shaft *D* is a plate, *G*, which may be formed with the shaft, or be made separate and secured thereto by a collar, *G'*, and a set-screw, or in any other suitable manner. To this plate *G*, on opposite
65 sides, are pivoted, at *j'*, pawls or clutches *H*,

the inner ends of which are provided with hooks or projections *m*, which enter the opening or notch *n* on the bearing *A'* and lock the
70 shaft *D* to the bearing *A'*, so that they will revolve together, the hook being forced into the notch by the action of the springs *k* (one for each pawl) on the outer ends, *l*, of the pawls,
75 with which one end of the spring comes in contact, the other end of the spring being secured to a pin or stud on the plate *G*. The outer ends, *l*, of the pawls or clutches *H* are arranged to come in contact with a stop or flange
80 on the rack or wheel (not shown) which drives the pinion *I*, so as to disconnect the shaft *D* and bearing *A'* and allow the bearing to revolve independently of the shaft. This can be accomplished by means of a flange or
85 bridge pivoted at one end to the reciprocating mechanism in such position that when the pinion is making the last half-revolution to complete the twist the end *l* of one of the
90 pawls or clutches will come in contact with the flange and ride thereon until such half-revolution is completed, which engagement of the end *l* will raise the inner end of the pawl or clutch from the notch *n*, allowing the bearing
95 *A'* to revolve while the shaft *D* remains stationary. When the half-revolution is completed the hook *m* on the inner end of the other pawl or clutch will engage with the notch *n*, again locking the bearing and shaft together, so that with the reverse movement which then
100 takes place the parts will all rotate in the same direction, the end *l* of the pawl or clutch in this movement engaging with the free end of the movable flange and lifting the flange out of the path of the pawls or stops, so as
105 not to unlock the shaft and bearing during such movement.

This movable flange or bridge for obtaining an intermittent rotary movement in one direction is made the subject-matter of another application for a patent, to be filed herewith.
110

Other means than those described can be used for interlocking the shaft and bearing.

In operation, when the parts are in the position shown in Fig. 2, the end of the main wire will be caught and held in the slit *b*,
115 which is closed or within the head *A*. The wire is then to be carried around the bundle in the usual manner, bringing the strands together. Then the mechanism which drives the pinion *I* is to be reciprocated to rotate the
120 pinion and head *A* in the direction indicated by the arrow in Fig. 2, which rotation of the head will twist the two strands of wire together between the head *A* and the bundle. Before the twisting commences the spool-wire
125 or main wire will slip on the periphery of the head and into the slit *b* which is outside of the head. Such rotary movement of the head is to be continued until the strands of wire are twisted or coiled around each other a sufficient
130 number of times to form a secure fastening, during which movement the bearing and head and shaft will be locked together by the pawls and clutches until the last half-revolution,

which completes the twist, when they are to be disconnected, as before described, or in some other suitable manner, so as to allow the bearing and head to rotate, while the shaft remains stationary during such half-revolution. This movement of the bearing A' and head A independent of the shaft D will, through the cam C, which must also remain stationary by reason of its attachment to the shaft, reciprocate the plate B, the sides of the opening B' being in contact with the cam. The reciprocation of B carries the slit *b* which has received the wire toward and into the head, and projects the opposite end of the plate beyond the head. This movement of the plate will sever the wire between the plate B and cap E, the lower edge of the cap and the outer edge of the slit being properly formed for this purpose, and the same movement will catch the spool or main wire between the under face of the plate at the slit-opening and the face of the head A in the opening *a'*, into which the wire is drawn as the head is rotated, and hold it firmly for the next operation. As the other end of the plate is carried beyond the head, the slit *b* therein, which has been closed, will be opened, releasing the wire caught therein, and allowing the bound bundle to be discharged. After the last half-revolution, which completes the twisting of the strand and reciprocates the plate B to sever and catch the wire, a reverse movement is to be given to the parts, the head and shaft being again interlocked, as before described, which movement will uncoil the main wire from the bearing, around which it has been coiled below the head A, and bring the parts to the proper position for the next operation, which then takes place, the wire being twisted, severed, and caught, as before described. Such movements will continue till the binding is completed.

It will be seen that the several operations are thus accomplished through the medium of a single device, consisting of a rotary head and a reciprocating plate which rotate around a common center, making a simple, cheap, and efficient means for twisting, severing, and catching the wire for binding purposes.

What I claim as new, and desire to secure by Letters Patent, is—

1. A revolving head carrying a reciprocating plate having slots at each end thereof, and arranged to act in conjunction with the head to twist and sever the band and catch and hold the spool end of the wire, the plate and head both revolving around a common center, substantially as specified.

2. The head A, provided with cut-away portions, forming shoulders *a*, in combination with the reciprocating plate B, provided with slits *b*, and a reciprocating mechanism for the plate, arranged and operating to pass the wire into one of the slits, twist the strands together, sever, and catch the end of the main wire, substantially as specified.

3. The revolving head A and reciprocating plate B, in combination with the cam C, for reciprocating the plate, substantially as and for the purposes specified.

4. The head A, hollow shaft or bearing A', and reciprocating plate B, in combination with the shaft D, operating the plate B, and locking pawls or clutches for locking the head and shaft together, substantially as and for the purpose specified.

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Witnesses:

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