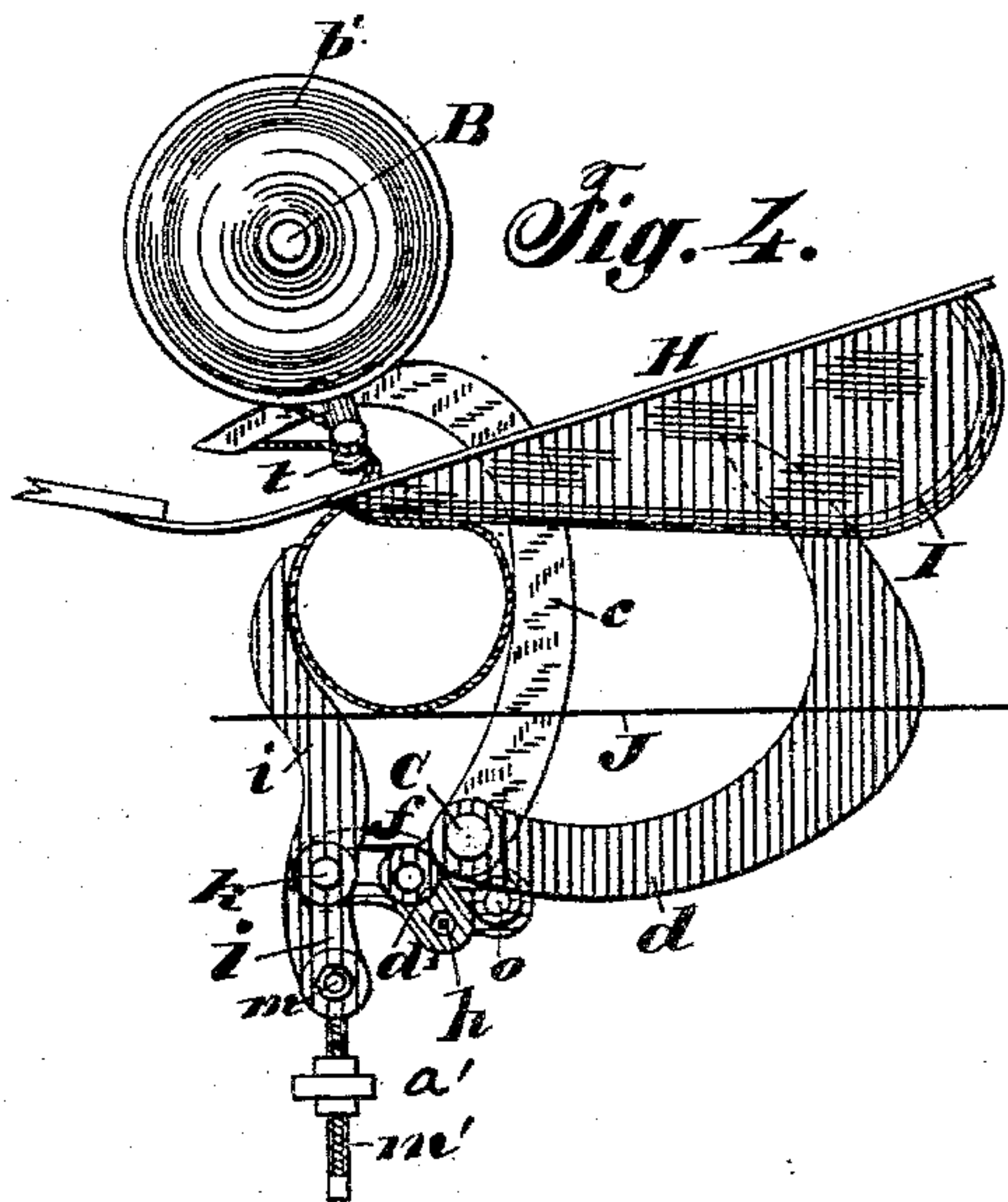
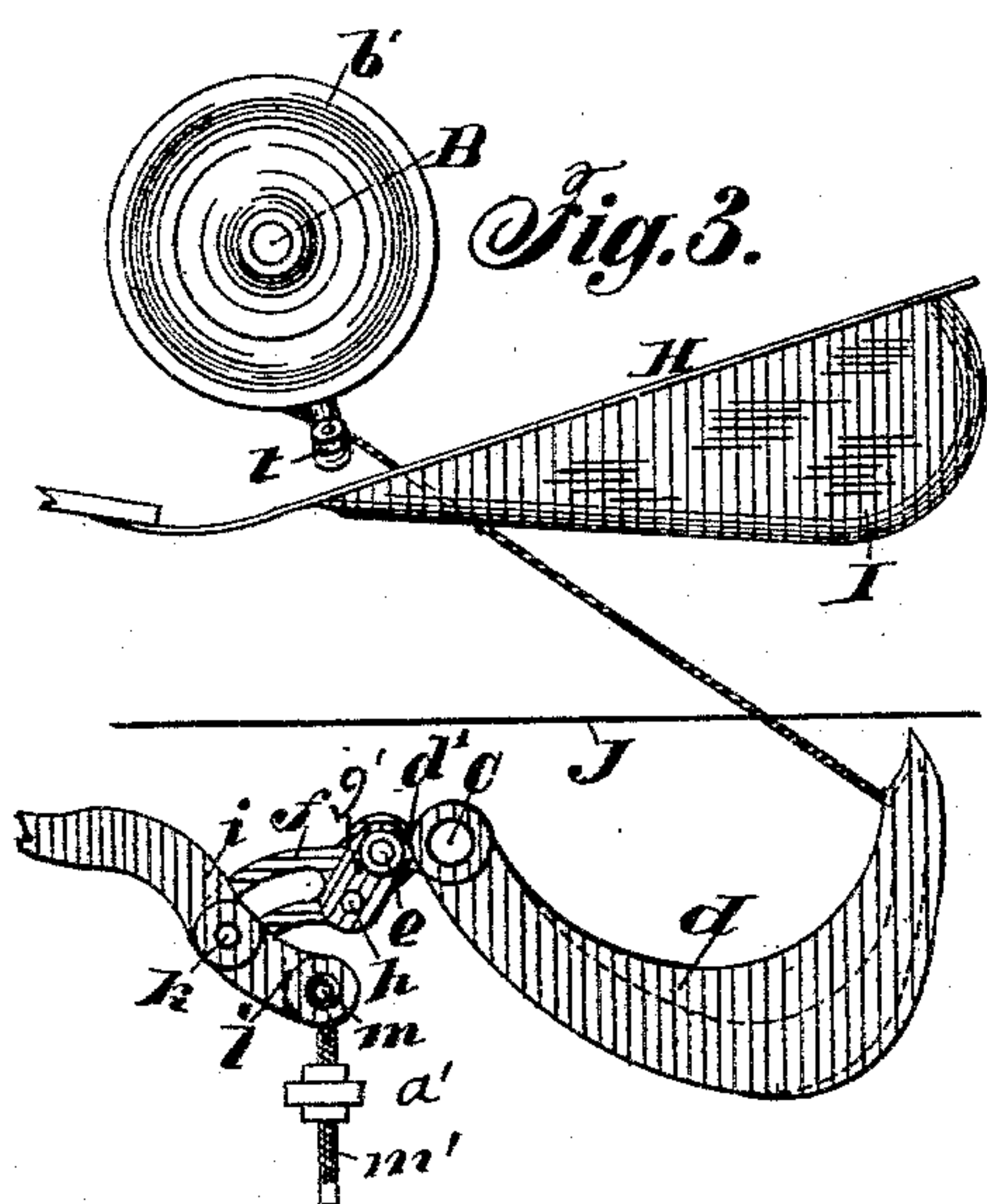
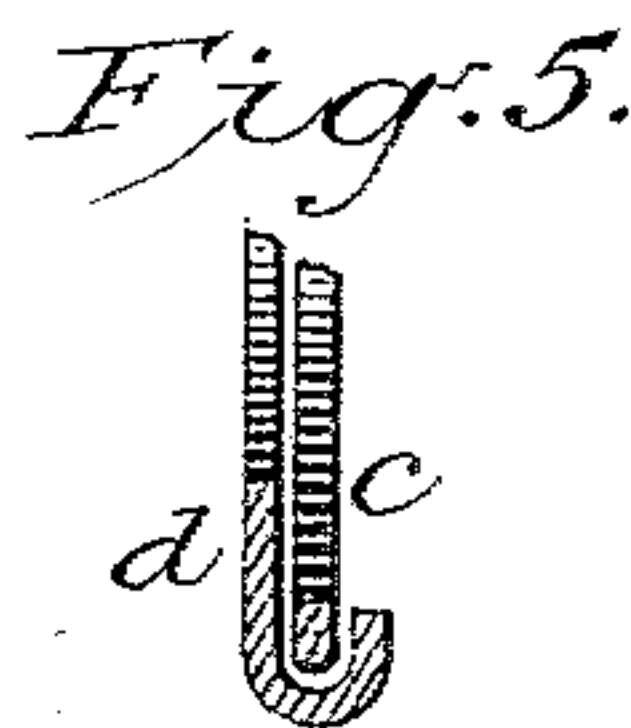


(Model.) L. FECHER, Jr., & W. F. OLIN.² Sheets—Sheet 1.

GRAIN BINDER.

Patented Apr. 14, 1885.



Witnesses:
John F. Steward
John B. Kaspar

Inventors:
*Lawrence T. Fitch &
 William F. Oliver*

(Model.)

2 Sheets—Sheet 2.

L. FECHER, Jr., & W. F. OLIN.
GRAIN BINDER.

No. 315,754.

Patented Apr. 14, 1885.

Fig. 2.

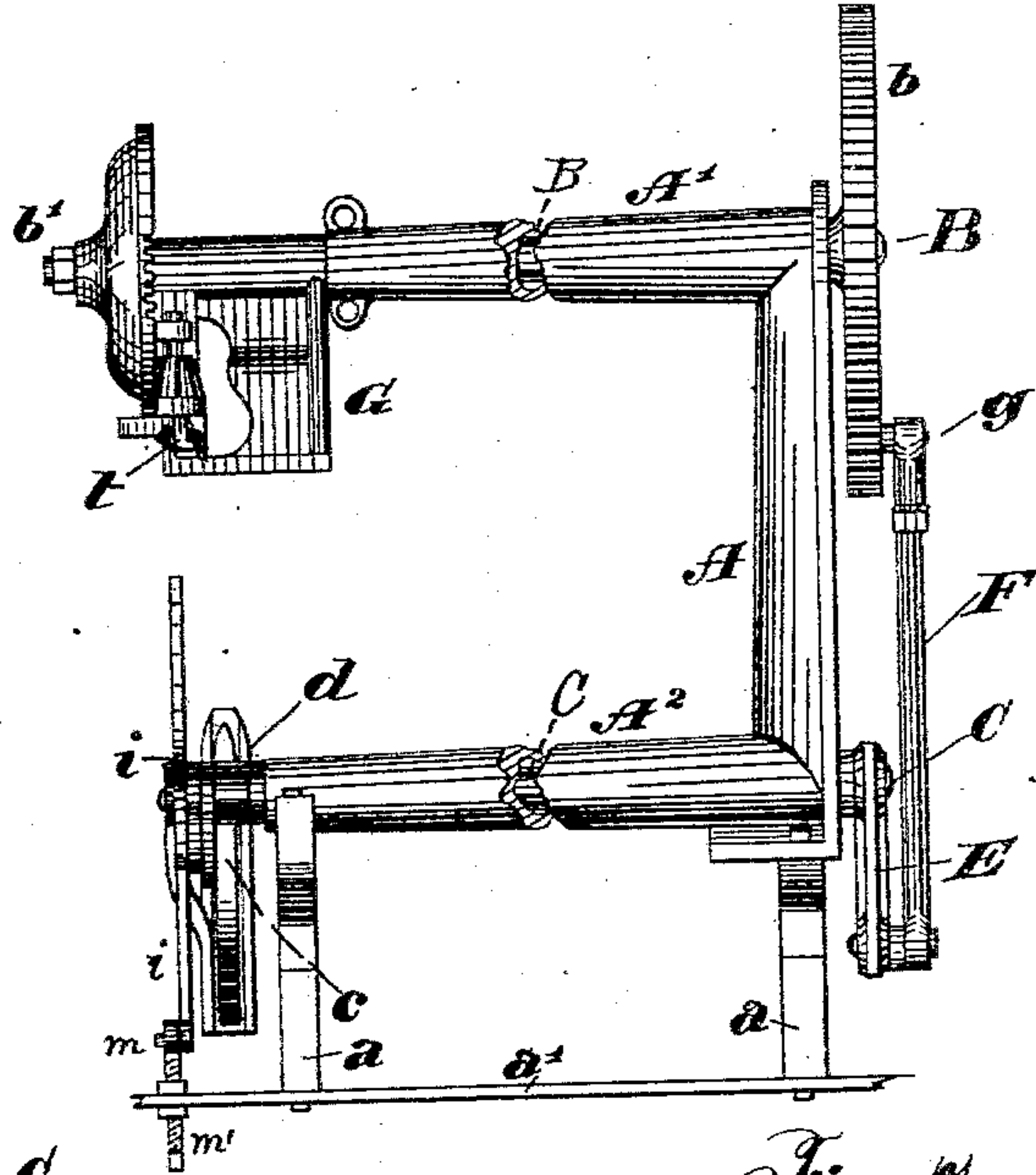


Fig. 6.

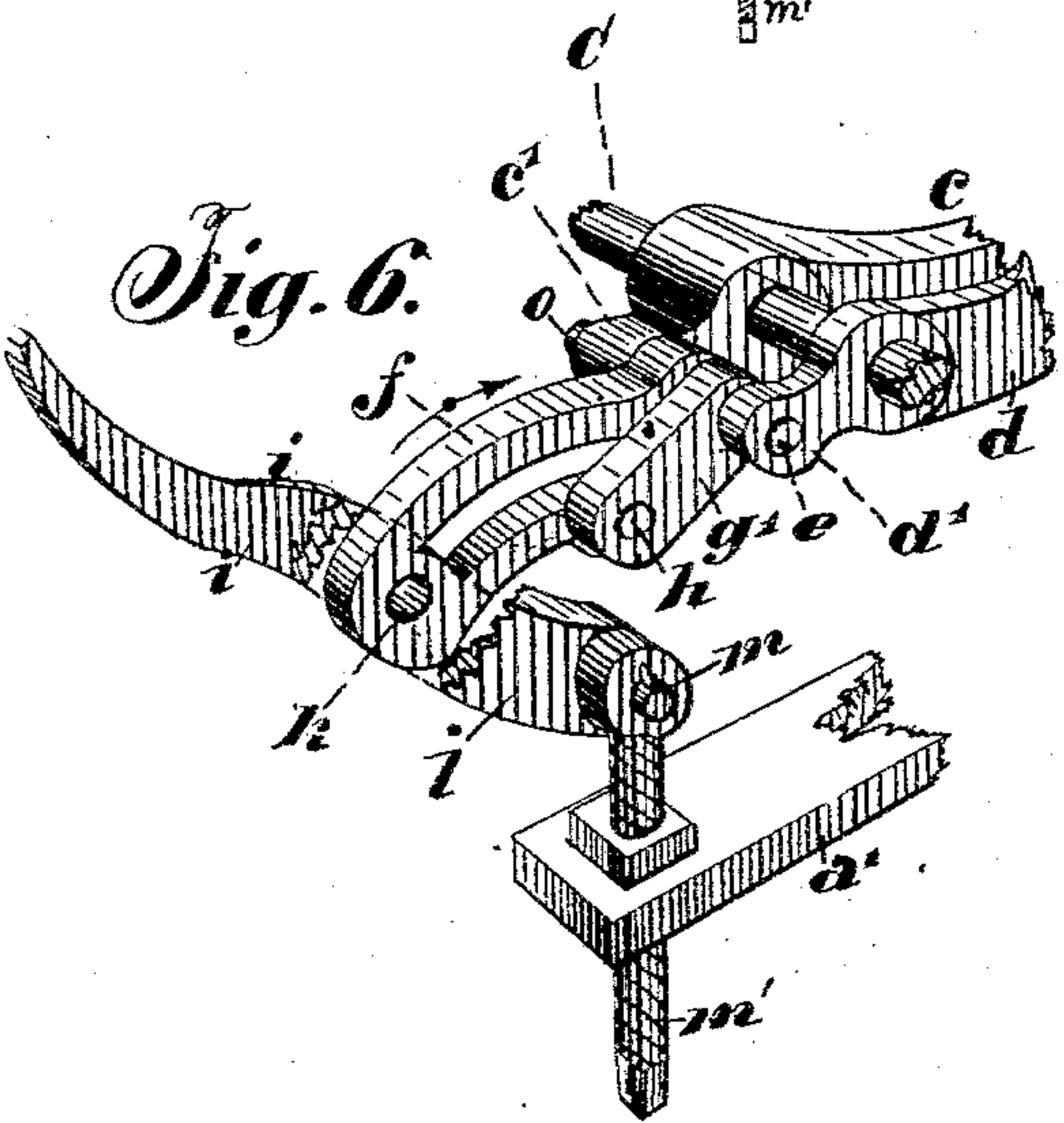


Fig. 7.

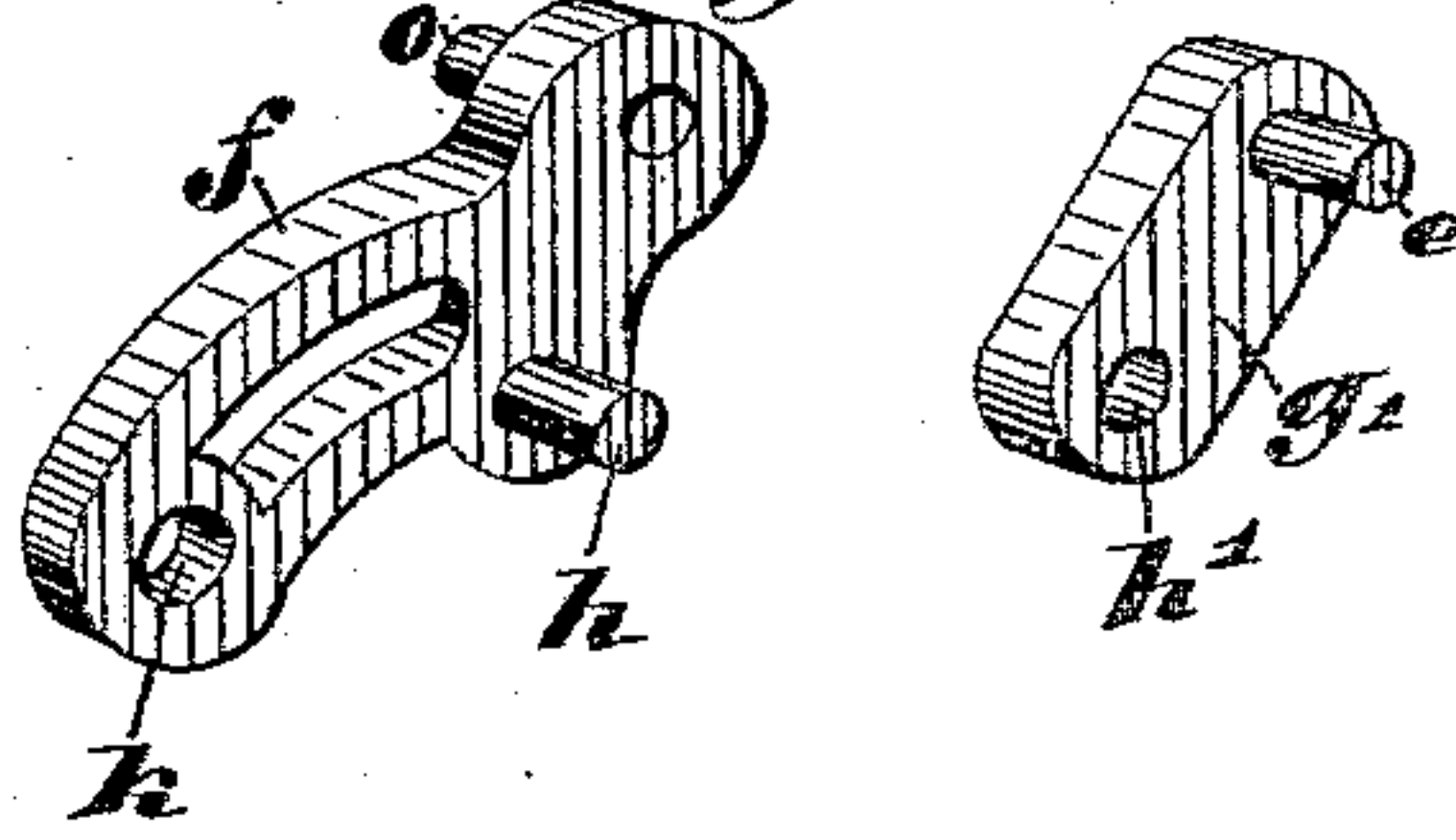
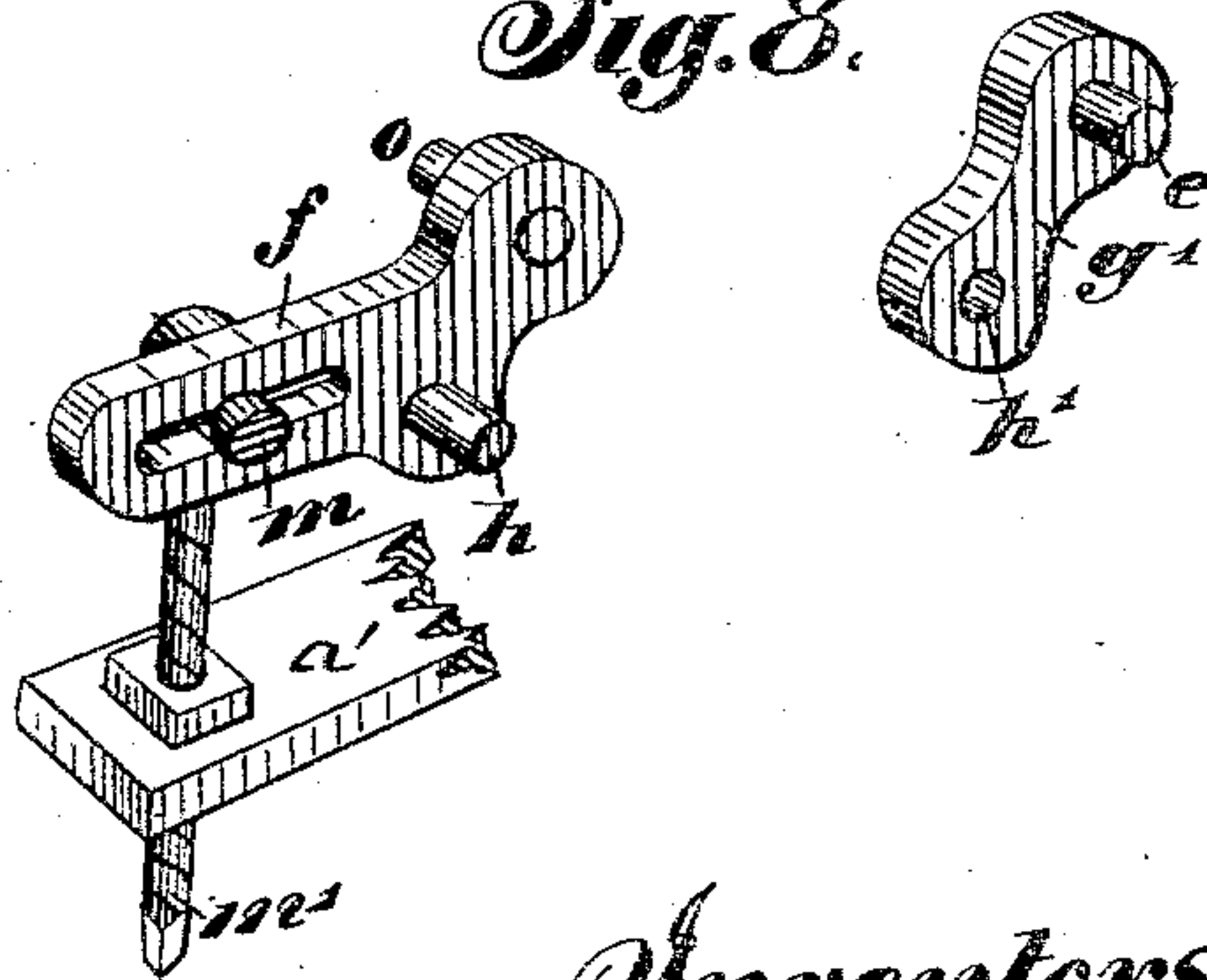


Fig. 8.



Witnesses:

*John F. Stewart
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UNITED STATES PATENT OFFICE.

LORENCE FECHER, JR., AND WILLIAM F. OLIN, OF CHICAGO, ILLINOIS,
ASSIGNORS TO WILLIAM DEERING, OF SAME PLACE.

GRAIN-BINDER.

SPECIFICATION forming part of Letters Patent No. 315,754, dated April 14, 1885.

Application filed January 16, 1883. (Model.)

To all whom it may concern:

Be it known that we, LORENCE FECHER, Jr., and WILLIAM F. OLIN, citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Needle Guards or Separators for Grain-Binders, of which the following is a full description, reference being had to the accompanying drawings, in which—

Figure 1 is an end elevation of the binder of which our invention forms a part, as seen from the gear end, and shows the needle and its appurtenances in two positions. Fig. 2 is a side elevation as seen from the left side of Fig. 1, showing the general form of the frame. Fig. 3 is an end view from a direction opposite that from which the machine is seen in Fig. 1, showing the relative positions of the needle, its guard, and the compressor when retracted. Fig. 4 shows the same parts as Fig. 3, but with the needle-guard and compressor in their active positions. Fig. 5 is a cross-section of the needle and the guard or separator. Figs. 6, 7, and 8 are perspective views of the needle, compressor, needle-guard, and linking mechanism.

The parts shown in Fig. 8 are modifications, as will be explained.

In the drawings, A is a cast-metal frame supported on suitable frame-work of the harvester to which the binder is attached; and it consists of two parallel sleeves connected by a standard, the whole forming an angular letter U lying upon its side. Through the upper sleeve, A', the shaft B passes, and upon this shaft at the standard end of the frame is keyed the gear-wheel *b*, as shown in Figs. 1 and 2. To the opposite end of the shaft B, which protrudes through the overhung end of the sleeve, is keyed the knoter-driving gear *b'*. The knoter-frame G is loosely hung on this shaft between the end of the sleeve and the knoter-driving gear, and may be braced in the usual manner. The office of the wheel *b* is to receive power from the harvester-gearing and to distribute it to the parts of the binding mechanism.

C is the needle-shaft passing through the sleeve A² of the frame, and having the needle *c* keyed to it at the overhung end of said

sleeve, in line with the band-securing mechanism, in the usual manner.

E is a crank keyed to the said shaft in line with the gear-wheel *b*. The gear-wheel *b* is provided with the wrist-pin *g*, forming a crank whose throw is a little less than that of the crank E, so that when the two are connected by the pitman F, as shown in Figs. 1 and 2, the revolution of the wheel will not cause the shaft C to revolve, but will impart a vibratory motion to it, and hence to the needle *c*.

t is the tyer, and H is a breastplate lying between the latter and the bundle of grain, thus forming one side of the gavel-receptacle, and which is slotted to permit the passage of the needle in its movement to carry the twine to the tyer. This breast-plate is secured to the tyer-frame and to the frame-work of the binder in any suitable manner.

I are cheek-pieces projecting downward from the breastplate, one on each side of the slot through which the needle-point passes.

J, Figs. 3 and 4, is the grain-table, and it and the cheek-pieces I constitute the limits of the throat through which the grain is carried in the direction indicated by the arrow in Fig. 1.

a a and *a'* are parts of the harvester framework, only the latter, however, performing any office other than a mere rest for the binder-frame.

d is the needle-guard or separator arm, its purpose being to separate the incoming grain from that being bound, and hold back the same from drawing under the needle. The needle is of a common form and rocks with the shaft, while the guard or separator arm is of the same general shape, but made to partly incase the needle, as shown in section in Fig. 5. The needle and guard or separator arm are mounted upon the same shaft; but while the former is fixed thereon so as to be vibrated with it, the latter is loosely mounted thereon, and is vibrated by means of mechanism connected with the needle, as hereinafter described. The needle has a heel, *c'*, provided with an eye, through which the pin *o* in the link *f* passes. The guard or separator arm has also a heel, *d'*, similar to that of the needle, its eye receiving the pin *e* of the short link *g'*. The link *f* is also provided with a pin,

h, which enters the eye *h'* of the link *g'*. It will be seen that the link *f*, being pivoted to the heel of the needle, will be carried therewith. To make this link operate properly its other end must be guided. For this purpose we have shown two means. One consists of a connection through a pivot at *k* with the arm *i*, connected to the pivot *m*, as shown in Figs. 6 and 7, and the other as shown in Fig. 8, where the link is slotted and moves on the fixed pin or pivot *m*. We prefer the former method, as it enables us to connect the compressor *i* with the needle, so as to be operated thereby.

So far as explained the arm *i* is but a guide for the end of the link *f*; but by extending this arm upward we make it perform the office of a compressor, and we make the link *f* the means for causing the compressor to approach the needle to compress the bundle and to recede as the needle is retracted to permit the discharge of the bundle. The compressor *i* is pivoted by the pin *m* to the bolt *m'*, and to it just below its middle is pivoted the outer end of the link *f*, a pin passing through the eyes *k* in both of the parts. The bolt *m'* is provided with an eye to receive the pivot-pin *m*, and is threaded and passes through a hole in the part *a'* of the frame-work. A nut above and below serves to adjust the height of the bolt as well as to secure it firmly to its base or support. The needle is given a vibration equal to about one-third of a revolution, as shown in Fig. 1, where the extreme positions are shown in full and dotted lines. The position of the heel *c'* of the needle is such that when the latter is withdrawn downward with the separator-arm *d* the eye at *o* in said heel shall be nearly as high as the center of the needle-shaft *C*, and the eye at *e* in the heel *d'* of the separator-arm shall be at substantially the same height. The eye at *o* in the heel of the needle being the source of movement of the other parts, the path of its movement will now be considered. This movement is in the arc of a circle in a vertical plane, the eye moving both in a vertical and a horizontal direction. Now, we connect our linking device in such a manner that only the vertical movement, or but little of the horizontal movement, of said eye will be imparted to the guard or separator, so that the latter will be moved somewhat less than one-half the distance upward that the needle moves, and while the needle makes a full stroke upward the separator stops half-way, such half-way position being shown in dotted lines in Fig. 1, and in full lines in Fig. 4, just across the throat formed by the cheek-pieces and table. As the needle moves, the link *f*, being pivoted thereto at one end by the pin *o*, will be carried in the direction indicated by the arrow in Fig. 6, and its other end, being pivoted to the compressor *i*, will be carried in an arc around the pivot *m*.

In the first part of the movement of the needle the link *f*, at the end where it is piv-

oted to the heel *c'* of the needle, will be carried downward, and, through the instrumentality of the link *g'*, the heel *d'* of the separator will be drawn downward; but by reason of the other end of the link *f* moving practically only in a horizontal direction, and the pivot *h* being near the center of said link, and thus moving through a smaller arc than the pivot *o*, the heel of the separator will move with less speed and a shorter distance than the heel of the needle; hence the separator and needle will move nearly together for a short distance. As the heel of the needle approaches its horizontal movement the vertical movement of the link *f* will be less, and will finally practically cease, when the separator will become practically stationary, and will so remain during the completion of the stroke of the needle. While the link *f* is thus being carried along substantially horizontally the link *g'* will simply swing on the pivot *e* and *h*. The power of the needle to move the separator upward ceases about the time the point of the latter is well across the throat; but should extraneous force be applied the separator could follow the needle farther upward. This, however, is prevented by the narrowness of the slot in the breastplate *H*, which will not permit it to pass, yet will allow the needle to go through and onward. In practice the straw itself is sufficient obstruction; but any kind of precautionary stop thought best may be used.

We make what may be termed the "working part" of the separator-arm so long that it will cross the throat so far that slight variations in the throw will not prevent a full closing of the throat through which the grain passes to the receptacle. As the needle is retracted its first movement is to close into the guard or separator, and then accompany the latter to the first position.

We have shown the link *f* as pivoted to the compressor, because it will thereby actuate said compressor; but the compressing mechanism may be moved by some other part than the heel of the needle, and the link *f* can be made, as shown in Fig. 8, with a slot, by which it is guided on the pin *m*.

It is plain that the successful operation of our needle and guard or separator does not depend upon any particular way of controlling the outer end of the link *f*. If the throw of the separator upward should be so little that its point would not fully reach the upper limit of the throat, or, on the other hand, if its upward throw were so great that its arched part would pass beyond the table, a good result would not follow. The adjustable bolt *m'* is provided to remedy all uncertainties on this point.

If attention is directed to Fig. 4, it will be seen that with the parts in the position there shown any adjustment of the bolt *m'* up or down will carry the end of the link *f*, pivoted thereto—through the medium of the com-

pressor-arm *i*—in the same direction. In reality, any adjustment of the bolt will but swing the link on the pin *o* as a pivot and carry the link *g'*, and hence the heel of the separator, up or down, and the separator vibrating on the needle-shaft will have its point carried down or up. If it is desired to depress the point of the separator, the nuts on the bolt *m'* are turned so as to force the bolt upward. A reversal of the adjustment of the bolt will raise the point of the separator.

We are aware that a sheath has already been combined with a needle; but we do not know that it has ever been connected with and operated by the needle itself.

What we claim is—

1. In a grain-binder, the combination of the needle and the guard or separator arm, both supported and adapted to vibrate on co-incident axes, with intermediate link mechanism, whereby a positive motion is imparted from the needle to the guard, substantially as and for the purpose described.

2. The combination of the needle provided

with a heel-extension, the separator-arm, also provided with a heel-extension, and suitable linking mechanism adapted to impart motion from the needle to the separator, and to retain the latter in substantially a stationary position while said needle is completing its stroke, substantially as and for the purpose described.

3. The combination of the needle, the separator-arm, the link *f*, and link *g'*, substantially as described.

4. The combination of the needle, the separator-arm, the linking device, and the adjustable pivot *m*, as and for the purposes set forth.

5. The combination of the needle having the heel-extension, the compressor-arm, and the link *f*, pivoted to said heel-extension and to said compressor-arm, substantially as and for the purpose set forth.

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WILLIAM F. OLIN.

Witnesses:

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JOHN B. KASPARI.