(No Model.) 2 Sheets—Sheet 1.

O. O. STORLE.

TRIPPING MECHANISM FOR GRAIN BINDERS.

No. 451,957. Patented May 12, 1891.

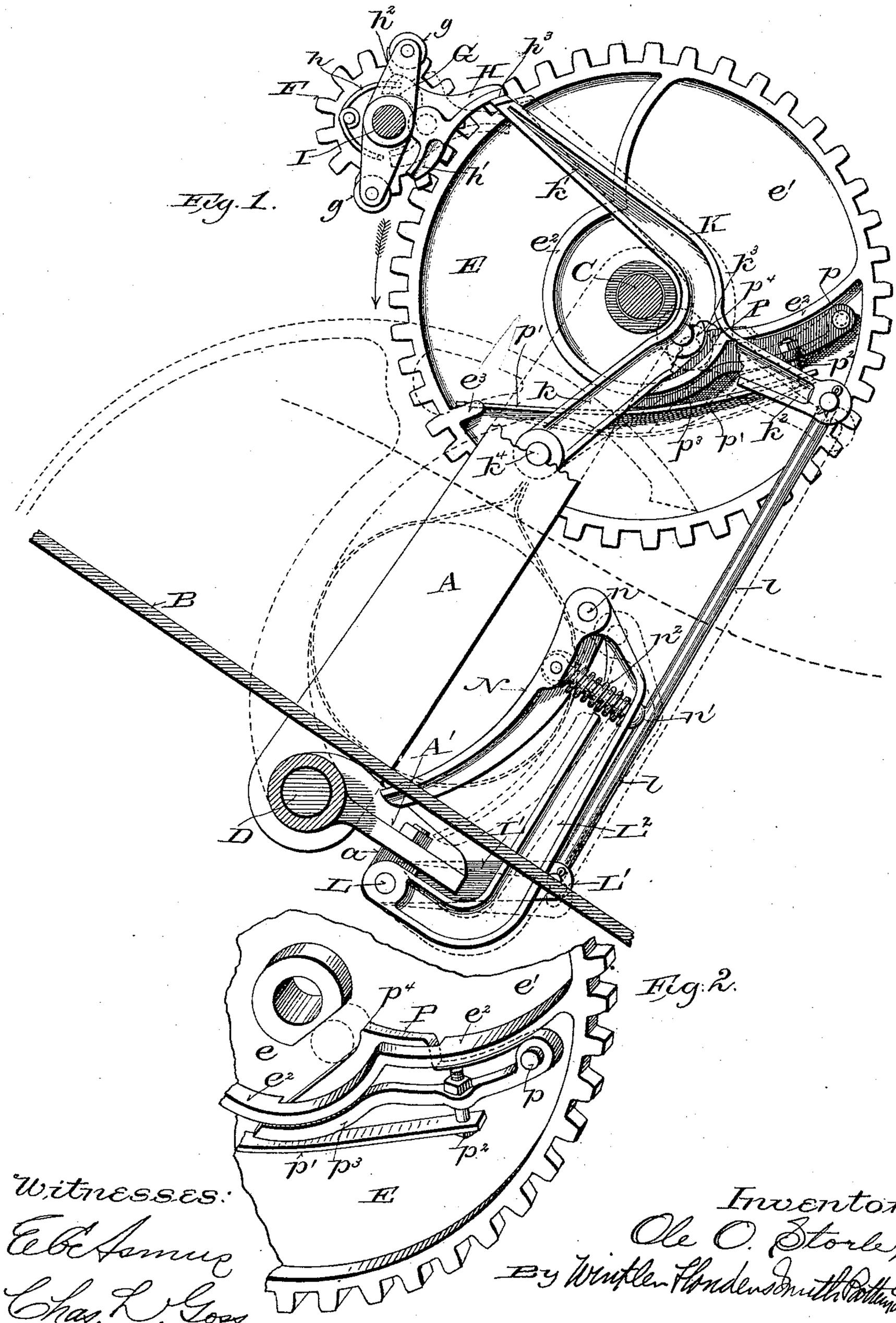

Fig. 1.

Fig. 2.

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Fig. 3.

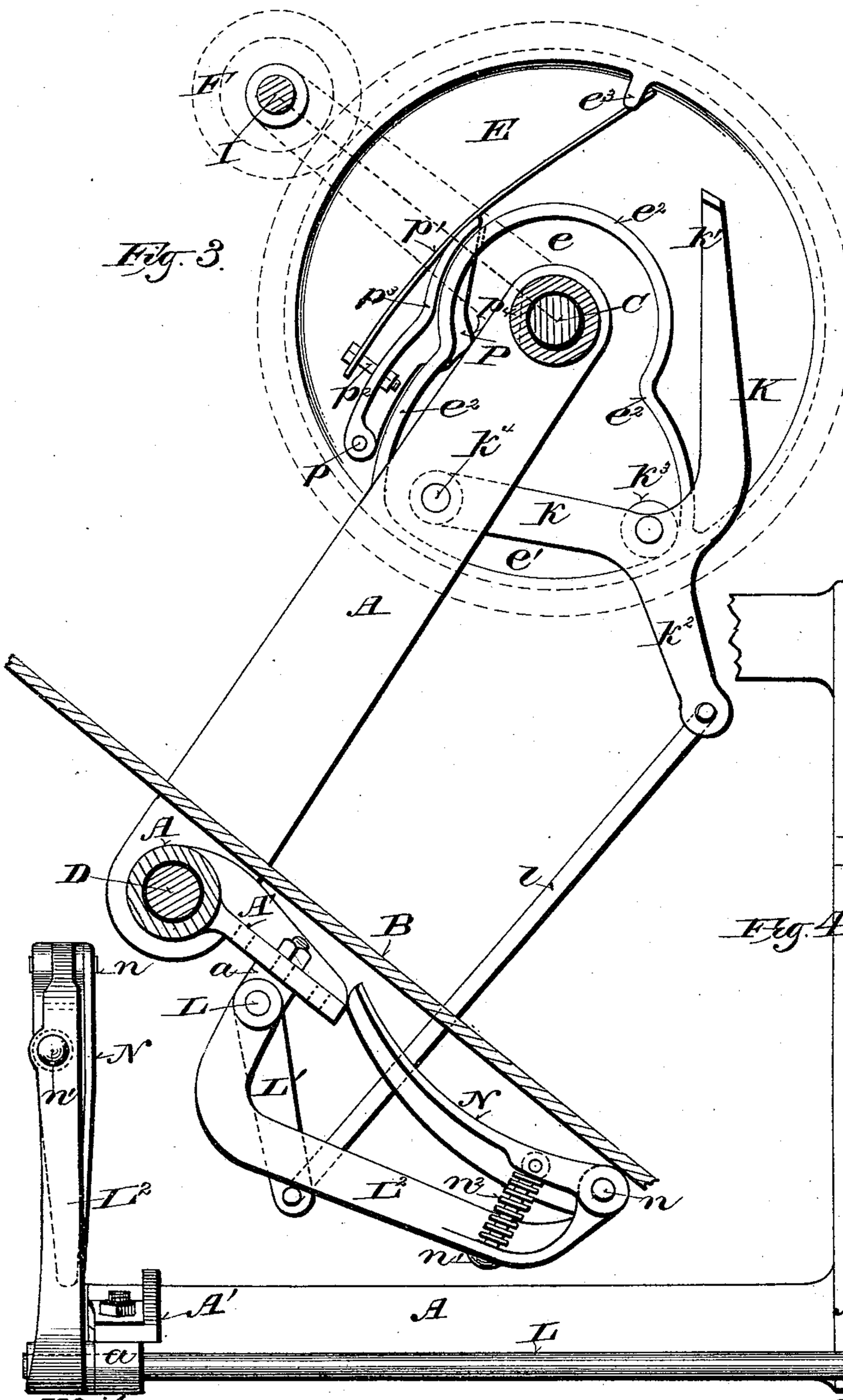
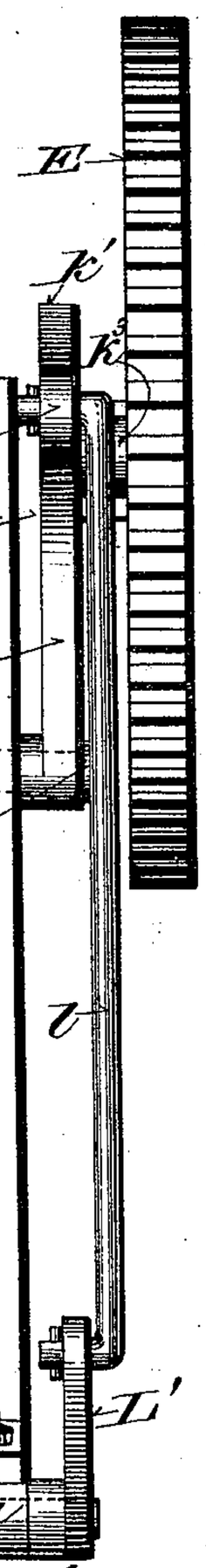


Fig. 4.



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UNITED STATES PATENT OFFICE.

OLE O. STORLE, OF MILWAUKEE, WISCONSIN.

TRIPPING MECHANISM FOR GRAIN-BINDERS.

SPECIFICATION forming part of Letters Patent No. 451,957, dated May 12, 1891.

Application filed September 22, 1888. Serial No. 286,131. (No model.)

To all whom it may concern:

Be it known that I, OLE O. STORLE, of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Tripping Mechanism for Grain-Binders; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

The main objects of my invention are to simplify the tripping mechanism employed to start and stop the binding mechanism of a harvester, to prevent breaking the binding twine or cord, and pulling the same away from the cord-holder.

It consists of certain peculiarities in construction and arrangement of parts, hereinafter specifically set forth, and pointed out in the claims.

In the accompanying drawings like letters designate the same parts in the several figures.

Figure 1 is an end elevation of a binder embodying my improvements. Fig. 2 is a detail view in perspective of the latch and a portion of the main binder-gear and cam. Fig. 3 is a view similar to that shown in Fig. 1, but with the parts in position for discharging the bundle; and Fig. 4 is a side elevation of a portion of the binder.

A is the binder-frame, and B the deck or table, of the usual or any suitable form and construction. The needle in its upper position, the breast-plate, and a gavel in position for binding, with the cord encircling the same, are shown by dotted lines in Fig. 1.

C and D are the knotter and the needle shafts supported in suitable bearings provided therefor in the usual manner in frame A. On the end of the knotter-shaft opposite the needle and knotter is fixed the gear E, formed on the side next to the frame A with a cam *e e'*.

K is a compound bell-crank lever having three arms *k*, *k'*, and k^2. The arm *k* is formed at its extremity with a laterally-projecting stem k^4, which has a bearing in frame A and serves as the fulcrum of said lever. The arm *k'* is turned nearly at right angles over the knotter-shaft, terminating close to the periphery of the gear E, and the arm k^2 extends in the opposite direction to a point near the periphery of said gear. At a point near the junction of said arms the lever K is provided with a crank-pin carrying a friction-roller k^3 in engagement with the cam *e e'*, which is traversed by said roller as the gear E makes a revolution.

L is a rock-shaft supported parallel with the needle-shaft D in boxes *a a*, which are adjustably attached to brackets A' A', formed on the binder-frame or to other suitable supports. The brackets A' A' are formed, as shown by dotted lines in Fig. 1, with a number of perforations to receive the bolts by which said boxes are attached thereto and by means of which said rock-shaft L may be set nearer to or farther from the needle-shaft for the purpose of making smaller or larger gavels or bundles, as desired. Upon the end of said rock-shaft opposite the needle is fixed a crank-arm L', which is connected by a rod *l* with the arm k^2 of the tripping-lever K. Upon the opposite end of said rock-shaft L is fixed the right-angled arm L^2, which at rest in its upper position projects upwardly through a slot in deck B, and is bent at its upper end toward the needle or binder-frame. To the upper end of said arm L^2 is hinged at *n* a depending compressor arm or finger N, which is connected near its upper end with the arm L^2 by an eyebolt *n'*, hinged to the former and passing loosely through the latter. A spiral spring n^2 is placed around the bolt *n'* between said arms, so as to hold the compressor-arm normally a short distance in advance of the arm L^2 toward the incoming grain.

I is a continuously-rotated driving-shaft upon which is loosely mounted the pinion F in engagement with the gear E.

H is a three-pronged dog pivoted to one side of the pinion F, with two prongs *h'* h^2 on opposite sides of the hub of said pinion and with the other prong h^3 projecting beyond

the periphery of the pinion in position to be engaged by the arm k' of the tripping-lever when said arm is depressed, so as to project within the line of its rotation. A cross-head G, provided at its opposite ends with small rollers g g, projecting laterally therefrom, is fixed on the shaft I next to the pinion F. A spring h, secured at one end to said dog and at the other end to said pinion, throws one of the prongs h^2, which has a lateral projection at the end, normally outward into position to be engaged by one of the rollers on said cross-head. The prong h', striking against the hub of the pinion, limits the outward movement of the prong h^2.

I make no claim to the clutch mechanism comprising said cross-head, pinion, and dog, the same being old, but have shown and described them for the purpose of explaining my improvements, which are employed and operate in connection therewith.

P represents a spring-actuated latch pivoted to a pin p on the cam side of gear E and projecting through a slot in the flange e^2 into the cam-groove e, as shown in Figs. 1 and 2. A rib or flange p^3, formed along one edge of said latch, strikes against the flange e^2 and acts as a stop to limit its inward movement. A spring p' is attached at one end by a bolt p^2 to the latch P near its pivot-bearing p, and bearing at the opposite end against a lug e^3 on gear E and at an intermediate point against the back of said latch at its free end holds it normally in the position in which it is shown in Figs. 1 and 2. That part of the latch which passes through the flange e^2 into the cam-groove is formed with a projection p^4 and a seat for the roller k^3 on the tripping-lever, and opposite said seat the hub of the gear E is recessed or flattened, as shown in Fig. 2, to hold said roller in the position in which it is shown in Fig. 1, while the binding mechanism is at rest and a gavel is being accumulated and formed by the packers. (Not shown.)

The latch P constitutes a yielding part of the cam against which the crank-pin or projection on the tripping-lever K bears when the binding mechanism is at rest, and which recedes sufficiently to permit the necessary movement of said lever to start the binding mechanism.

I do not wish to confine myself to the precise construction shown and described herein, inasmuch as various changes and modifications can be made in the various parts without departing from the spirit of my invention—as, for example, other suitable means for adjusting the position of the rock-shaft L with reference to the needle and needle-shaft may be employed, and in place of the leaf-spring p' any other suitable form of spring may be used.

My device operates as follows: When the necessary quantity of grain to form a gavel has been accumulated by the packers against the compressor arm or finger N, the arm L^2 is forced back a short distance by the action of the packers into the position indicated by dotted lines in Fig. 1, and, acting through the shaft L, crank-arm L', and connecting-rod l, draws the arm k^2 of the tripping-lever down and elevates the arm k' sufficiently to release the dog H. The roller k^3 forces the latch P outwardly against the spring p', the tension of which is adjusted as desired by means of the nut on bolt p^2, but so as to yield to a pressure insufficient to compress the spring n^2. As the dog H is released by the tripping-lever K, one of the rollers on cross-head G engages the prong h^2 thrown outwardly by spring h, and, causing the pinion F to rotate with the cross-head, turns the cam-gear E in the direction indicated by the arrow, Fig. 1, and simultaneously raises the needle to the position indicated by dotted lines about the gavel. Leaving its seat on latch P, the roller k^3 traverses that portion of the cam designated e between the hub of the gear E and its flange e^2 and rigidly holds the tripping-lever and lever L^2 in the positions shown by dotted lines, Fig. 1, the arm k' being thus held up out of the circuit of the prong h^3 on dog H. While the tripping mechanism is thus held the needle rises, the gavel is compressed between it and the compressor arm or finger N, which yields at its lower end, as indicated by dotted lines, against the spring n^2, more or less, according to variation in the size of the bundles, and the bundle is finally bound. The roller k^3 then drops into the larger part of the cam designated e', as seen in Fig. 3, and allows the arm L^2, with the compressor arm or finger N attached thereto, to descend by its own weight entirely below the deck B and the bundle is discharged. As the roller k^3 returns to its first position it returns the tripping-lever K and compressor to the positions shown by full lines, Fig. 1, and passes the projection p^4 on the spring-actuated latch P, and being forced by the latter against the flat or recessed portion of the hub of gear E causes the arm k' to descend into engagement with the prong h^3 of dog H, thereby releasing the pinion F from the cross-head and arresting its rotation. The further rotation of the gear E in the same direction is prevented by the pinion F, which is held stationary as the arm k' abuts against the prong h^3 of said dog, and its rotation in the reverse direction is prevented by the projection p^4 on latch P.

The tripping-lever K is formed in a single rigid piece, the latch P, against which the roller k^3 bears when at rest, yielding sufficiently to allow only the required movement of the arm k' to release the dog H.

Compressor-arms as heretofore constructed and connected have been arranged to yield or recede at the upper end both in the operation of tripping and of compressing the bundle, so that when the cord is drawn taut by the needle around the bundle and is pre-

vented by the friction of the bundle from slipping or yielding toward the cord-holder the receding of the upper end of the compressor-arm and the bundle caused by the compression of the needle lengthens that part of the cord between the bundle and the cord-holder, and the strain thus produced is apt to either break the cord or pull it out of the cord-holder.

It will be observed that the upper end of my compressor recedes only in the operation of tripping, while the lower end yields to the compression of the bundle by the needle, the upper end being fixed during the latter operation. The slight movement of the pivoted end of the compressor which takes place in tripping occurs when the needle is underneath the deck and the cord passes loosely under the gavel, so that it will readily slacken to accommodate said movement without pulling on the cord-holder; but when the cord is drawn taut around the gavel by the needle in binding the compressor does not yield at the top to the compression of the bundle. Consequently no pull is exerted by the latter operation on that part of the cord between the bundle and cord-holder.

I claim—

1. In a grain-binder, the combination, with a clutch for connecting and disconnecting the binding mechanism and driving mechanism, of a tripping-lever fulcrumed to the binder-frame and having an arm adapted to engage with and operate said clutch, and a cam-wheel engaging with a crank pin or projection on said lever and having a yielding part, against which said crank-pin or projection bears when the binding mechanism is at rest and which permits a sufficient movement of said tripping-lever to release or operate said clutch, substantially as and for the purposes set forth.

2. In a grain-binder, the combination of a clutch for connecting and disconnecting the binding and driving mechanism, a tripping-lever fulcrumed to the binding-frame and provided with a crank pin or projection and with an arm adapted to engage with and control the engagement of said clutch, a cam-wheel with which said crank pin or projection engages, provided with a yielding part, against which said crank pin or projection bears when the binding mechanism is at rest, and an adjustable spring acting on said yielding part, substantially as and for the purposes set forth.

3. In a grain-binder, the combination, with the cam-gear, a driving-pinion working therewith, and a clutch for temporarily connecting said pinion with a continuously-rotated driver, of a tripping-lever fulcrumed to the binder-frame and provided with a crank pin or projection working with the cam on said gear, said lever having an arm adapted to engage with and control the engagement of said clutch, and said cam-gear being provided with a yielding part, against which said crank pin or projection bears when the binding mechanism is at rest and which yields to the pressure required to set the binding mechanism in motion, substantially as and for the purposes set forth.

4. In a grain-binder, the combination of a clutch for temporarily connecting and disconnecting the binding and driving mechanism, a cam-wheel, a tripping-lever fulcrumed to the binder-frame and provided with an arm or projection controlling the engagement of said clutch and with a crank-pin engaging and working with said cam, and a spring-latch attached to said cam-wheel, arranged to yield and permit the crank-pin on the tripping-lever to pass and to drop behind said crank-pin and prevent the cam-wheel from turning backward, substantially as and for the purposes set forth.

5. In a grain-binder, the combination of a clutch for connecting and disconnecting the driving and binding mechanism, a trip controlling the engagement of said clutch, a rock-shaft unyieldingly connected with said trip, a tripping-arm rigidly mounted on said shaft and arranged to yield a limited distance sufficient to release or operate said clutch, and a compressor-finger pivoted to the end of said arm nearest the knotter and having a yielding connection therewith, the tripping-arm being held rigidly in place during the operation of compressing the bundle by the needle, substantially as and for the purposes set forth.

6. In a grain-binder, the combination of a clutch for connecting and disconnecting the driving and binding mechanism, a tripping-lever controlling the engagement of said clutch, a rock-shaft under the binder-deck, provided with a crank which is unyieldingly connected with said tripping-lever, a tripping-arm rigid with said rock-shaft, and a compressor-finger pivoted to the end of said tripping-arm nearest the knotter and having a yielding connection therewith, whereby said finger yields to the compression of the bundle by the needle, but the tripping-arm is held stationary during said operation, substantially as and for the purposes set forth.

7. In a grain-binder, the combination of a clutch for connecting and disconnecting the driving and binding mechanism, a tripping-lever controlling the engagement of said clutch and provided with a crank pin or projection, a cam-wheel working with said crank pin or projection and having a yielding part, against which said crank pin or projection bears when the binding mechanism is at rest, a rock-shaft provided with a crank which is unyieldingly connected with said tripping-lever, a tripping-arm rigid with said rock-shaft, a compressor-finger pivoted to the end of said tripping-arm nearest the knotter, and a spring interposed between said arm and finger, whereby the latter is permitted to yield to the compression of the bundle by the needle,

substantially as and for the purposes set forth.

8. In a binder, the combination, with the needle and needle-shaft, of a clutch for connecting and disconnecting the driving and binding mechanism, a trip controlling the engagement of said clutch, a rock-shaft connected with said trip and provided with a tripping-arm, said shaft being adjustable toward and from the needle-shaft for the purpose of varying the size of the bundle, substantially as and for the purposes set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

OLE O. STORLE.

Witnesses:
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