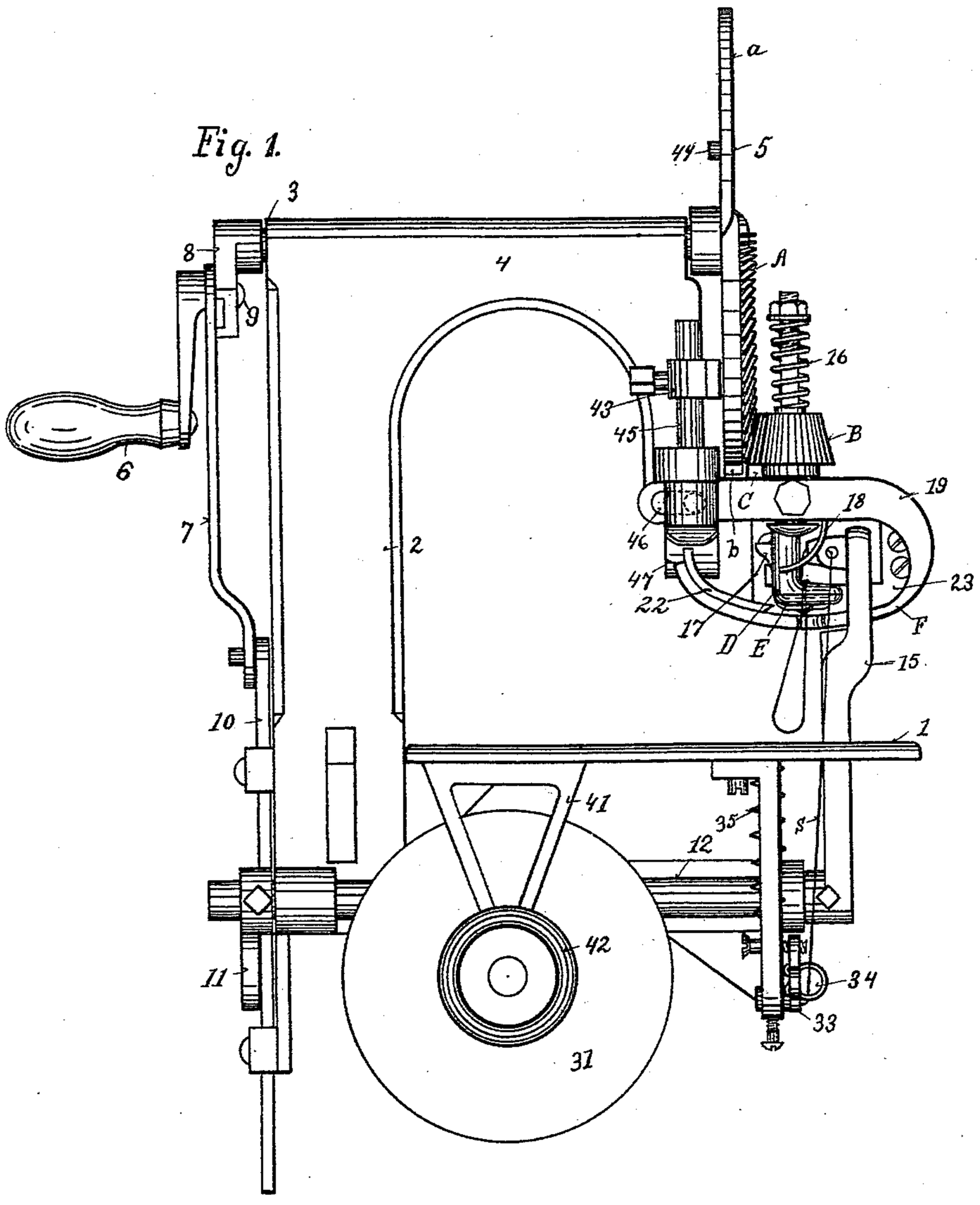
(No Model.) 4 Sheets—Sheet 1.

W. N. PARRISH.

SELF BINDER.

No. 457,665. Patented Aug. 11, 1891.

Fig. 1.



Witnesses.

C. W. Miles,

F. Simmons

Inventor.

William N. Parrish

By his Att'ys, Wood & Boyd

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Fig. 2.

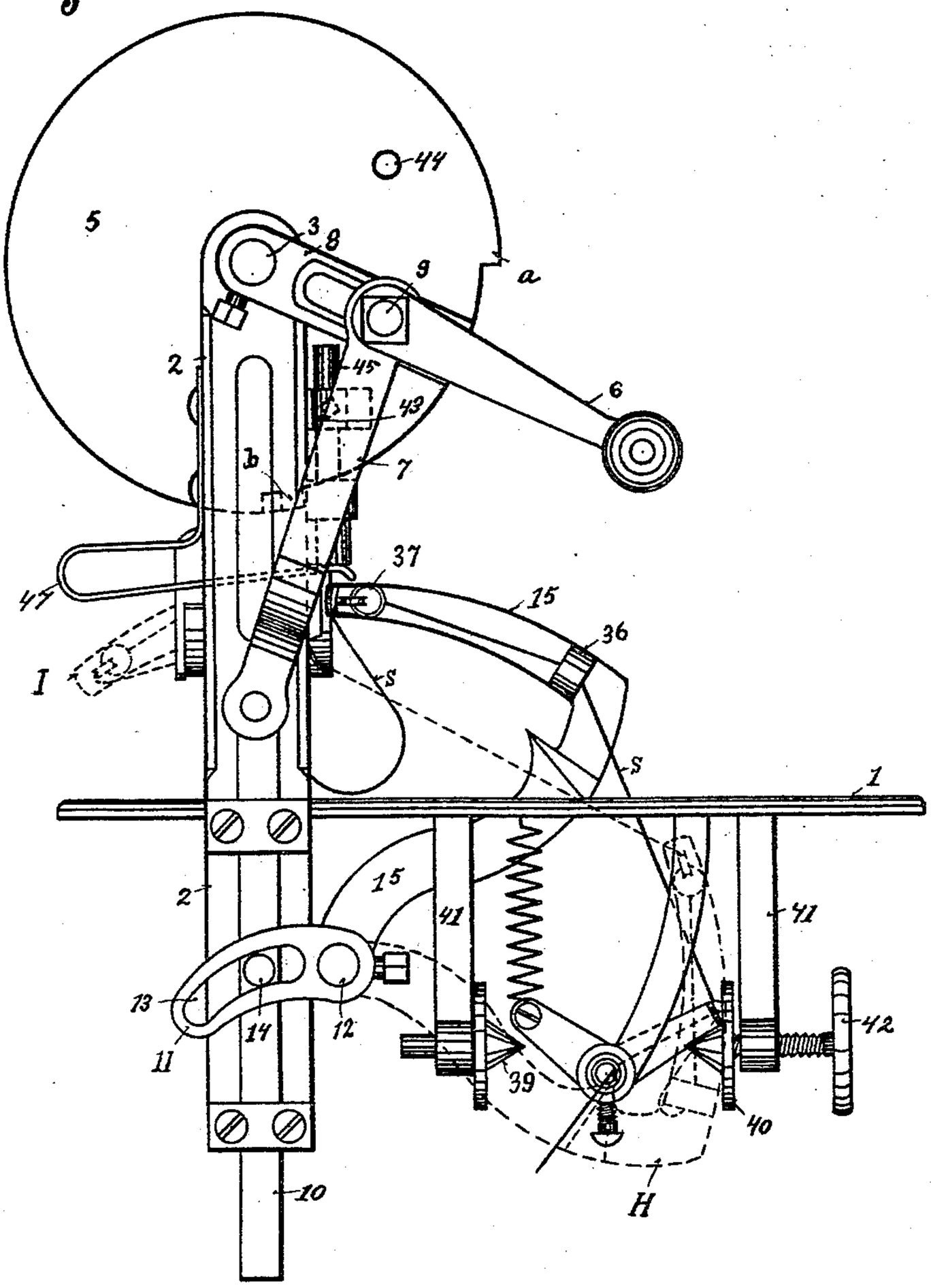

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Fig. 3.

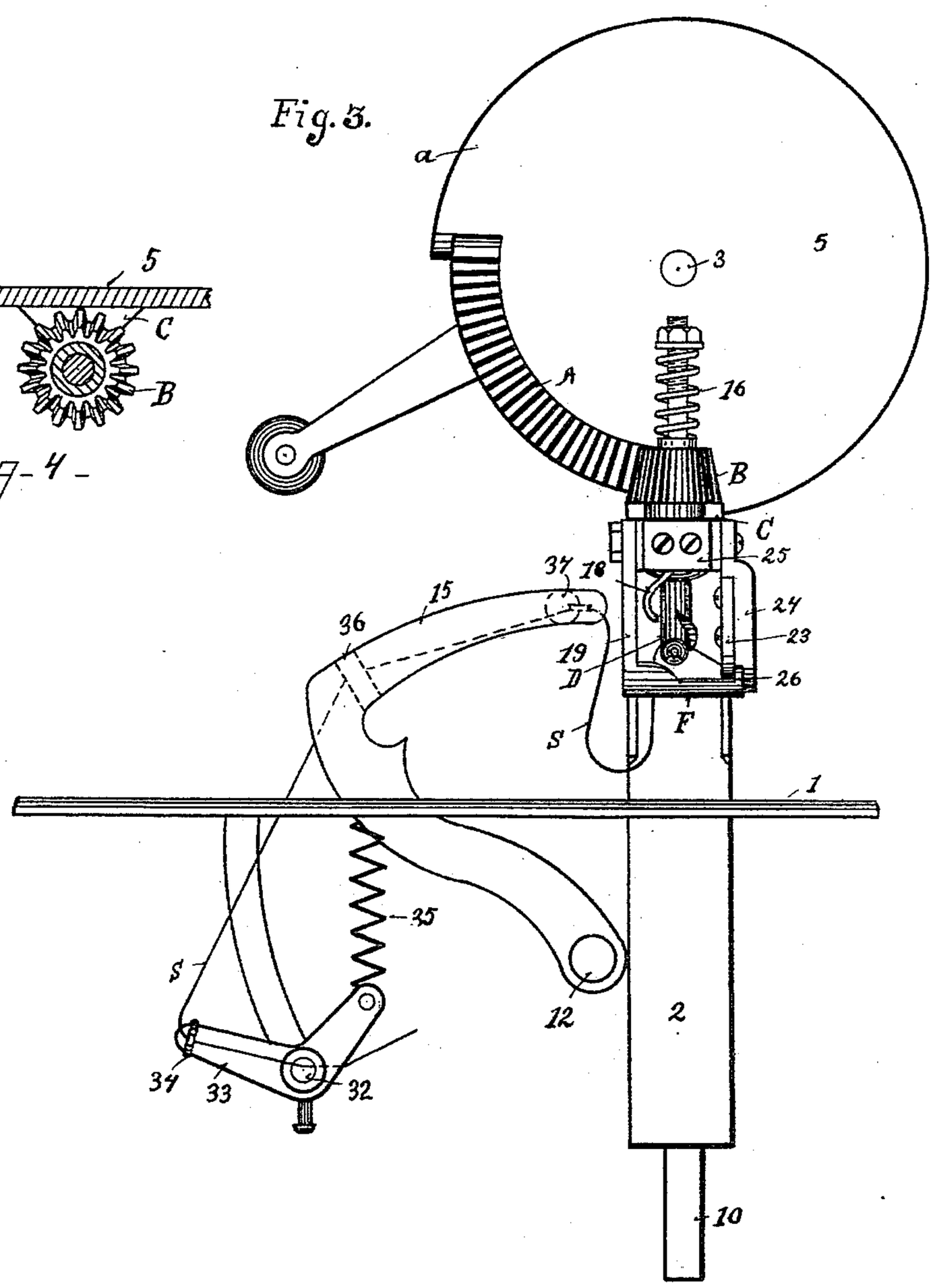

Fig. 4.

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(No Model.) 4 Sheets—Sheet 4.

W. N. PARRISH.

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Fig. 5.

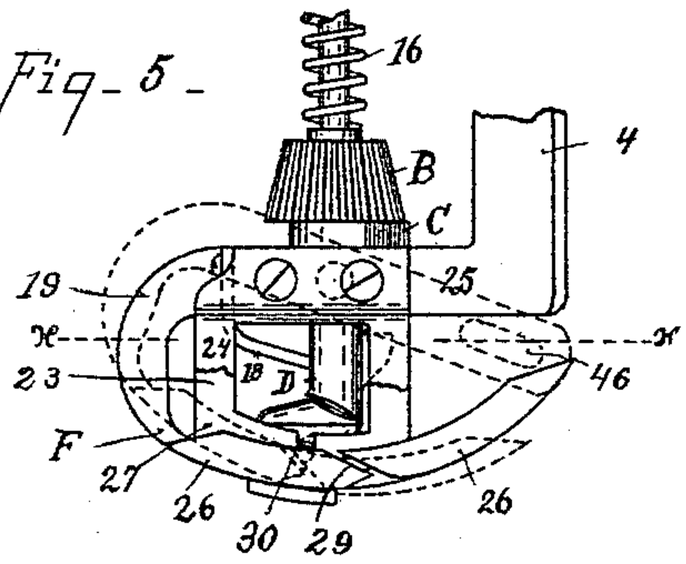
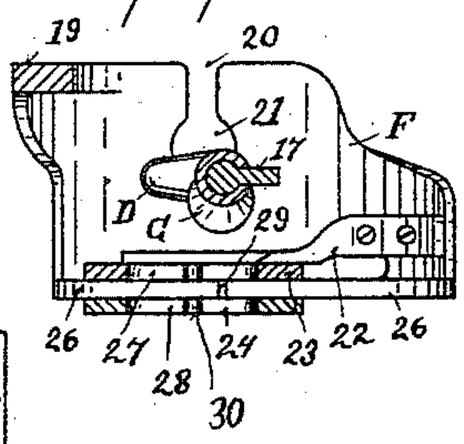


Fig. 6.



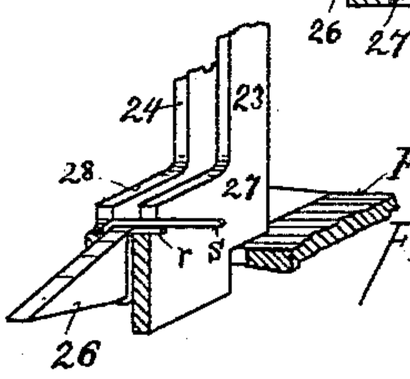
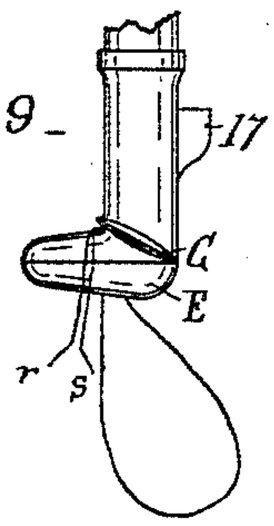


Fig. 7.

Fig. 9.



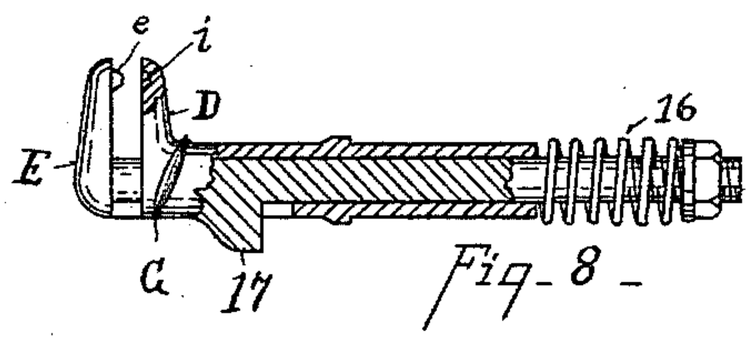
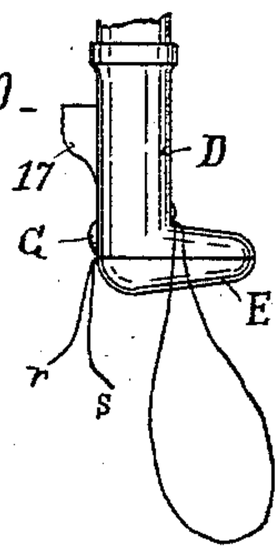


Fig. 8.

Fig. 10.



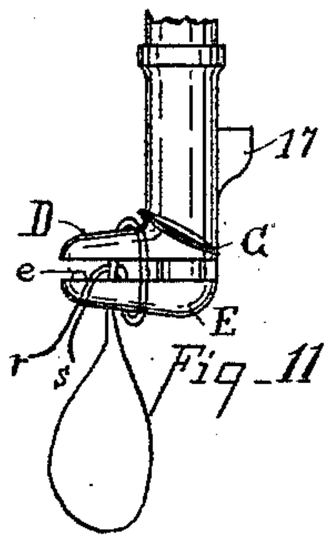


Fig. 11.

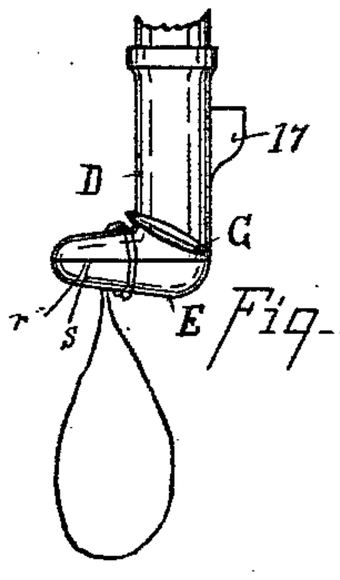


Fig. 12.

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

WILLIAM N. PARRISH, OF RICHMOND, INDIANA.

SELF-BINDER.

SPECIFICATION forming part of Letters Patent No. 457,665, dated August 11, 1891.

Application filed September 18, 1890. Serial No. 365,420. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM N. PARRISH, a citizen of the United States, and a resident of Richmond, in the county of Wayne and State of Indiana, have invented certain new and useful Improvements in Self-Binders, of which the following is a specification.

The object of my invention is to provide a cheap, simple, and more effective mechanism for binding grain, tobacco, or bunches of other material, and which is primarily adapted to be used and attached to a harvester.

Another object of my invention is to provide a mechanism which will tie a hard knot, the various features of which will be fully set forth in the description of the accompanying drawings, making a part of this specification, in which—

Figure 1 is a side elevation of my improvement. Fig. 2 is a rear elevation of the same. Fig. 3 is a front elevation. Fig. 4 is a detail view of the gear driving the knotting mechanism. Fig. 5 is a rear elevation of the knotting mechanism. Fig. 6 is a section on line *x x*, Fig. 5. Fig. 7 is a detail view of the twine-clutch. Fig. 8 is a detail view of the knotting-jaws partly in section. Figs. 9, 10, 11, and 12 are diagrams showing the different positions of the knotting-jaws in the act of tying a knot.

1 represents the binder-table, attached to the frame of the machine in the ordinary manner and connected to the upright 2, on the top of which is supported the driving-shaft 3, which is journaled in the overhanging head 4.

5 represents a disk carrying a segmental gear A, mounted on the shaft 3. For convenience I have illustrated that as driven by the crank 6, which is hinged to the link 7 and rigidly secured to the crank-arm 8 by means of the crank-pin 9, which likewise connects the link 7 to said crank 8. The said crank 8 is shown slotted to allow the adjustment of the throw of the link 7. Said link 7 is hinged at its lower end to the connecting-rod 10.

11 represents a curved crank-arm fixed to the shaft 12, and it is provided with a slot 13, which engages with the pin 14 upon the connecting-rod 10. 15 represents the binder or cord arm mounted upon said shaft 12. The construction of this mechanism for oscillating the knotter-arm is such that the cord-arm is held stationary within the knotter, as shown in dotted lines at I, Fig. 2, during the act of tying the knot, and it moves backward when the knot is tied. This stopping is obtained by means of the arm 11, which is provided with a slot 13 for the crank-pin 14 to travel down in when the link is brought to a vertical position, the crank-pin traveling as an idler during the lower portion of its movement. It is so adjusted with reference to the knotting mechanism that the knotting-arm is retracted when the knotter-jaws are brought to the stationary position after tying a knot.

The knotting mechanism is constructed as follows: The driving-wheel 5 carries the segment-gear A, which is placed upon a radius shorter than the radii of the disk 5. This furnishes a blank space *a* on the face of the disk, which projects below the gear-wheel B, meshing with said gear A. Attached to said gear B is a lug C, which is free to revolve, owing to the small radii of the driving-gear A, when the two gears are in contact; but as soon as the gear has passed out of contact the flat face of the lug C comes in contact with the periphery *a* and holds the gear B stationary, serving as a lock to positively hold the knotting mechanism in a fixed position when it is not at work. This is important, because it holds the knotter-jaw in proper position to receive the twine or binding-string at the commencement of the knotting operation, and it also holds the said knotter-jaws rigidly in position to assist in pulling the twine at the end of the operation.

In order to secure the registering of the driving-gear, I provide a downwardly-projecting lug *b*, (see Fig. 2,) which engages with the edge of the boss C just as the segment-gear A arrives at the point of contact with the gear B, thus securing a perfect meshing of the gear.

D E represent the knotter-jaws. The preferred form of construction is to have the shank of the jaw E slide within the sleeve of the shank of jaw D.

16 represents a retractile spring for the retraction of jaw E. It is forced downward by means of the lug 17, affixed to the shank of

said jaw E, which comes in contact with the spiral rod 18 as the shanks of said jaws are revolved by the gears A B.

In tying a twine-knot segment A should have the same number of teeth as gear B, so as to have but one revolution of the same.

G represents a guide affixed upon one side of the shank of jaw D, the lower edge terminating opposite the opening between the jaws when they are spread apart, so as to guide the string between the jaws in the last half of their revolution.

e represents a teat on jaw E, engaging in groove *i* of the jaw D to assist in pulling the string through to make a hard knot, as will be hereinafter explained.

In order to cut the knot and strip it off the jaws, as well as to guide the twine in position, I have provided a vibratory shield F, which is secured to the curved oscillating arm 19. It is provided with slot 20 and recess 21 immediately under the knotting-jaws, which revolve over said recess. 22 represents a cutting-knife rigidly secured to said shield and movable against the guide-post 23, which post is stationary and secured to the frame 24. Said frame is secured to the opposite side of arm 25, which serves as a journal for the bevel-gear B, to the lower end of which the knotting-jaw D is rigidly secured.

26 represents a segmental rim projecting up from the bottom of the shield F, (see Figs. 5 and 6,) and it reciprocates between the curved guides 27 and 28, which are projections of the parts 23 and 24, as shown in Figs. 6 and 7. Said rim 26 is provided with slot 29, through which the twine passes, and which reciprocates under the notch 30, cut through the guides 27 and 28, into which the twine is carried by the knotting-arm, and as the said rim 26 is reciprocated past the notch 30 the twine will be caught therein and carried back, bringing it between the guides 27 28, as shown in Fig. 7, thereby holding one end of the string taut for wrapping it around the bundle or sheaf. Arm 19 is operated automatically at the appropriate time by means of the shaft 45, which carries a pin projecting in the slot 46 of said arm 19, so as to be depressed by the pin 44 on the disk 5 striking lug 43.

47 represents a spring engaging the end of shaft 45, so as to retract the arm 19 and the shield F, carried thereby, as soon as the pin 44 has passed out of contact with the lug 43.

31 represents a spool on which the twine is wound. Said twine passes from said spool through the eye 32 of the tension device.

33 represents a tension-arm carrying the secondary eye 34 at the forward end of said arm. The rear end of said arm is connected to the take-up spring 35, so as to regulate the tension of the twine, which passes from said tension-arm through the eyes 36 37 of the knotter-arm.

In Fig. 2 the spool is omitted, and gimbal-points 39 40 are shown suspended upon the hangers 41.

42 represents a screw for adjusting the tension of the spool, so as to allow it to revolve freely under the strain, which is regulated to suit the different conditions, sizes of twine, &c., occurring in the ordinary use of the machine.

Mode of operation: The twine *s* is threaded, as above described, brought forward, and caught in the slot 29. The bundle is deposited on the table and above the twine, the knotter-arm being retracted into the position shown in dotted lines H, Fig. 2. When the bundle is deposited ready to be bound, motion is communicated by the shaft 3 to the crank 6, and by means of the link 7, connecting-rod 10, and crank 11 the binding-arm is oscillated forward into the position shown in dotted lines at I, Fig. 2, looping the twine over the bundle, as shown in said Fig. 2. The binding-arm stops in the position before explained at the instant that the gears A B are brought in contact and remain stationary during a portion of the knot-tying, which is performed as follows: The knotting-jaws are in position shown in Fig. 9 when the binding-arm passes over, the two strings *r s* being held, one by the knotter-arm and the other by the slot 29. Fig. 10 shows the position of the knotting-jaws when they have been turned half-round. During the remaining half of the revolution the said jaw E is opened out by means of the cam 18 and the twine *r s* carried through the same, as shown in Fig. 11. At the end of this movement the cam 18 is passed out of contact with the lug 17, and the jaw closes in position shown in Fig. 12. At this point of the revolution lug 43 is acted upon by pin 44, which depresses the rear end of the arm 19, which carries the shield F, cutting off the twine by the movement of the knife 22. The edge of the shield-plate at the front of the recess 21 pushes the twine off the end of the knotting-jaws, and by the ejection of the bundle the teat *e* pulls the ends of the twine through the loop, making a hard knot. The other end of the twine, which is in the eye of the binder-arm, is caught by the slot 29 and held for a second operation.

I have shown the shield F as having an oscillating movement to guide the knife-stroke and catch the end of the twine and push the twine off of the knotter-jaws. It is manifest that a reciprocating movement would be the equivalent thereof.

Having described my invention, what I claim is—

1. In a harvester, the combination, with the knotter-jaws, of the binder-arm 15, a crank-and-link mechanism, substantially as described, for driving said arm, the rod 10, slotted arm 11, and pin 14, adapted to hold the said binder-arm stationary in a forward position, and mechanism, substantially as de-

scribed, for tying the knot while the binder-arm is held stationary, substantially as specified.

2. In a knotting mechanism, the combination, with the rotary jaw D and the reciprocating jaw E, adapted to slide in the shank of the rotary jaw, of the oscillating shield F, provided with the knife 22, recess 21, and rim 26, having a twine-holding notch 29, substantially as specified.

3. In a knotting mechanism, the combination of the jaw D, provided with groove *i* and spiral guide G, the jaw E, provided with teat *e* and having a shank adapted to slide in the sleeved shank of the jaw D, means, substantially as described, for operating said jaws, and the hinged oscillating shield F, provided with slot 20, recess 21, and knife 22, substantially as set forth.

4. In a knotting mechanism, the combination of the knotter-jaws D E, the disk 5, having segmental gear A, track *a*, and pin 44, the gear B, provided with stop-lug C, the oscillating shield F, provided with knife 22, the pivoted arm 19, to which said shield is attached, and the shaft 45, connected with said arm and provided with lug 43, substantially as described.

5. In a knotting mechanism, the combination of the jaws D and E, the oscillating shield F, provided with slot 20, recess 21, knife 22, and slotted segmental rim 26, the guides 27 and 28, the disk 5, having segmental gear A, track *a*, and pin 44, the gear B, provided with stop C, the shaft 45, provided with lug 43, and the arm 19, pivotally connected with said shaft and impulsively operated by contact of the pin 44 with the lug 43, substantially as described.

6. In a harvester knotting mechanism, the combination of the binder-arm 15, having eyes 36 and 37, the spring-tension mechanism, substantially as described, the knotter-jaws D E, mechanism for holding the binder-arm stationary while the knot is being tied, the shaft 45, having lug 43, the oscillating arm 19, pivotally connected with said shaft, the slotted and recessed shield F, carried by said arm and provided with knife 22 and segmental rim 26, the guides 27 and 28, the disk 5, having segmental gear A, track *a*, and pin 44, and the gear B, provided with stop C, substantially as described.

In testimony whereof I have hereunto set my hand.

WILLIAM N. PARRISH.

Witnesses:
I. C. DOAN,
W. T. DENNIS.