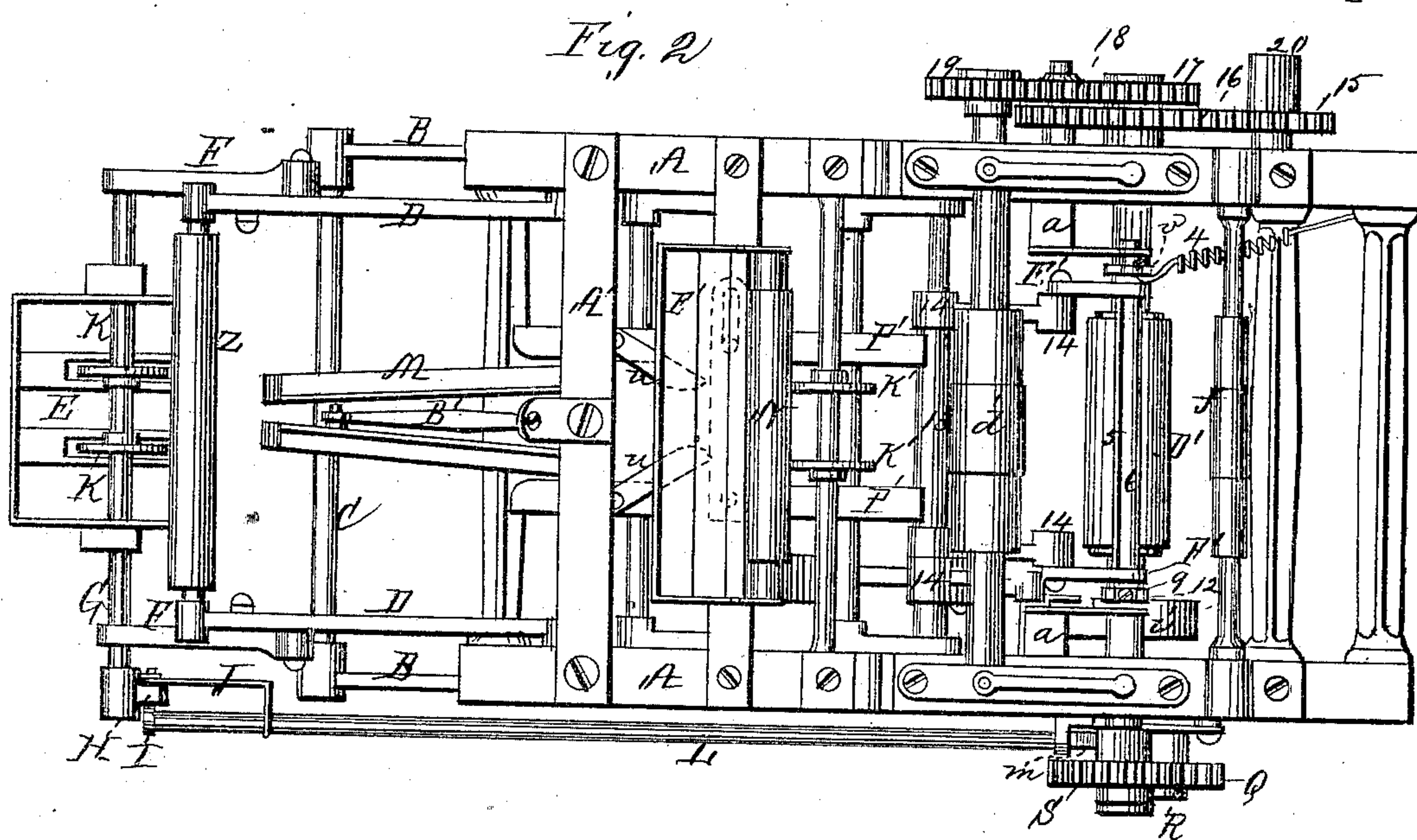
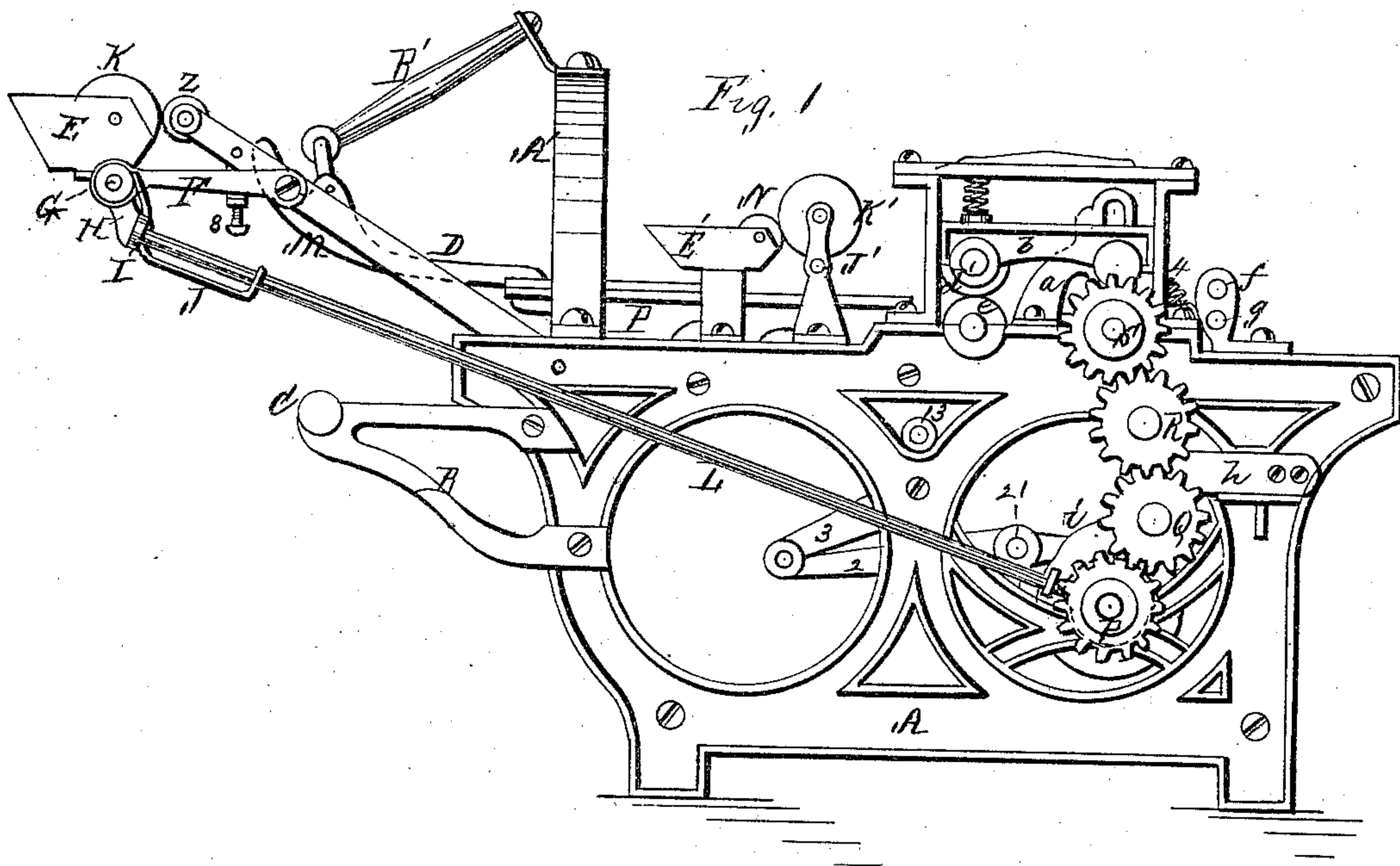


H. S. MERRILL.  
Paper-Bag Machine.

No. 160,782.

Patented March 16, 1875.



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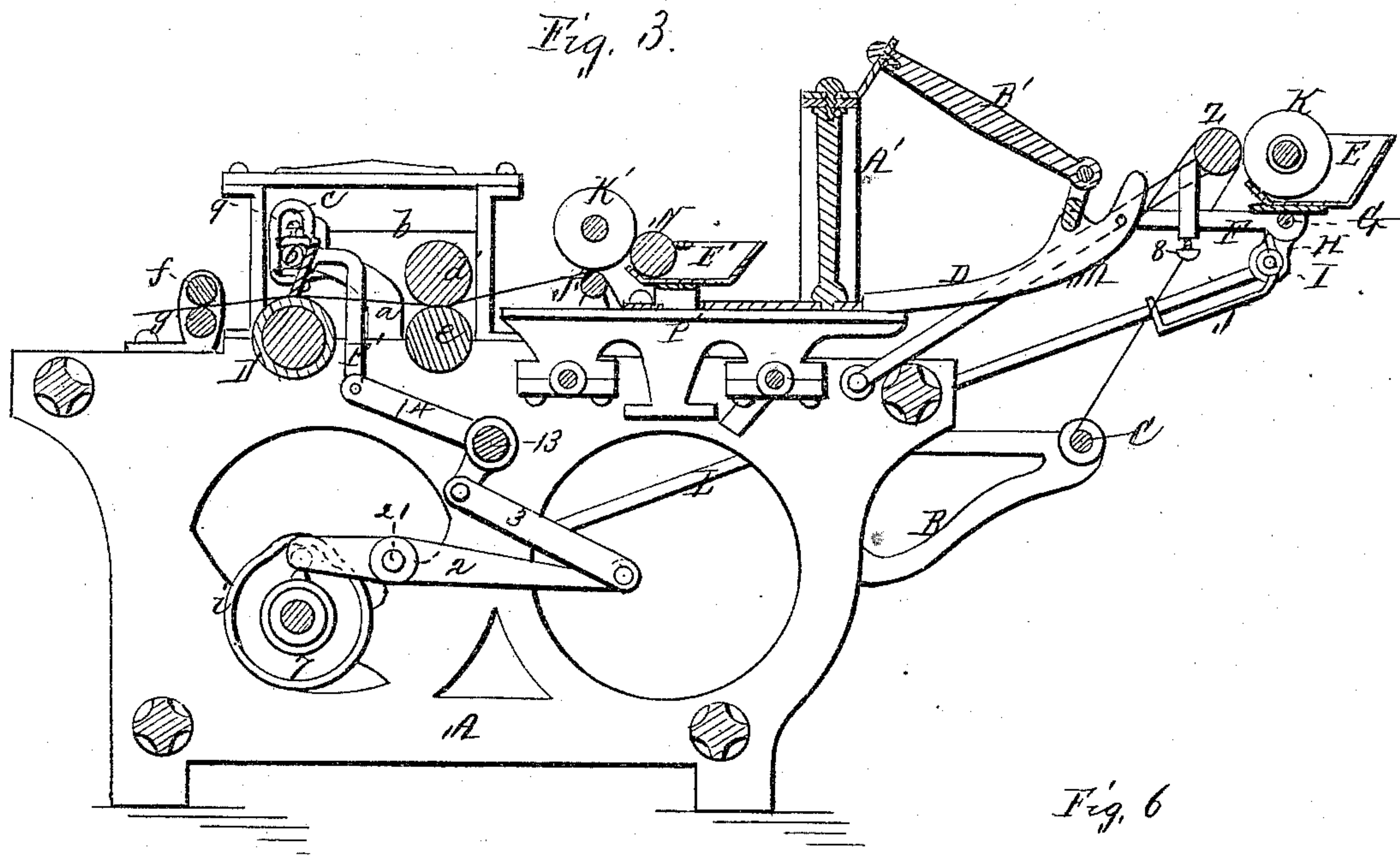
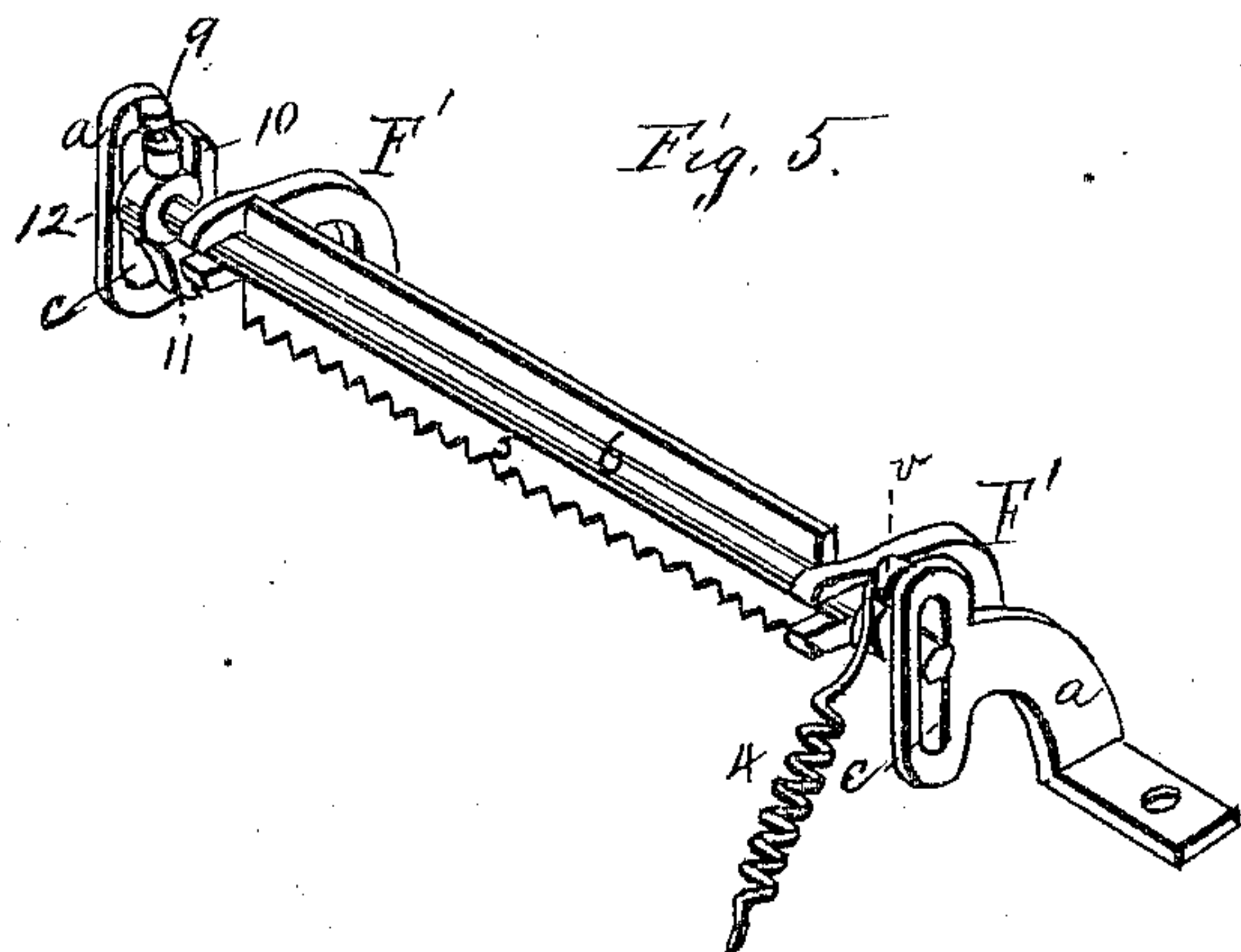
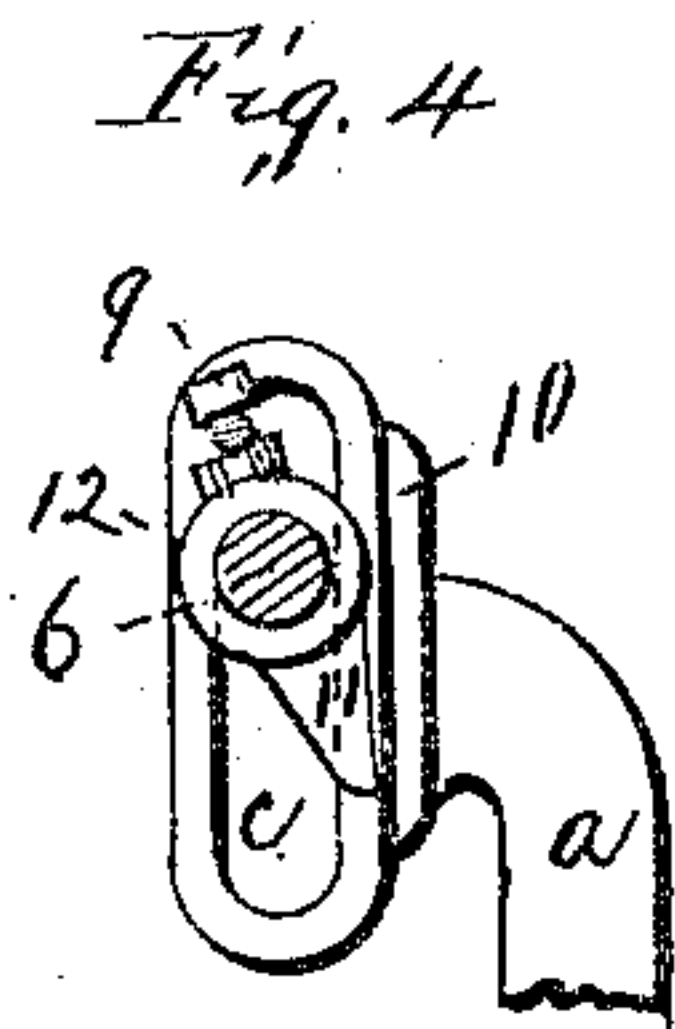


Fig. 6



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# UNITED STATES PATENT OFFICE.

HERBERT S. MERRILL, OF CAMBRIDGE, MASSACHUSETTS.

## IMPROVEMENT IN PAPER-BAG MACHINES.

Specification forming part of Letters Patent No. 160,782, dated March 16, 1875; application filed December 10, 1873.

*To all whom it may concern:*

Be it known that I, HERBERT S. MERRILL, of Cambridge, in the county of Middlesex, State of Massachusetts, have invented a certain new and useful Improvement in Paper-Bag Machines, of which the following is a description sufficiently full, clear, and exact to enable any person skilled in the art or science to which my invention appertains to make and use the same, reference being had to the accompanying drawings forming a part of this specification, in which—

Figure 1 is a side elevation of my improved bag-machine. Fig. 2 is a plan of the same. Fig. 3 is a vertical longitudinal section, showing the knife mechanism. Fig. 4 is a sectional view, showing the method of adjusting the knife. Fig. 5 is a perspective view of the knife and its immediate adjuncts. Fig. 6 is a cross-section of the paper in process of folding.

Like letters refer to like parts in the different figures of the drawing.

My invention relates more especially to that class of paper-bag machines which manufacture the bags or sacks complete from a continuous flat strip of paper, or directly from the roll; and consists in a novel construction and arrangement of the parts, as hereinafter fully set forth and claimed, by which a more effective machine of this character is produced than is now in common use.

To avoid as detailed an explanation as might otherwise be necessary, I will state that Letters Patent of the United States were granted to Charles F. Annan for certain improvements in paper-bag machines, December 27, 1870, No. 110,536, and February 14, 1871, No. 111,802, and February 14, 1871, No. 111,803, and January 7, 1873, No. 134,580. Letters Patent for an improvement in paper-bag machines were also granted to L. C. Crowell, October 14, 1873, No. 143,674; and Letters Patent for an improvement in paper-cutters were granted to James Arkell and others, August 22, 1871, No. 118,327.

In the patents referred to various mechanical devices are described, which are thereby secured; and also various devices and parts not so secured, which are common to nearly all paper-bag machines of the present day.

While an examination of said patents will assist materially in understanding my invention more readily, it will be seen that my present improvements are not embodied therein.

I therefore do not herein claim anything shown or described in either of said patents when in and of itself considered, and make reference to them for the purpose of showing the present state of the art, and for a better understanding of my improvements.

I am also aware that in the English patent No. 2,724, granted in 1859, pasting-wheels are described, which act to paste the paper in combination with certain brush-wheels, but the wheels and their trough or box do not move with a vibratory motion and conjointly, as in my improved machine, and are arranged in an essentially different manner in other respects. An intermediate roller is also described in said English patent, but it is placed on a line with the feeding-rollers, and carries a flat strip of paper; whereas mine is mounted or elevated considerably above the point of contact between the feeding-rollers, and combined with another roller, N, being so arranged as to complete the folding of the edges of the paper, and deliver it in proper shape to the feeding-rollers, as herein described. The receiving feeding-rollers in said English patent are also essentially different in their action from the pulling-rollers in my machine, as they run at the same speed of the delivery feeding-rollers, and do not perform the additional function which mine do.

I am also aware that a patent was issued to one Arkell, December 26, 1871, in which the paste-wheels are brought intermittently into contact with the paper, but, unlike mine, they are wholly withdrawn from the paste-trough at each operation, thus exposing their entire surface, causing the paste to dry and harden rapidly, and the machine to work imperfectly.

I am also aware that a patent was granted to one Armstrong, October 2, 1860, in which the feeding-rollers common to all paper-bag machines are described, but their action is essentially different from the pulling-rollers in my machine; also, that in British patent, No. 541, granted in 1853, a series of rollers provided with bosses are shown, but there is no intermediate roller arranged to complete



the folding of the edges of the paper, as hereinafter set forth.

I am also aware that in English Patent No. 1,603 for 1864, mechanism for folding and pasting the edges of the bag is described, but the same is essentially different from that used by me, there being no devices or arrangement for moving the pasting-wheels up to and withdrawing the same from the paper intermittently without removing the wheel from the paste trough or fountain, and no occasion for doing the same, as the bag made on said English machine is folded down the center of the side, the flaps or folds being pasted in a continuous line. I, therefore, do not herein claim anything shown or described in said British patents of 1859, or 1853, or 1864, or said patents of December 26, 1871, and October 2, 1860, when in and of itself considered.

In Fig. 2, A is the frame-work of the machine; B B, brackets carrying the spindle C on which the roll of paper is supported; D D, the supporting-arms of the pasting mechanism; F F, short adjustable arms on which the paste-box is supported; K K, paste-wheels arranged on the shaft G and working in the paste-box E. Attached to one end of the shaft G is a lever, H, through which the stud I passes loosely, forming a kind of toggle-joint. L is a sliding bar, one end of which is made fast in the outer end of the stud I, and the other working in contact with the face-cam *m*. J is a spring coiled around the inner end of the stud I, its respective ends bearing downward upon the lever L and shaft G, so that, by its expansive action, it will have a constant tendency to elevate the joint formed by the lever H and stud I, and thus to keep the lower end of the sliding bar L against the cam *m*. I will here remark, however, that the bar L can be kept against the face of said cam by a spring attached at one end to the main frame-work of the machine, and at the other to a fast collar on said bar. A' is an arch springing from the frame A, and having the brace B', on which the curved guide D is disposed. E' is a paste-box located centrally on the machine, and having the distributing-roller N working in contact with the paste-wheels K' K'. Under said wheels K' K', and arranged in the same supports, is a friction-wheel, J', Fig. 1. P' P' is a former, arranged on supports running transversely through the machine, and provided with the fingers *u u*. A shaft, 13, carries a two-armed lever, 14, which is actuated by the cam *i* and levers 2 and 3, Figs. 1 and 3. D' is a rubber-covered roller, against which the knife 5 works in cutting the paper into sections of the proper length for bags. The main shaft 20 is provided with a small gear, 15, which intersects with the large gear 16 disposed on the shaft D'. Outside of said large gear, and on the same shaft, is a small gear, 17, which intersects with the intermediate gear 18, and through that with the gear 19 disposed on the shaft of the main feed-roll *e*, Fig. 3. Two slotted guides, *a a*, are also at-

tached to the frame A A, in which the journals of the knife-shaft 6, Figs. 3 and 5, move vertically, said journals being supported in the forked levers F' F'. On the opposite end of the shaft from that on which the gear 17 is disposed there is a small gear, *s*, Fig. 1, which, through the intermediate gears R Q, operates the pinion P disposed on the same shaft with the cam *i* and cam *m*, Fig. 2. The lever 2, Fig. 3, has a stud on its short arm working in the groove 7 of the cam *i*, and is supported on the stud 21, which projects from the frame of the machine. A two-armed lever, 14, is supported on the stud 13, its short arm being connected, by the link 3, with the lever 2, and its long arm with the forked lever F', which carries the knife-shaft 6.

Referring to Fig. 5, *a a* are the slotted guides, in which the journals of the knife shaft or axis 6 work. The knife-blade 5 is provided with a serrated edge, and is attached at its center in a vertical position to the shaft or axis 6. On one end of said shaft an adjustable collar, 12, is fastened by the screw 9, said collar being provided with a projection, 11. On the opposite end of the shaft or axis 6 there is a fast collar, V, to the upper side of which one end of the spring 4 is attached, the other end being secured to the frame, as in Fig. 2, said spring working by contractile action through said collar V to rotate the knife on its shaft 6, which rotation is prevented by the projection 11 on the collar 12 coming into contact with the lip or projection 10 of the guide *a*. This action of the spring 4 and collars V and 12 and stop 10 holds the knife in a vertical position until its edge is moved forward by the action of the rubber roller D', Fig. 2, and by the pulling-rollers, Fig. 1, as hereinafter more fully described.

In view of the references to other patents herein given, it is not deemed necessary to describe in detail the full operation of the machine shown in the accompanying drawings, or to set forth in detail the entire process of making a bag on such machine.

The roll of paper or blank from which the bags are made is supported on the spindle C, Fig. 3, and passes thence upward over the leading-roller Z, thence obliquely downward, under the curved guide M through the former P', thence obliquely upward over the intermediate roller J', thence downward through the feeding-rollers *d' e*, thence horizontally over the rubber-covered roller D', and through the pulling-rollers *f g*.

Power being applied to the main shaft 20, Fig. 2, motion will be communicated through the train of gears 15, 16, 17, 18, and 19 to the main feeding-rollers *d' e* and rubber-covered roller D', and through the gears S, R, Q, and P, Fig. 1, to the cam *i*, cam *m*, and sliding bar L, and through the lever 2, link 3, lever 14, and forked lever F' to the knife 5. The gears R R, Fig. 1, are supported on studs projecting from the plate *h*, which is attached to and made adjustable on the frame A, so that by



moving said plate away from or nearer to the gears S and P, larger or smaller gears may be substituted for the gears R Q, and thus the feed of the machine be changed, or the length of the bag be determined, as more fully set forth in said patent No. 111,802.

From the foregoing it will be understood by all conversant with such matters that when power is applied to the shaft, as aforesaid, the strip of paper being in the machine, as described, and the paste-boxes filled with paste, the paper will be fed or carried forward to the knife by the rollers, and cut off or severed at proper intervals, the strip of paper being also pasted intermittently at the same time.

As my present invention relates more especially to the pasting mechanism, the intermediate rollers, and the cutting mechanism, I will describe these features and their merits in the order mentioned.

In Fig. 2 the cam *m* is so formed and arranged on its shaft as to slide or push the bar L upwardly at regular intervals, thus acting through the lever H and rocker-shaft G to bring the paste-wheels K K, Fig. 2, against the edges of the paper, as it passes over the roller Z, and retain them there, as the paper is drawn over said roller, long enough to properly paste a single blank or bag; and the cam *m* is also so formed and arranged as to release or allow said bar L to be pushed downwardly at regular intervals by the action of the spring J, thus permitting the spring J, by its expansive action, to partially rotate the shaft G and throw the rollers K K out of contact with the paper passing over the roller Z, by which said paper will be pasted intermittently, as will be readily understood. The strip of paper, on its way through the machine, after having its edges partially folded down by the former P' P', Fig. 2, will, on its way from said former to the feeding-rollers *d' e*, Fig. 1, have a tendency to assume the form shown in Fig. 6, or to unfold, and if it enters the rollers *d' e* in this state the edges will be "crimped" and the bag, when finished, be imperfect. To obviate this difficulty, I have provided the intermediate roller J', working in connection with the paste-box E', roller N, and paste-roller K', the said roller J' being elevated above the point of contact between the feeding-rollers *d' e*. This arrangement, by carrying the strip of paper upward and over said roller J', "creases" or folds down the edges perfectly preparatory to entering said feeding-rollers.

The rollers *d'* and *f*, Fig. 2, are provided with bosses in the center, which serve to keep the bodies of said rollers up from the pasted edges of the paper, the said bosses being narrow enough to pass between said edges in feeding the paper along through the machine,

thus preventing the paper, by reason of the paste coming in contact with said rollers, from tending to wind around them, as it otherwise would.

In Fig. 3, the lever 2 being in the horizontal position shown, as the cam *i* is revolved, (a pin in the short arm of said lever, provided with a friction-roller, being in the groove-cam 7,) said short arm will be depressed and the long arm raised correspondingly, thus, through the link 3, causing the long arm of the lever 14 to be elevated, raising the forked lever F' and knife 5. The cam *i*, continuing to revolve, will in due time be brought again into the position shown in Fig. 3, producing a reverse action on said levers, and bringing the serrated edge of the knife forcibly into contact with the folded and pasted paper passing over the roller D', which roller, continuing to revolve, will carry the lower edge of the knife forward a short distance with it until the knife is again raised by the action of the cam *i*, thus preventing the tearing of the bag, which would occur if said knife did not have such forward movement.

The rollers *f g*, Fig. 1, I denominate "pulling-rollers," the same being geared to the other machinery, (gears not shown,) and so speeded as to exert a slight pulling action on the strip of paper, so that when the knife descends and produces the cut, as described, these rollers aid very materially in severing the paper properly and at the right time, and on the line of incision made by said knife, as will be readily understood.

It will, of course, be understood that after the bag passes through the pulling-rollers, as described, the ordinary mechanism (not shown) will be required to properly finish it.

Having thus described my invention, what I claim is—

1. In a machine for making paper bags from a continuous strip of paper, the following instrumentalities, to wit: a pasting mechanism for pasting the paper prior to its entrance into the former, in which mechanism the paste-distributing wheel, moving conjointly with the paste-box, and, without being withdrawn from said box, is intermittently brought into contact with, and removed from, the paper, substantially in the manner and for the purpose specified.

2. The cutting mechanism described, consisting of the knife 5, the collar 12, projection 11, collar V, spring 4, roller D', and forked lever F', combined with the pulling-rollers *f g*, to operate substantially as specified.

HERBERT S. MERRILL.

Witnesses:

CHARLES LETTS,  
CHAS. A. SHAW.