

(Model.)

3 Sheets—Sheet 1.

J. R. PRESCOTT.
GRAIN BINDING MACHINE.

No. 258,114.

Patented May 16, 1882.

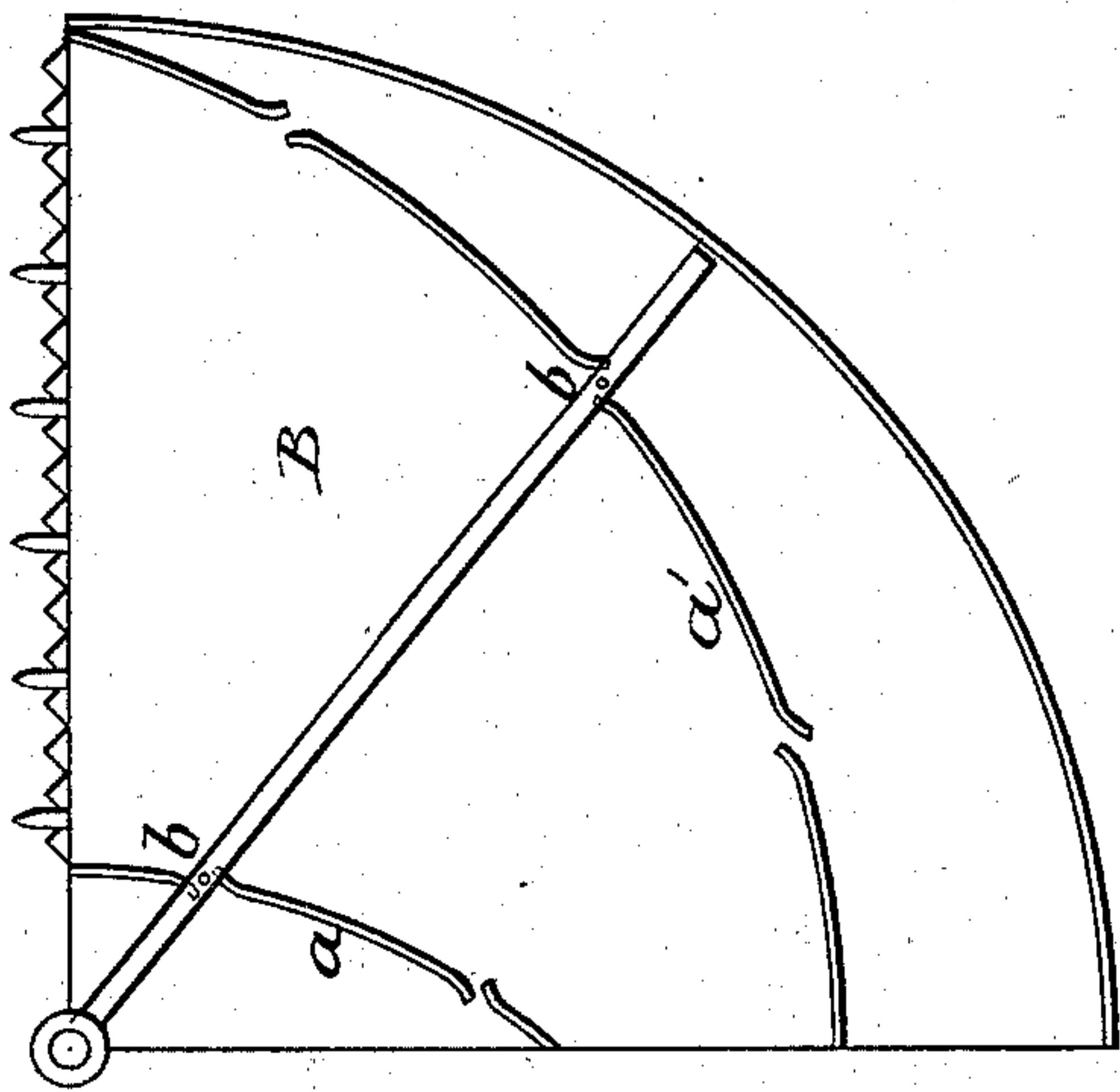


Fig. 2.

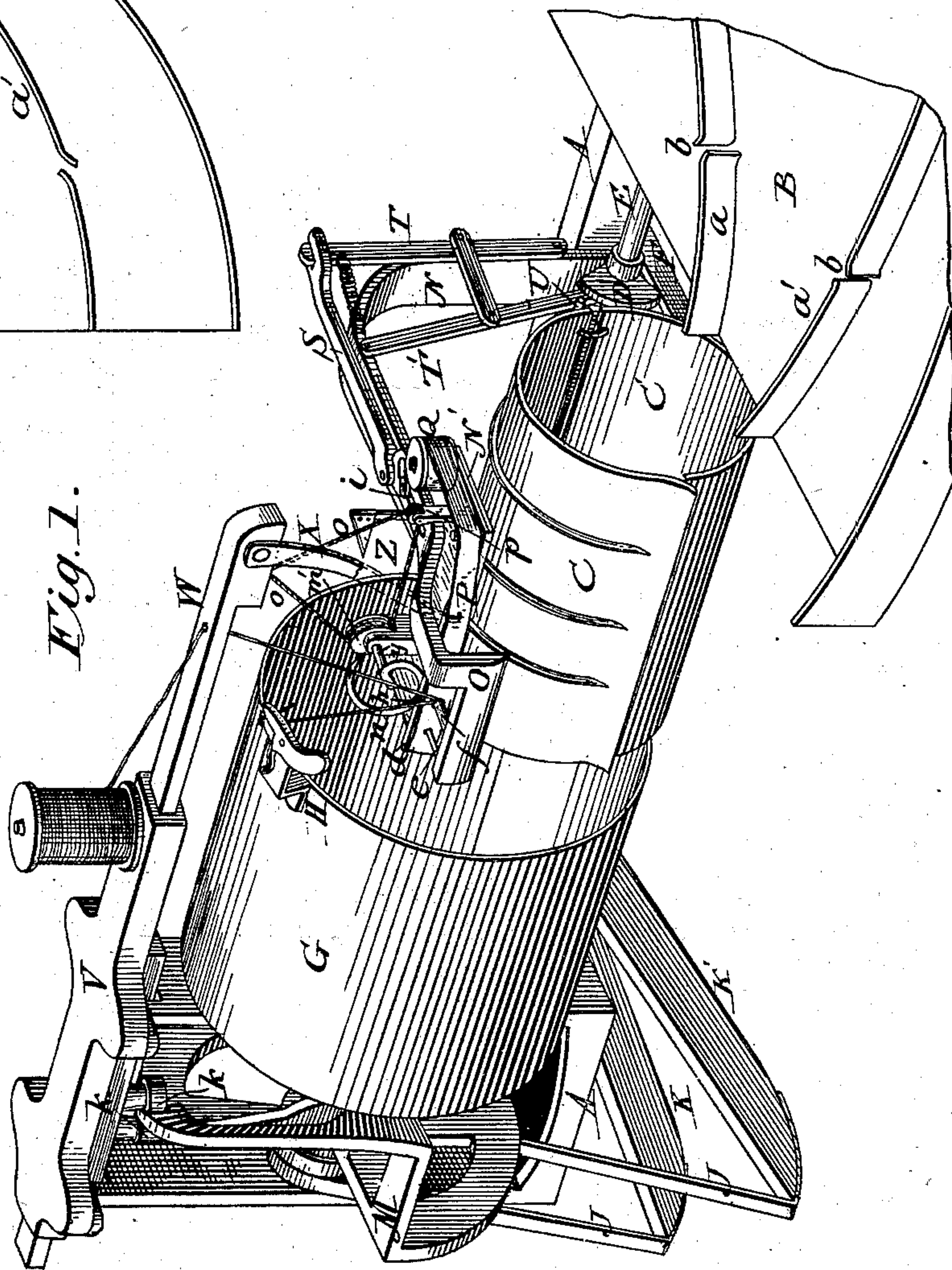


Fig. 1.

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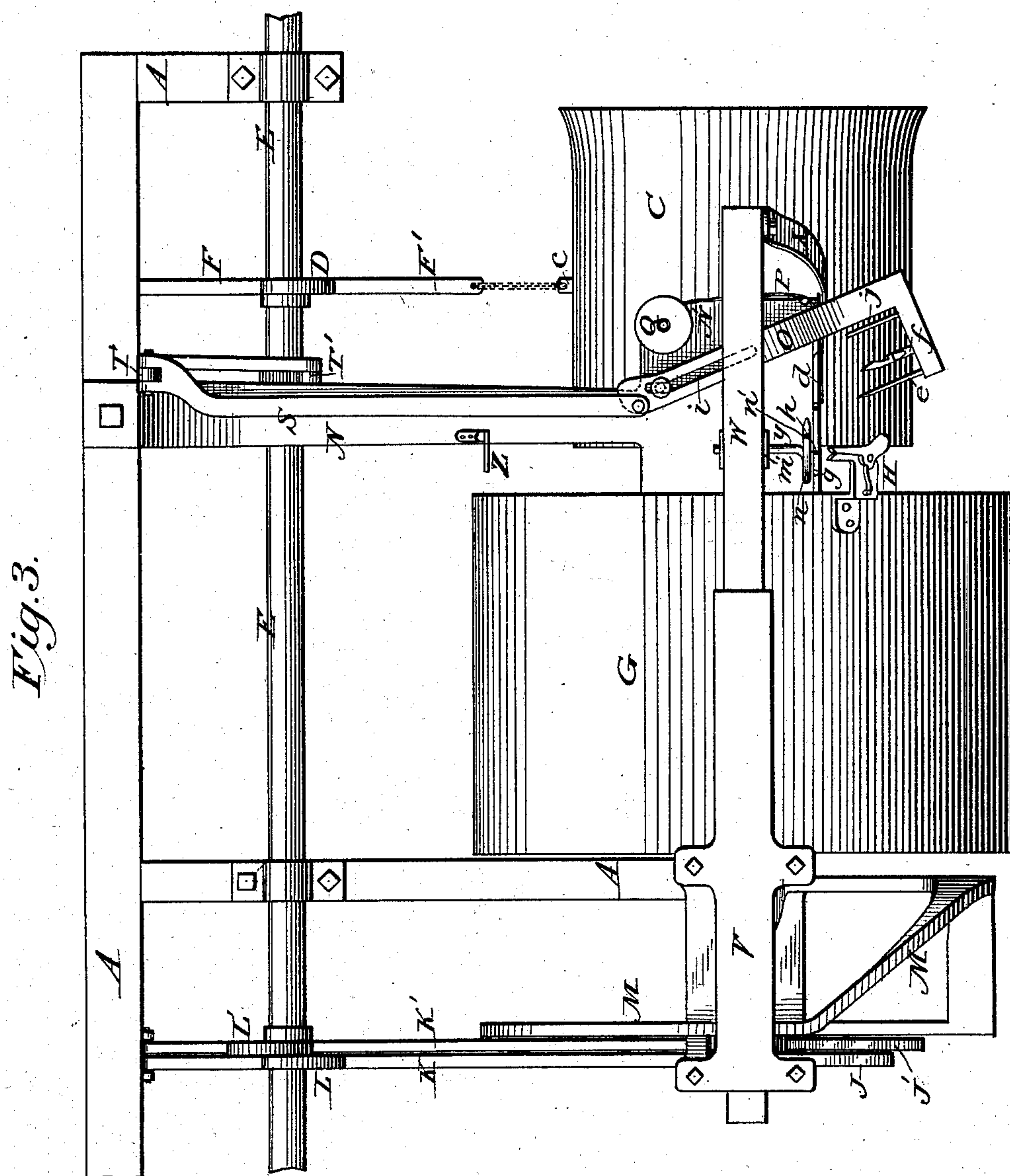
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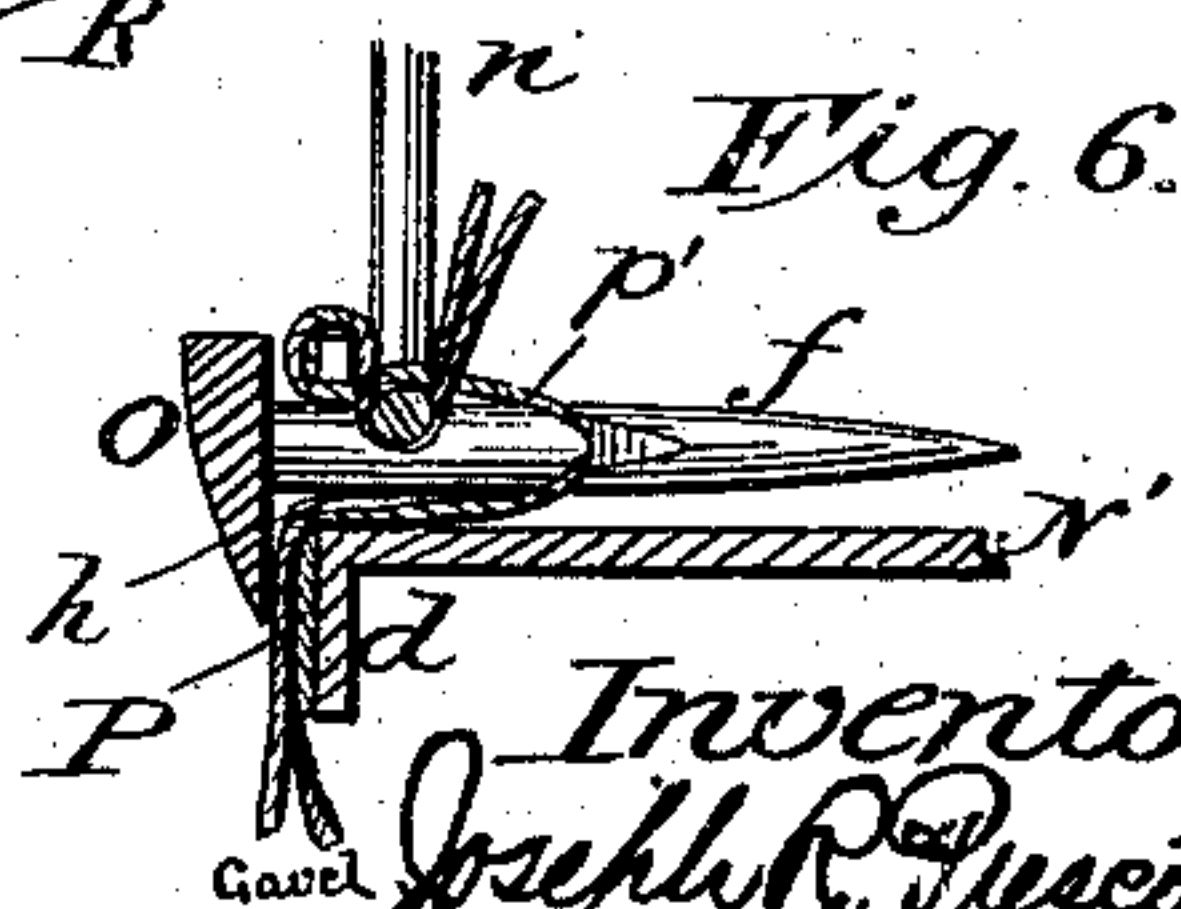
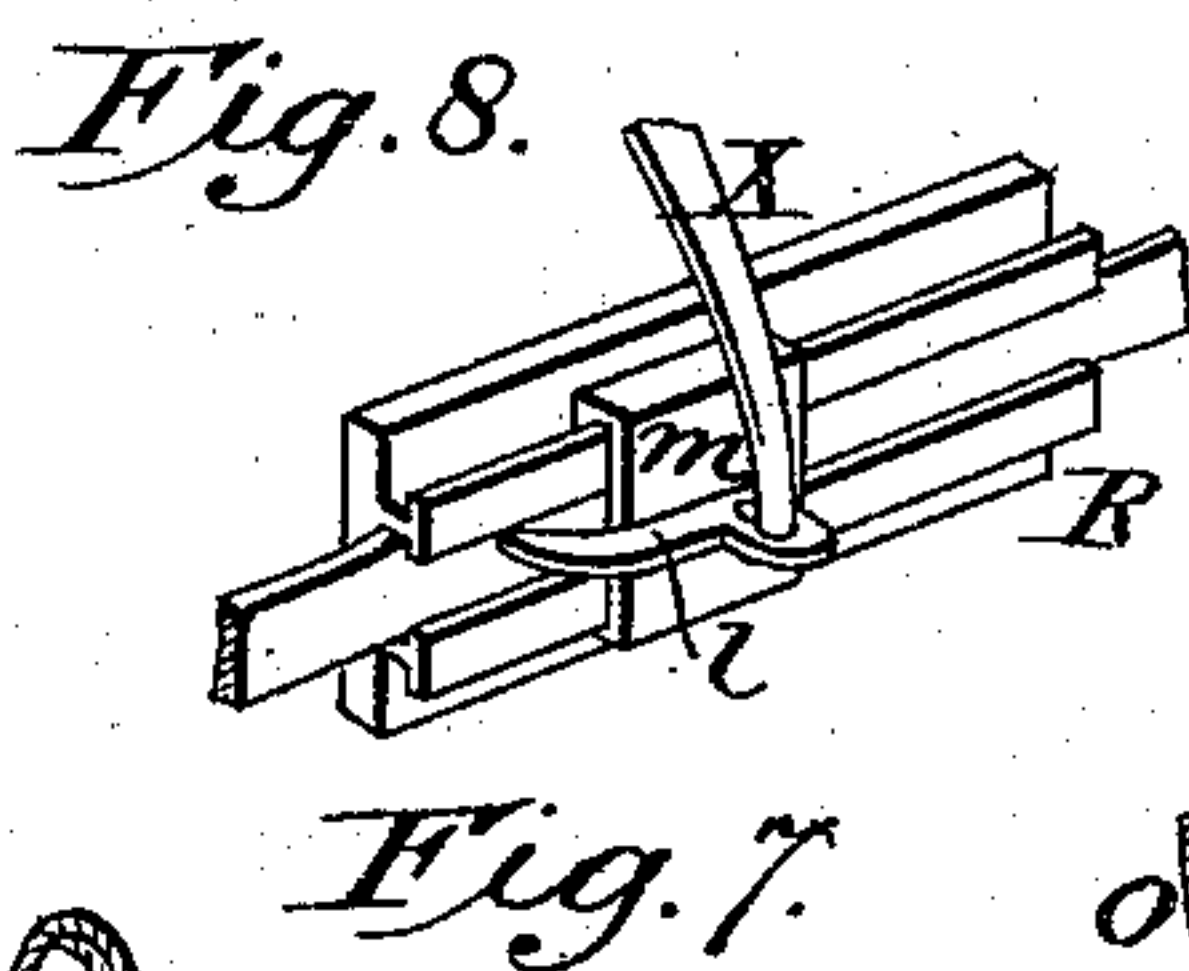
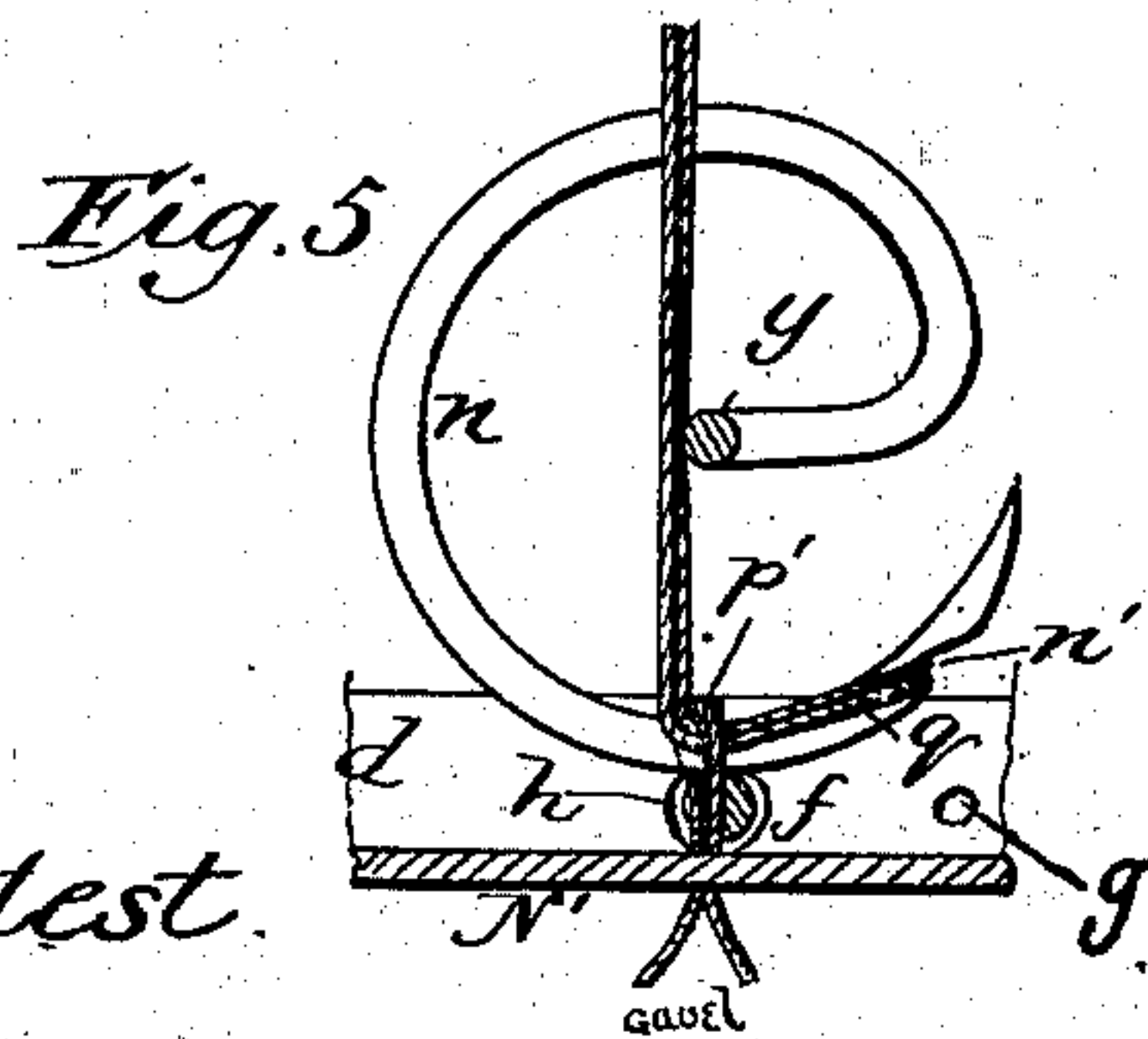
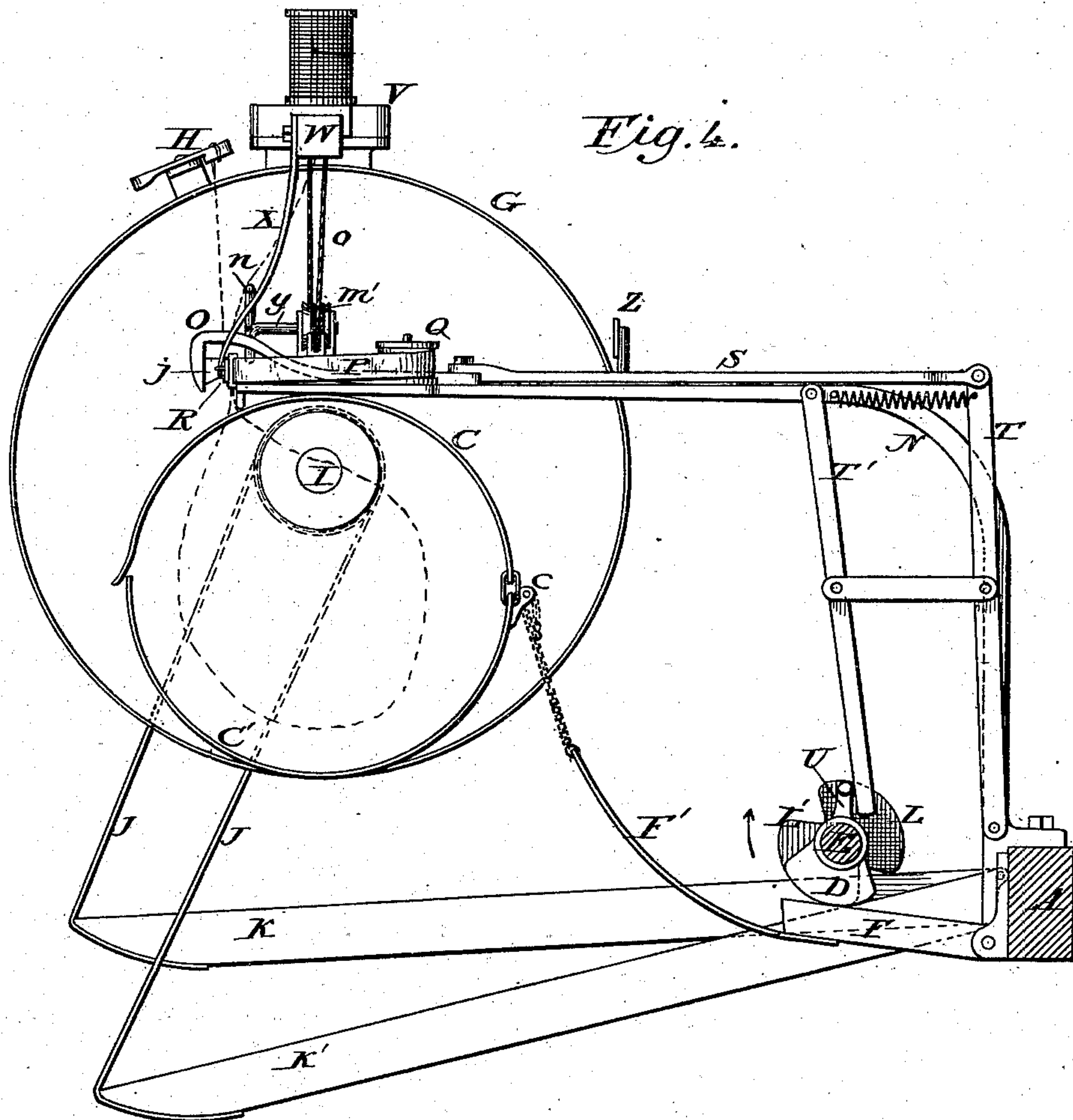
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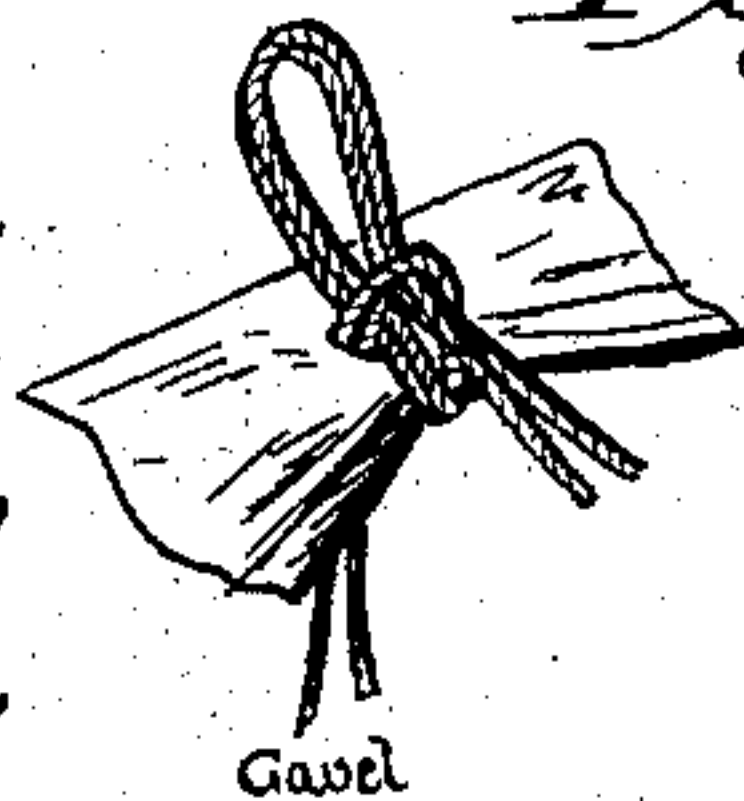
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UNITED STATES PATENT OFFICE.

JOSEPH R. PRESCOTT, OF BEAVER DAM, WISCONSIN, ASSIGNOR OF ONE-HALF TO RICHARD J. ANDREWS, OF SAME PLACE, AND HORACE FOSTER, OF SHELDON, ILLINOIS.

GRAIN-BINDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 258,114, dated May 16, 1882.

Application filed January 17, 1882. (Model.)

To all whom it may concern:

Be it known that I, JOSEPH R. PRESCOTT, of Beaver Dam, in the county of Dodge and State of Wisconsin, have invented certain Improvements in Grain-Binding Machines, of which the following is a specification.

This invention relates to a binding attachment for reaping-machines; and the improvements consist in guards or fenders applied to the ordinary reaper-platform to direct the grain and insure its delivery into the compressor; in a cylindrical compressor one section of which is sustained by a yielding or elastic support to permit it to accommodate different-sized gavels and properly compress them while being bound, and which is permitted to fall and discharge the bound bundle; in a novel method of and mechanism for securing or fastening the ends of the applied bands, and in various other details hereinafter fully set forth.

In the accompanying drawings, Figure 1 represents a perspective view of my improved attachment, showing also a portion of the reaper-platform; Fig. 2, a plan view of the reaper platform or table; Fig. 3, a top plan view of the machine or attachment; Fig. 4, an end view looking into the compressor; Figs. 5 and 6, views illustrating the operation of forming the knot; Fig. 7, a view of the completed knot, and Fig. 8 an enlarged view of a feeding device hereinafter referred to and explained.

In this machine the ends of the applied band are tied into a knot of peculiar form, and in order to prevent the knot from drawing or slipping out the strands of the band are passed through and tied about an independent strip of material. The grain to be bound is swept by the ordinary sweep-rake directly into the compressor through its end and caused to project therefrom into an open-ended cylinder provided with a cord-carrier, which passes the band about the bundle. The cord or twine passes from the reel to the cord-carrier, which swings around the bundle, carrying the cord with it and laying the two strands in position to be seized and manipulated by the tying devices. The various motions are imparted to the machine from a main driving-shaft, which in turn is driven from the main drive-wheel of the reaper.

Referring now to the drawings, A represents

the framing of the binding attachment, which may be applied and secured to the reaper in any convenient manner, and B the grain table or platform of the reaper. As shown in Figs. 1 and 2, the table or platform is furnished with upright guards or guides *a a'*, which start respectively at opposite ends of the sickle-bar and gradually approach each other until they terminate at the delivery side of the table at such distance apart as to cause the grain to be delivered between them endwise into the compressor C. These guards or guides are designed to be applied to the ordinary reaper-platform without any modification or alteration of the same or of the rake which sweeps over it; and in order to permit the teeth or fingers of the rake to pass the guards or guides, they (the guards) are provided with openings *b* at such points as would otherwise be struck by the teeth or fingers.

The compressor C, into which the grain is delivered end first, is composed of two semi-cylindrical sections, the lower one of which, C', is hinged to the upper section, and is held normally in the position shown in Fig. 1 by a cam, D, on the main drive-shaft E, bearing upon a lever, F, connected with an arm, *c*, projecting from the hinged section C' in rear of its pivot or hinge. The connection between the lever F and the arm *c* consists of an elastic or spring arm, F', and a chain or equivalent flexible band or connection, which will permit of lengthening or shortening, to diminish or increase the force of the spring-arm and consequent pressure upon the bundle in the compressor. The cam D serves to draw the hinged lower section of the compressor up to the position shown in Fig. 1 during the formation and binding of the bundle, thereby compressing the same; but as the tying operation is completed and the applied band is severed from the band-stock the cam rides off lever F and permits the section C' of the compressor to fall and discharge the bundle. The mouth or receiving end of the compressor is preferably made flaring, as shown in Fig. 3, to insure the proper entrance of grain into it, the grain being pushed through the same and caused to project therefrom into an open-ended cylinder, G, which serves to support the heads during the binding operation, and which is also fur-

nished with a cord holding and carrying device, H, by which the cord or band is passed around the grain and presented to the tying or fastening mechanism. The cylinder G is carried by a rock-shaft, I, to which an alternating rotary motion is imparted by straps or bands J, attached to pivoted levers K K', which are alternately depressed and released by cams L L' on the driving-shaft E, the straps winding in reverse directions upon the shaft I or upon a hub secured thereon. The rock-shaft also carries a cam-wheel, M, the purpose of which will appear presently.

Before describing the tying mechanism in detail I would say that the two ends or strands of the applied band are first passed in a double or loop form through a strip of tape or fabric, thin metal, or other penetrable or perforated material. Then the strands, or the portions which subsequently become the ends of the applied band, are carried over and around the edge of the strip or tape, again doubled, and passed through the loop previously carried through the tape or strip, thus forming a single bow-knot of the two strands, into which the strip or tape is tied or incorporated to prevent the slipping or drawing out of the knot.

Referring now to the drawings, N represents an overhanging arm, provided with a lateral extension or bed, N', at its outer end, directly over the compressor-cylinder, and projecting a short distance beyond the inner end of said cylinder, as shown. Upon the bed N' is mounted and arranged to slide an L-shaped arm, O, one portion of which lies upon the face of the bed, while the other portion drops down in front of the forward edge of the bed, or in front of an upright flange or rib, d, formed thereon, and is armed with a steady-pin, e, and a notched needle, f, arranged to pass respectively through the hole g and the notch or opening h in the rib or flange d, both passing through a strip or band, P, of tape or other material, fed along the upright face of the rib or flange from a reel or spool, Q, by the feeding device R. The arm O is formed with a straight slot, i, which, near the rear end of the arm, turns off to one side, as shown in Figs. 1 and 3, and through or into this slot extends a cylindrical pin or stud projecting upward from the face of the bed N'. The rear end of arm O is jointed to a bar or rod, S, and this in turn to an upright lever, T, pivoted at its lower end to the frame A. The lever T is connected by a link-bar with a similar lever, T', pivoted to the arm N at its upper end, and actuated by a crank or eccentric, U, on the main shaft E, to move the parts in one direction, a spring or other device being employed to move them in the reverse direction, or the lower end of the lever T being slotted to straddle the crank and to afford the required play of the same.

From the above construction it follows that when the lever T is moved in one direction the arm O is caused to move outward until the pin e and needle f are entirely clear of the rib d, and then to swing to one side, as in Fig. 3, and

that upon the reverse movement of said lever the arm is swung around, so that its forward portion is parallel with the rib or flange d and the pin e and needle f are in line with their respective openings, through which they are passed by the inward movement of the arm. The arm O also carries a blade or cutter, j, which passes through a slit or opening in the rib d as the arm is drawn in, and serves to cut from the strip P a short piece or section suitable for use in the formation of a knot, the strip being steadied and retained in place during the cutting by the pin e.

V represents a bracket-arm or overhanging support, through which slides a rod or bar, W, which bar is moved longitudinally by the cam-wheel M, previously mentioned, the edge of the wheel traveling between two studs or rollers, k, formed upon or attached to the lower side of said bar, as shown in Fig. 1. The bar W carries an arm, X, which operates and controls the tape or strip feeder R, which latter consists of an elbow lever or dog, l, with a sharp nose or a roughened foot and pivoted at the angle or elbow to a sliding block or plate, m. It will readily be seen that under this construction the retraction or movement of the sliding bar W toward the cylinder G will cause the nose of the dog l to be thrown against the tape or strip P by the arm X and to move the strip forward; but that upon the reverse movement of the bar the nose of the dog will be thrown away from the strip and the dog caused to move back without acting upon the same.

Upon the bed N' is mounted, in suitable supports or bearings, a shaft, y, carrying at one end a pulley or wheel, m', and at the opposite end fashioned into or provided with a circular needle or finger, n, notched in its outer surface near the point, as shown in Figs. 1, 3, and 5. The movements of the bar W also serve to impart a rotary motion to this circular needle or finger by means of a cord or band, o, passing about the pulley m' and around a second pulley, p, carried in a fixed support at the outer side of the bed N', the ends of the band being secured to and carried back and forth by the bar, as shown in Fig. 1.

The cord-holder H consists simply of a stationary and a pivoted jaw or finger, the latter held against the former by a spring, as shown in Fig. 1. The ends of the jaws are beveled to cause the cord to enter readily between them and force them apart when sufficient pressure for the purpose is exerted.

A stationary cutting-blade, Z, preferably having its edge inclined, as shown in Fig. 1, is located in rear of the circular finger or needle n in the path of the binding-cord as it is carried back by the holder H.

Having now described the construction of the machine and its various parts, I will explain the operation of forming and binding a bundle of grain, securing the band, severing the same from the twine upon the reel, and finally discharging the bound bundle.

The strip P is fed forward across the open-

ings *g h*, and grain is swept by the rake into the compressor C, which closes tightly as the grain passes to its place therein, thus compressing the bundle and rendering it firm and compact. The cylinder G up to this time stands with the cord-holder in front of the compressor or toward the advancing front of the reaper, the cord passing down from its spool or reel through an eye or guide in the sliding arm W, over the opening *h* in the face of rib or flange *d*, and over strip P lying thereon, and thence under the bed N', back to the cord-holder H. The grain being supplied to the cylinder or compressor C and properly compressed, the cylinder G is caused to rotate and the cord or band is carried by the cord-holder H about the bundle, passing between the compressor C and cylinder G and upward to and across the opening *h*, the arm O being at this time thrown aside, as in Fig. 3. When the second strand or end of the band is thus brought up by the cord-carrier H and laid beside the first, the lever T' is actuated and the arm O caused to swing over and to bring the steady-pin *e* and needle *f* opposite their respective openings and then to move inward. In thus moving inward the notched needle *f* engages the strands or cords and pushes them in the form of a loop, *p'*, through the strip P and opening *h*, as shown in Fig. 6, the strands above the strip being at the same moment across the circular needle or finger *n*, which thereupon rotates, bringing its notch *n'* opposite the strands or cords and permitting them to fall therein. The rotation of the needle or finger continuing, the strands are carried through the loop *p'* a sufficient distance to form a full loop, *q*, whereupon, the rotation of the circular needle being reversed by the retraction of bar W, the circular needle or finger backs out through loop *p'*, leaving a bow-knot. Just previous, however, to the backward rotation of the needle or finger *n* the strands or ends of the applied band are severed by being carried against the fixed blade or cutter Z by the further movement of the cord-holder H. In carrying the second strand or end of the band up to the side of the first, and after the formation of the loop *p'*, the cord-holder H comes into contact with the first or main cord passing from the reel, which cord, striking between the beveled jaws, forces them apart and enters just previous to the cutting of the applied band from the twine of the reel. In passing inward the arm O carries the cutter *j* with it, severing a short section from the strip P, which is tied into a knot, as explained. Thus it will be seen that the knot is tied through and around the strip P, that a short section of the strip is severed from the main stock for this purpose, and that as the knot is completed the applied band is severed from the band material of the reel or spool. The applied band being cut from the main supply or stock at a point below the cord-holder H when the latter is up, as in Fig. 1, it will be seen that the new end coming from the reel above

will be retained by the holder H, and carried thereby to the position occupied at the commencement of the binding operation proper as the cylinder G is turned back to its first position.

It is obvious that the details of the gearing or operating mechanism may be modified, any usual or well-known mechanism for producing the motions peculiar to the different parts being employed, if desired, in lieu of that shown and described.

It is apparent that instead of operating the circular needle or finger *n* by means of the pulley and band, as described, a gear-wheel or pinion may be substituted for the pulley and a sliding rack-bar or a curved rack attached to a swinging arm or lever employed to give motion to the pinion alternately in reverse directions, the rack bar or lever being connected with the driving mechanism in any usual or convenient manner to produce the alternate motion. Cams, links, or reversing-gear of any well-known form may be used for this purpose.

Any usual form of tension or take-up device, or both, may be employed, if desired or necessary.

I am aware that the reversing mechanism by which the cylinder is operated is not new *per se*; and I do not broadly claim the same, but only when used in connection with other mechanism or devices; nor do I broadly claim the feeding device by which the strip is fed or the mechanism for operating the same.

I am also aware that in sewing-machines a single strand of thread has been carried through and around the edge of the fabric in the form of a loop; but I am not aware that the two strands have ever before been so manipulated, or that such plan has ever before been applied to the fastening of grain-bands.

Having thus described my invention, what I claim is—

1. In combination with a reaper, a grain bundling and compressing device composed of segmental sections C C', adapted and arranged to receive the grain at the end while closed, one of said sections being hinged to the other and adapted to open to discharge the bundle, substantially as described.

2. In a reaper provided with a binding attachment, a grain-platform provided with curved guides *a a'*, approaching each other toward the delivery side of the platform, and provided with openings for the passage of the rake teeth or fingers, as set forth.

3. The compressor C, provided with hinged section C', in combination with lever F, connected with section C', and cam D, adapted to depress the lever, as explained.

4. In combination with the compressor, lever F and intermediate elastic section, F', connected with the hinged section C' in rear of its pivot.

5. In combination with the hinged compressor, section C', the operating-lever F F', and the chain connecting the section C' with the lever, as and for the purposes set forth.

6. In a grain-binder, the combination of a cylindrical compressor and an open-ended rotary cylinder adapted to receive and support the heads of the grain, and provided with a cord-carrying device, substantially as described, whereby it is adapted to pass the band about the bundle.

7. In combination with the compressor or bundle-former C, the open-ended rotary cylinder G, provided with a cord-holding device, and means, substantially such as described, for rotating the cylinder G alternately in reverse directions, as and for the purpose set forth.

8. In combination with the cylinder G, provided with a cord-holder and mounted upon a rock-shaft, straps or bands J, wound upon said shaft in reverse directions and attached respectively to levers K K', and cams L L', adapted and arranged to depress or actuate the levers alternately, substantially as set forth.

9. The herein-described method of binding grain, consisting in passing the band about the bundle of grain, then carrying the two strands of the band through an independent band of penetrable or perforated material and about the edge of the same, thereby introducing said material into the knot to prevent the slipping or drawing out thereof.

10. The method of securing the knots of grain-bands, consisting in introducing therein, substantially in the manner explained, an independent strip of material, through and around which the band is carried, as shown and described.

11. The cord-tying device for grain-binders, consisting of the pointed needle *f* and circular needle *n*, arranged and operating in connection with needle *f*, substantially as described.

12. In a grain-binding machine, the combination of a strip of penetrable or perforated material, a needle adapted and arranged to pass through said strip and to carry the strands of the band in the form of a loop through the same, and a second needle or finger operating substantially as described, whereby it serves to pass the outer ends of the strands through the loop.

13. In combination with the needle *f*, the steady-pin *e*, adapted and arranged to guide the needle and to hold the strip P in place.

14. In combination with the rib or flange *d*, provided with the slot or opening *h*, the arm O, provided with needle *f*, and adapted and arranged to move straight out from the rib, and then to swing to one side to permit the placing of the strands of the band across the opening *h*, as explained.

15. In combination with the rib *d*, provided with hole *g* and slot or opening *h*, the arm O, provided with pin *c*, and needle *f*, adapted and arranged to move in a straight line from the rib and then to swing to one side, substantially as set forth.

16. The arm O, provided with needle *f*, and slotted as described, in combination with a sta-

tionary pin extending into said slot, and means for reciprocating the arm, whereby it is caused to move a given distance in a straight line, then to swing to one side, as set forth and shown.

17. The combination, in a grain-binder, of the rib *d*, provided with slot or opening *h*, arm O, provided with needle *f*, bar S, and means, substantially as shown and described, for reciprocating said bar.

18. In a grain-binder, the combination of band-fastening mechanism, substantially such as shown and described, a sliding bar, W, connected with a feeding-dog, and provided with lugs or studs *k*, and cam-wheel M, working between said studs, as shown and described, whereby the bar is reciprocated and caused to actuate the feeding-dog to supply material to the feeding devices.

19. In combination with the needle or finger *n*, a pulley secured upon its shaft, and a band connected with the sliding bar W and passing about said pulley and about a second pulley in line therewith, whereby the needle or finger is rotated alternately in opposite directions.

20. In a grain-binder, the combination of a notched needle adapted to pass the strands of the band in the form of a loop through an interposed piece of material, and a circular finger or needle adapted and arranged to seize the strands above the loop and to carry them through the same, as set forth.

21. In combination with the notched needle *f* and slotted or recessed rib *d*, the notched circular finger or needle *n*, rotating in a plane at right angles to the movement of the needle *f*, whereby it is adapted to seize the ends of the strands and carry them through the loop formed by the needle *f*.

22. In combination with the needle *f* and circular needle or finger *n*, notched as described, a cord guide or eye located above and in line with opening *h*, and a cord-carrier arranged, substantially as described, to carry the second strand up to a position by the side of the strand coming from said eye or guide, whereby the strands are brought into position to be seized by the needle *f* and the finger or needle *n*.

23. In combination with the cylinder G, provided with the cord-carrier H, compressor C, and bed or plate N, projecting over the space between the cylinder and compressor, whereby it is adapted to catch the cord or band carried downward by the cord-carrier H.

24. The herein-described binding mechanism, consisting of needle *f*, arm O and its operating mechanism, circular finger or needle *n*, sliding bar W, cam M, strip P, and cord-carrier H, all combined and operating substantially as specified.

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Witnesses:

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J. E. HOSMER.