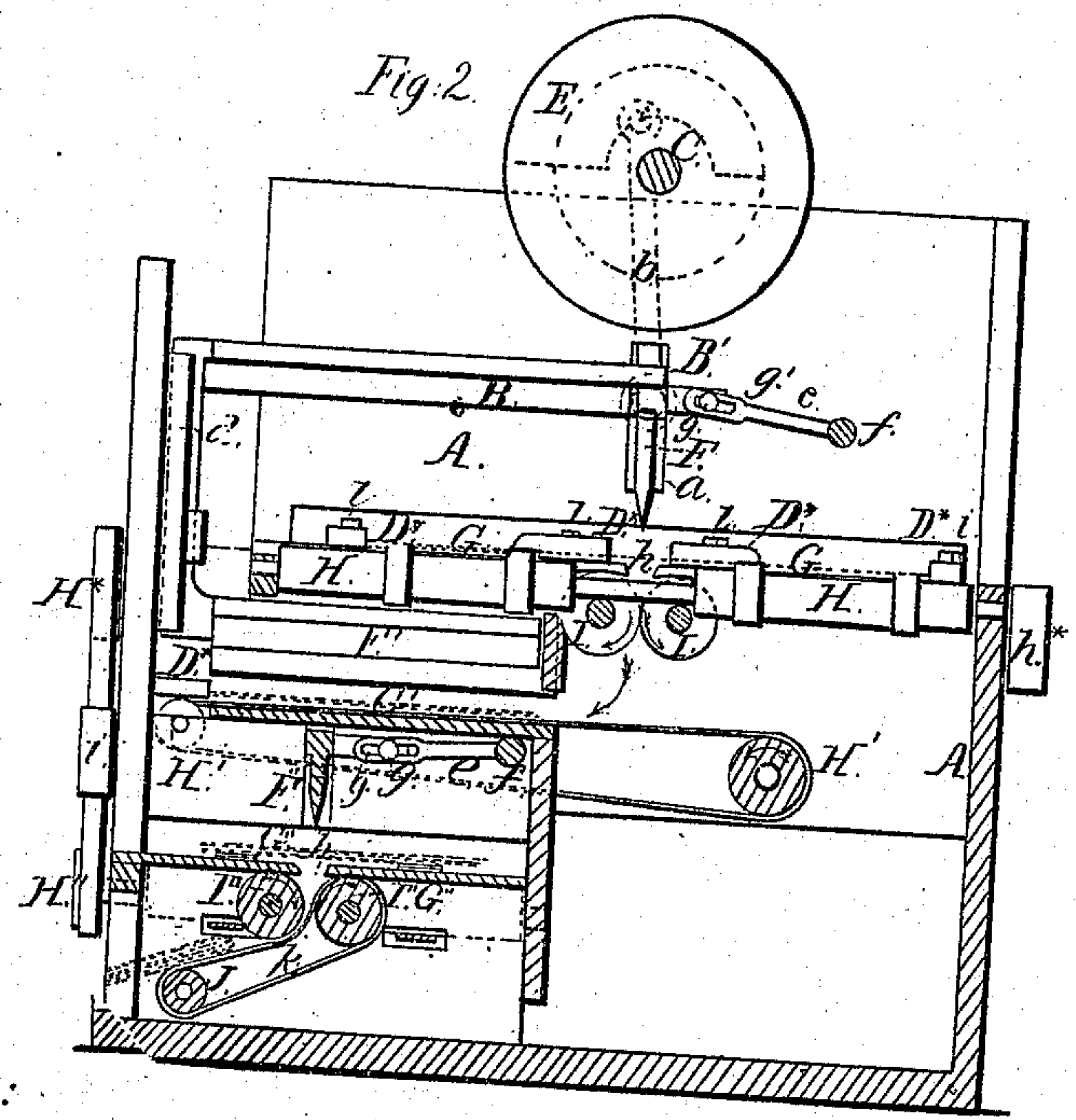
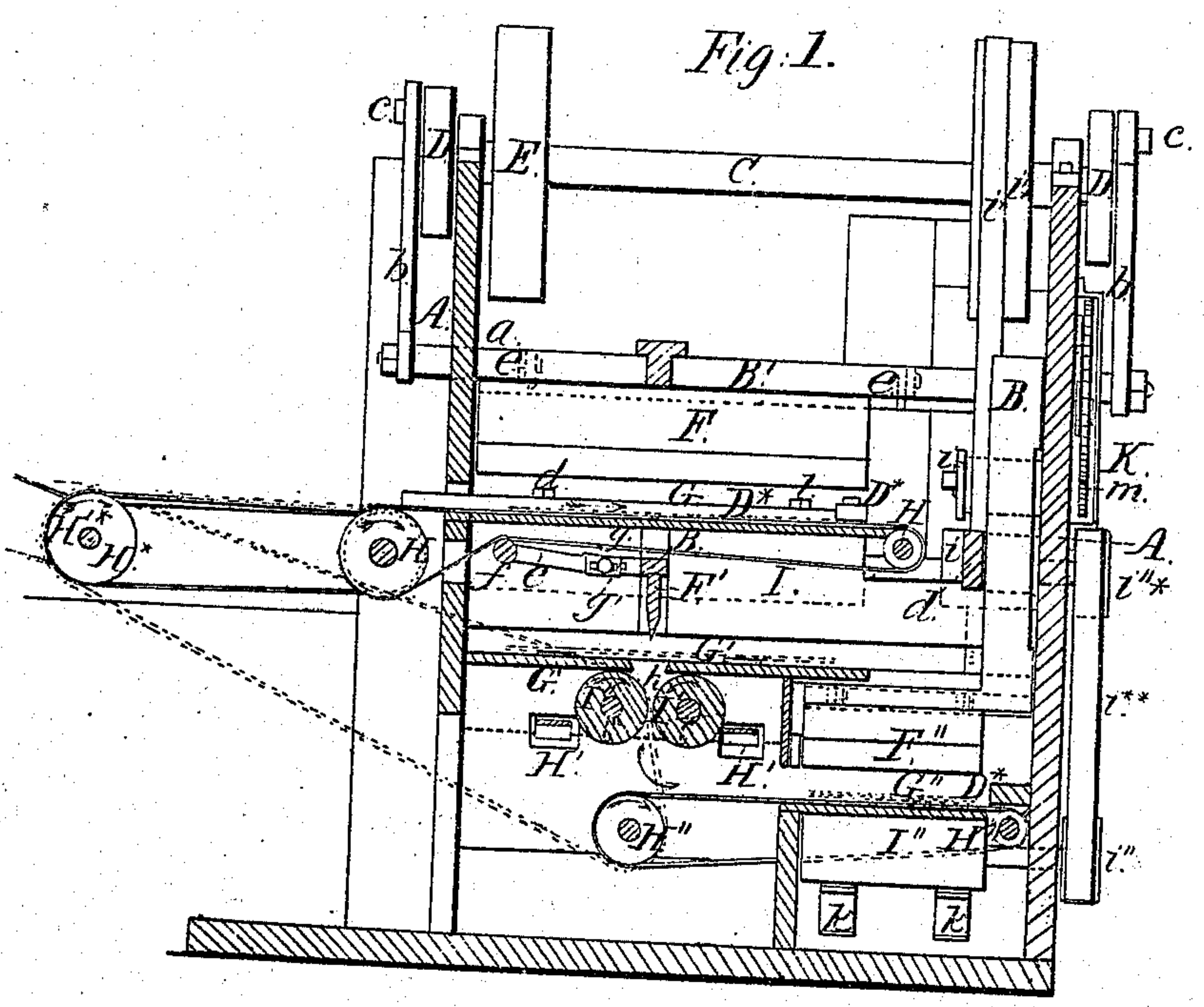


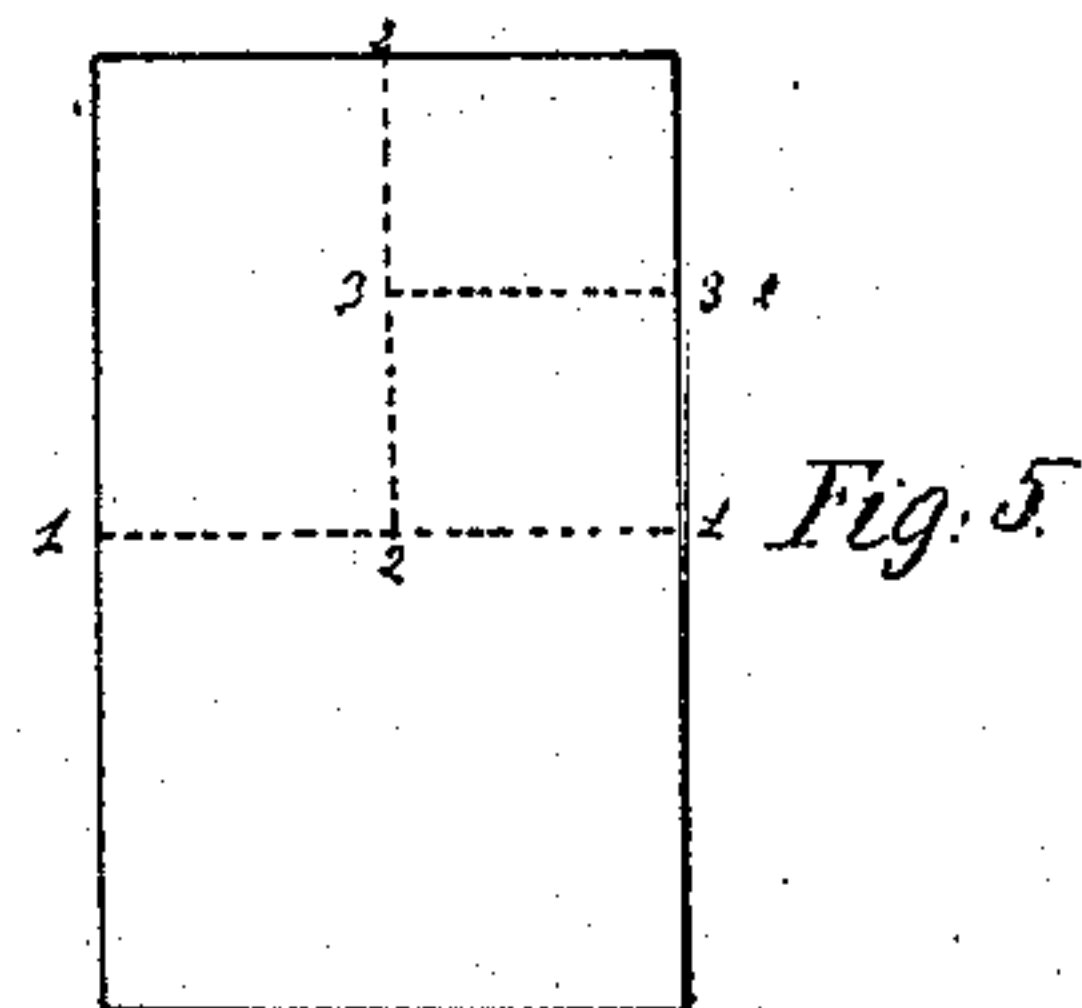
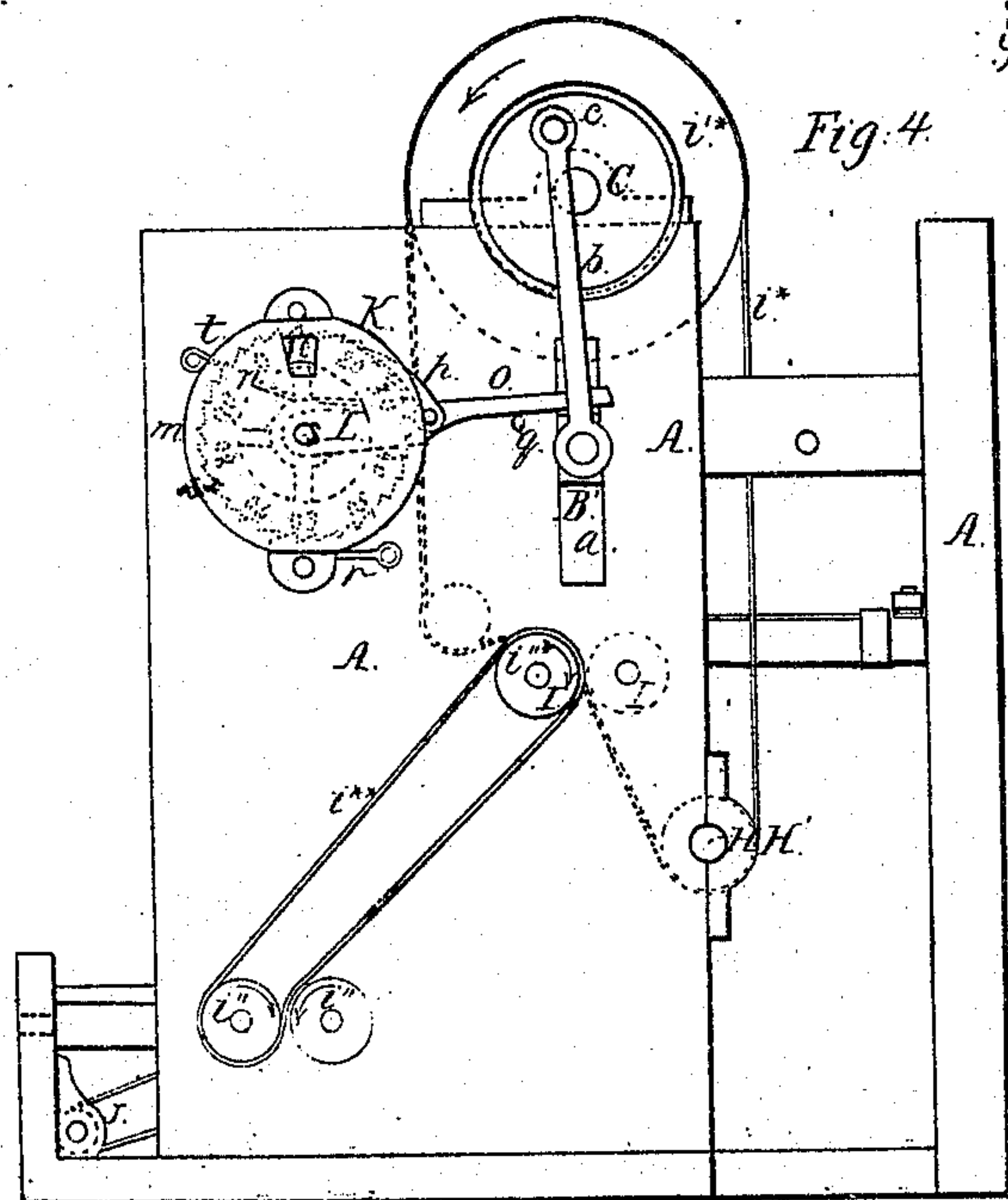
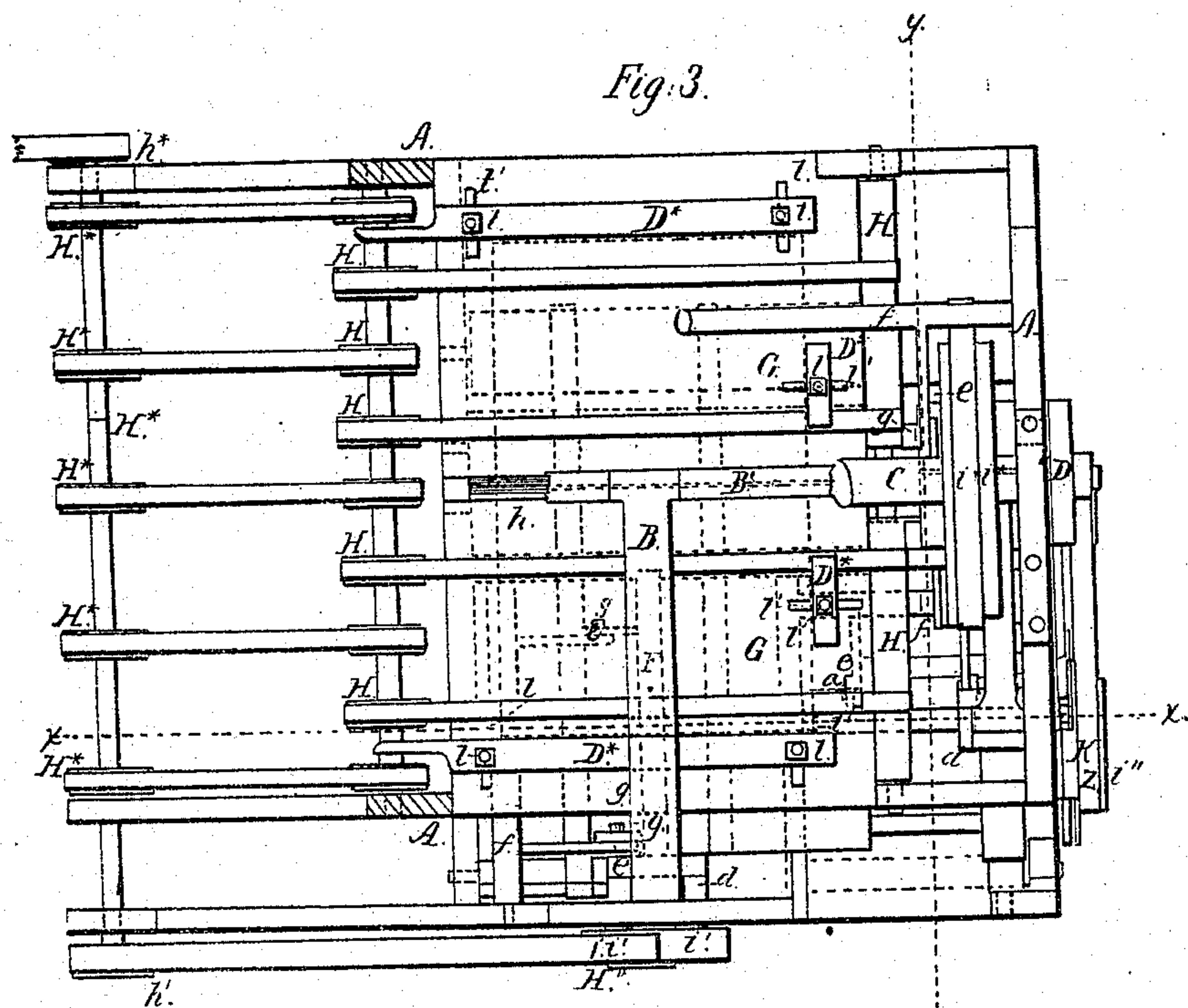
A. F. Endriss.  
Impr'd. Machine for folding Paper.  
No. 23,161.  
Patented March 8, 1859.



Witnesses:  
R. Bockley  
J. Hughes and

Inventor:  
A. F. Endriss

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*Imp'd. Mach. for folding Paper*  
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Witnesses:  
*R. Beckley.*  
*J. Hughes and*

Inventor.  
*A. F. Endriss.*



# UNITED STATES PATENT OFFICE.

A. F. ENDRISS, OF NEW YORK, N. Y.

## MACHINE FOR REGISTERING AND FOLDING PAPERS.

Specification of Letters Patent No. 23,161, dated March 8, 1859.

*To all whom it may concern:*

Be it known that I, A. F. ENDRISS, of the city, county, and State of New York, have invented a new and Improved Machine for Folding and Registering Sheets of Paper; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1, represents a vertical longitudinal section of my machine, the line *x, x*, Fig. 3, indicating the plane of section. Fig. 2, is a transverse vertical section of ditto, taken in the plane indicated by the line *y, y*, Fig. 3. Fig. 3, is a plan or top view of the same, a portion of the upper part of the frame and of the driving shaft being removed. Fig. 4, is a front elevation of the same, intended to exhibit more particularly the apparatus which I employ for registering the folded sheets. Fig. 5, is a plan or top view of a sheet of paper representing the lines in which it is to be folded.

Similar letters of reference indicate corresponding parts in the several figures.

This invention consists in making the required bend into a sheet of paper by means of folding knives which are placed over a gap made in the top of horizontal tables and in such relation to two rollers which revolve in opposite directions, under the tables, that a sheet of paper on the table is depressed by the knives between the rollers where it is caught and folded over by being drawn through between these rollers; and it further consists in connecting with a frame in which a series of such folding knives are arranged, a registering apparatus, so that by registering the strokes of the frame, the correct number of sheets folded by the knives is registered.

To enable others skilled in the art to fully understand and construct my invention, I will proceed to describe its construction and operation.

A, is a rectangular frame, of wood, or other suitable material, in which a sliding frame B, is made to move up and down by means of a driving shaft C. The top bar B', of the sliding frame extends through slots *a*, in the sides of the frame A, and it is connected by rods *b, b*, to the wrist-pins *c*, of two cranks D, which are attached to the ends of the driving shaft C. A band-wheel E serves to give motion to this shaft and

the frame A, is placed in such a position that motion can be imparted to the band wheel E, from some part of a printing press, the printed sheets from which are fed directly to my folding machine in order to be folded.

Guides *d*, attached to the sides of the frame A, serve to guide the sliding frame B, in its up and down motion, and it is further steadied by means of rods *e*, which are attached to rocking bars *f*, and which connect with the frame B, by means of pivots *g*, working in slots *g'*, in their ends.

F, F', F'', are the folding knives which are placed in the frame B, one above the other and at right angles to each other so that they bend the sheet in the proper lines, and tables G, G', G'', are arranged under the knives, each of these tables to be cut in two so as to leave gaps or spaces *h*, amply large for the knives to pass through and a series of tape rollers H, H', H'', serve to feed the sheet of paper to the tables on which they are arrested in the proper position by means of gages D\*, which are adjusted by means of screws and nuts *l*, working in slots *l'*, according to the size of the sheet. The first series of tape rollers H\*, is attached to an axle H\*, which receives motion from the printing press by means of a band wheel *h\**, and motion is imparted from the rollers H\* to the several rollers H and H'', which bring the sheets to the tables G and G'', respectively, while the rollers H', which carry the paper to the table G', are set in motion by the band *i\**, which runs over a pulley *i''\**, on the driving shaft C, and between the ends of the rollers I I, as clearly represented in Fig. 4.

Three pairs of rollers I, I', I'', are placed under the tables G, G', G'', the arbors of the two rollers constituting one pair, being parallel to each other and to a line drawn in a longitudinal direction through the center of the gap *h*, in the table to which said pair of rollers belongs, and at such distances from said line that the rollers nearly touch each other right under the center of the gap *h*, the rollers I, belonging to the table G, the rollers I', to the table G', and so on, as indicated by the number of strokes attached to the respective letters.

Motion is imparted to the rollers I, by means of band wheels *i*, which receive motion by means of the band *i\** from the pulley *i''\**, placed on the driving shaft C, and a pulley



$i''^*$ , attached to the outer end of the axle of one of the rollers I, serves to give motion to the rollers I'', by means of band wheels  $i''$ , and a band  $i''^*$ . The rollers I', are provided  
 5 with band wheels  $i''$ , at the ends of their axles and they receive motion from a pulley  $h'^*$ , placed on the axle H'^\*, at the end opposite to the one occupied by band wheel  $h^*$ , and the rollers I, as well as the rollers I',  
 10 and I'', rotate in opposite directions as indicated by the arrows placed on their respective sections in Figs. 1 and 2, so that when a sheet of paper is placed on one of the tables G, G', G'', and depressed in the gap,  $h$ ,  
 15 by the folding knife F, the rollers I, catch hold of it (the sheet) and carry it down between them.

The last pair of rollers I'', are connected by a band  $k$ , with the roller J, which serves  
 20 to carry off the folded sheets. On the front side of the frame A, a registering apparatus K, is attached, which is represented in Fig. 4, and which consists of a ratchet wheel  $m$ , to which a dial plate  $n$ , is attached and  
 25 which is operated by a lever  $o$ , which receives motion from that part of the top bar B', of the sliding frame B, which projects beyond the sides of the frame A. A pawl  $p$ , is attached to the lever  $o$ , and gears into the  
 30 ratchet wheel  $m$ , and a pin  $q$ , prevents the lever from dropping down any farther than necessary. A spring hook  $r$ , arrests the ratchet wheel  $m$ , so that it can be moved in one direction only. The lever  $o$  vibrates on  
 35 the same pivot  $s$ , which forms the arbor for the ratchet wheel  $m$ , and a spring  $t$ , depresses the lever on the bar B'. A case L incloses the ratchet wheel  $m$ , and dial plate  $n$ , and the latter is marked with figures one  
 40 of which is exhibited through an opening left for this purpose in the case.

The operation is as follows: As soon as the printing press is started, the driving shaft C, receives motion and the first sheet  
 45 of paper which is printed is carried on the table G, by means of the tape rollers H\* and H, where it is arrested in the proper position by the gages D\*, and the folding knife F, descends and bends the sheet down  
 50 through the gap  $h$ , left in the table G, where it is caught and carried down to the tapes running over the tape rollers H'. By this operation the sheet of paper has been folded over once, in the line 11, of Fig. 5. The  
 55 tape rollers H', carry the sheet thus folded to the second table G', where the knife F',

operates on it in the same manner, and the rollers I', fold it over for the second time, in the line 22, Fig. 5, and deposit it on the tapes running over the rollers H<sup>2</sup>, which  
 60 carry it to the table G'', where it is folded over for the third time, in the line 33, Fig. 5, by the operation of the knife F'', from which it is taken off by the action of the band  $k$ , running over the roller J. It is ob-  
 65 vious that the paper may be thus folded as often as desired, and as the sheets are always arrested in the required position over the gaps  $h$ , in the tables G, G', G'', by means of the gages D\* the folding is done  
 70 quite as nicely as it can be done by hand. At the same time each sheet so folded by this arrangement is registered by the operation of the sliding frame B, on the lever  $o$ , with-  
 75 out fail as each stroke of the frame raises the end of the lever  $o$ , once, and the ratchet wheel  $m$ , together with the dial  $n$ , is moved for the space of one tooth. This manner of attaching the registering apparatus is supe-  
 80 rior to the usual manner of operating the same by means of bands and pulleys, where it is very difficult to get at the exact number of sheets folded by the folding apparatus, while my manner of imparting motion to the  
 85 registering apparatus, insures a correct result.

I am well aware that folding knives arranged in relation to horizontal tables and folding rollers, in a manner very similar to that which I employ, have been before used;  
 90 those however were arranged in different frames, making the machinery necessary to operate them very complicated and difficult to manage. I do not claim therefore the arrangement of folding knives in relation to  
 95 horizontal tables and folding rollers. But

What I claim as new and of my invention, and desire to secure by Letters Patent, is—

1. The arrangement of a series of folding knives F, F', F'', at right angles to one  
 100 another, in the same sliding frame B, which is constructed and operated substantially as set forth.

2. And I also claim arranging the sliding frame B, in such a manner that it operates  
 105 a registering apparatus K, by means of a lever  $o$ , substantially as and for the purpose specified.

A. F. ENDRISS.

Witnesses:

T. STUYVESANT,  
 R. BOAKLER.