

(No Model.)

2 Sheets—Sheet 1.

G. I. FRANCIS.
TYPE WRITING MACHINE.

No. 448,646.

Patented Mar. 24, 1891.

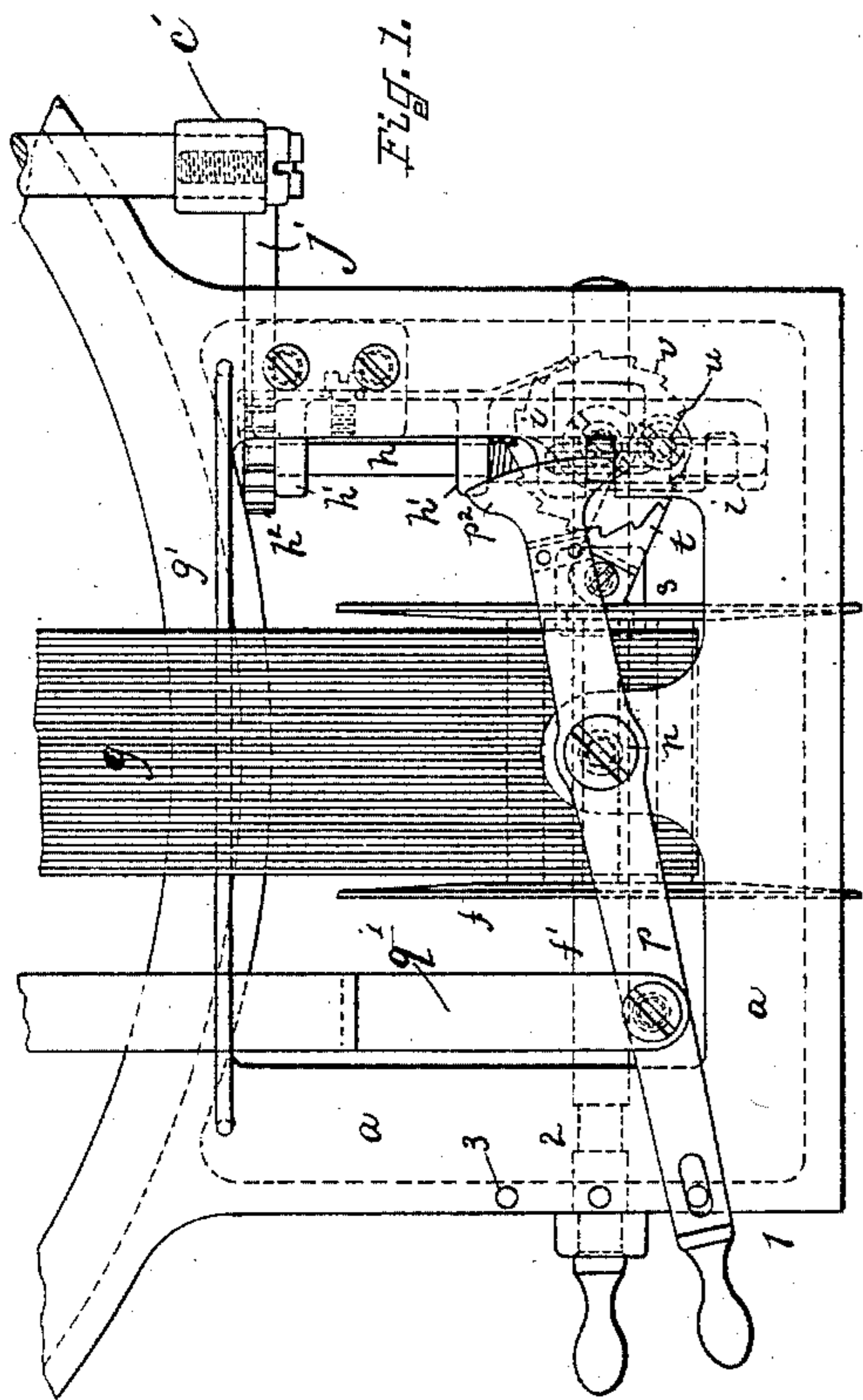


Fig. 1.

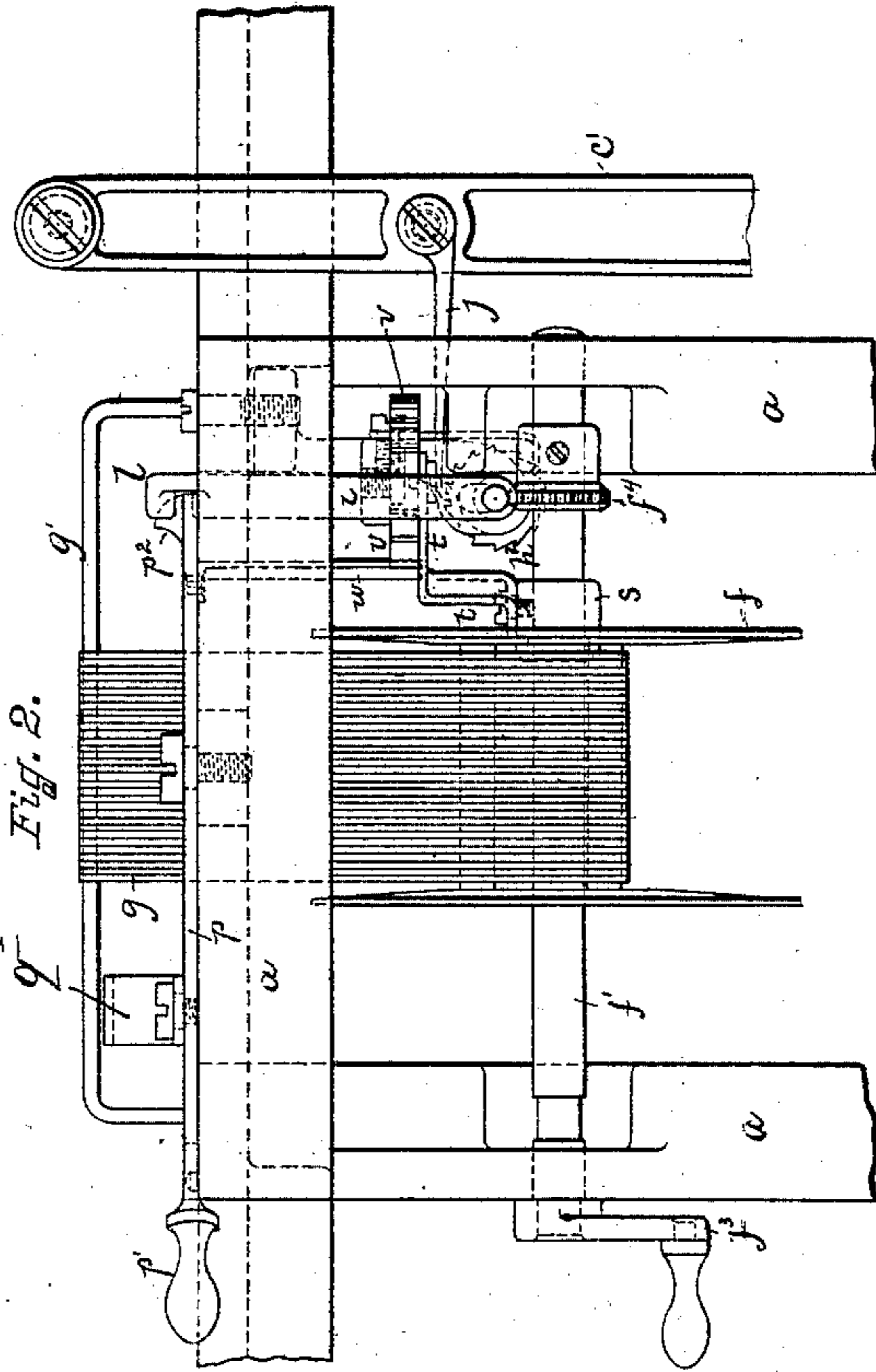
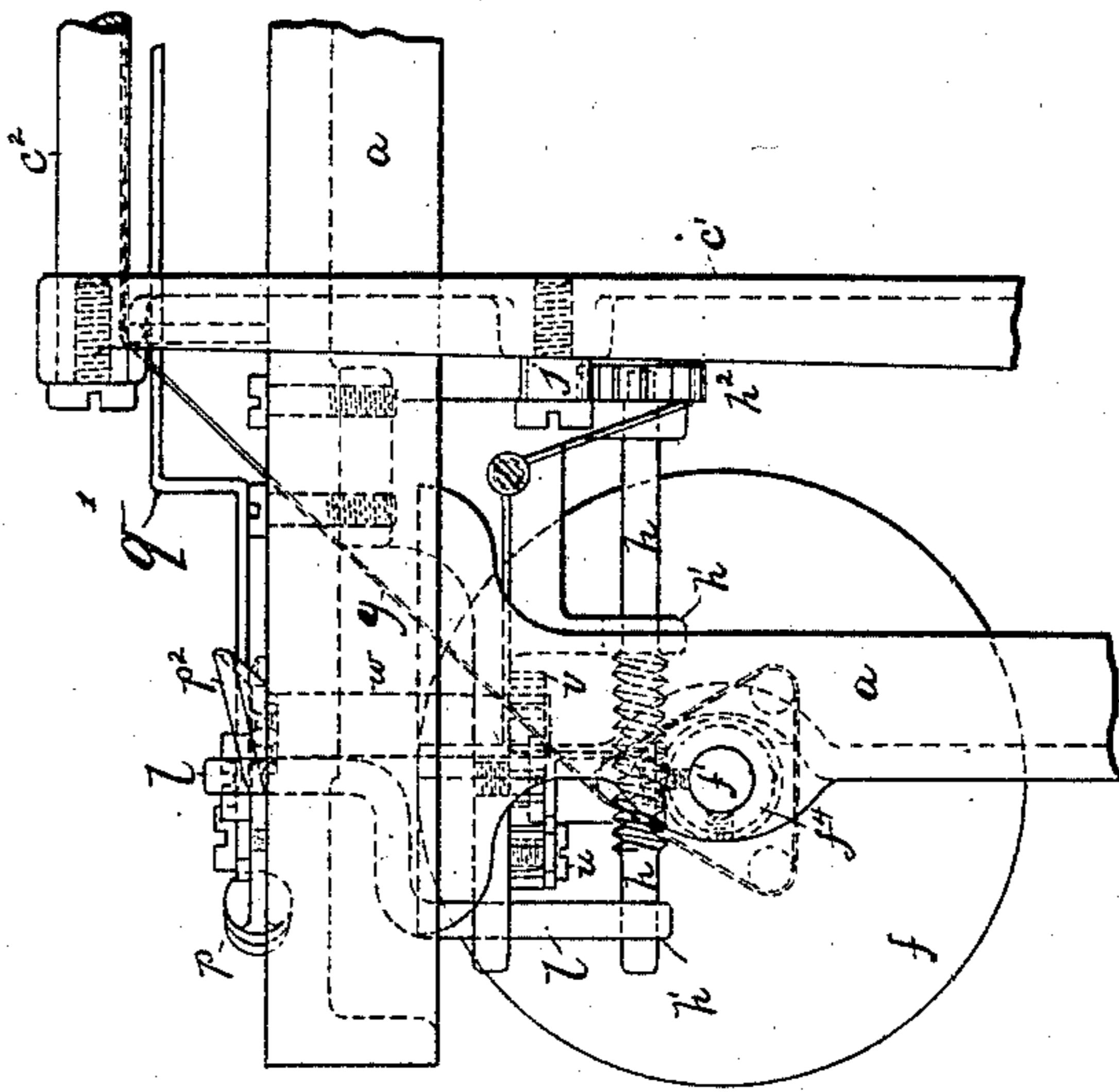


Fig. 2.

Fig. 3.



Witnesses:

Martin Layden
S. W. Valentine

Inventor

Graham I. Francis

By Attorney H. D. Donnelly

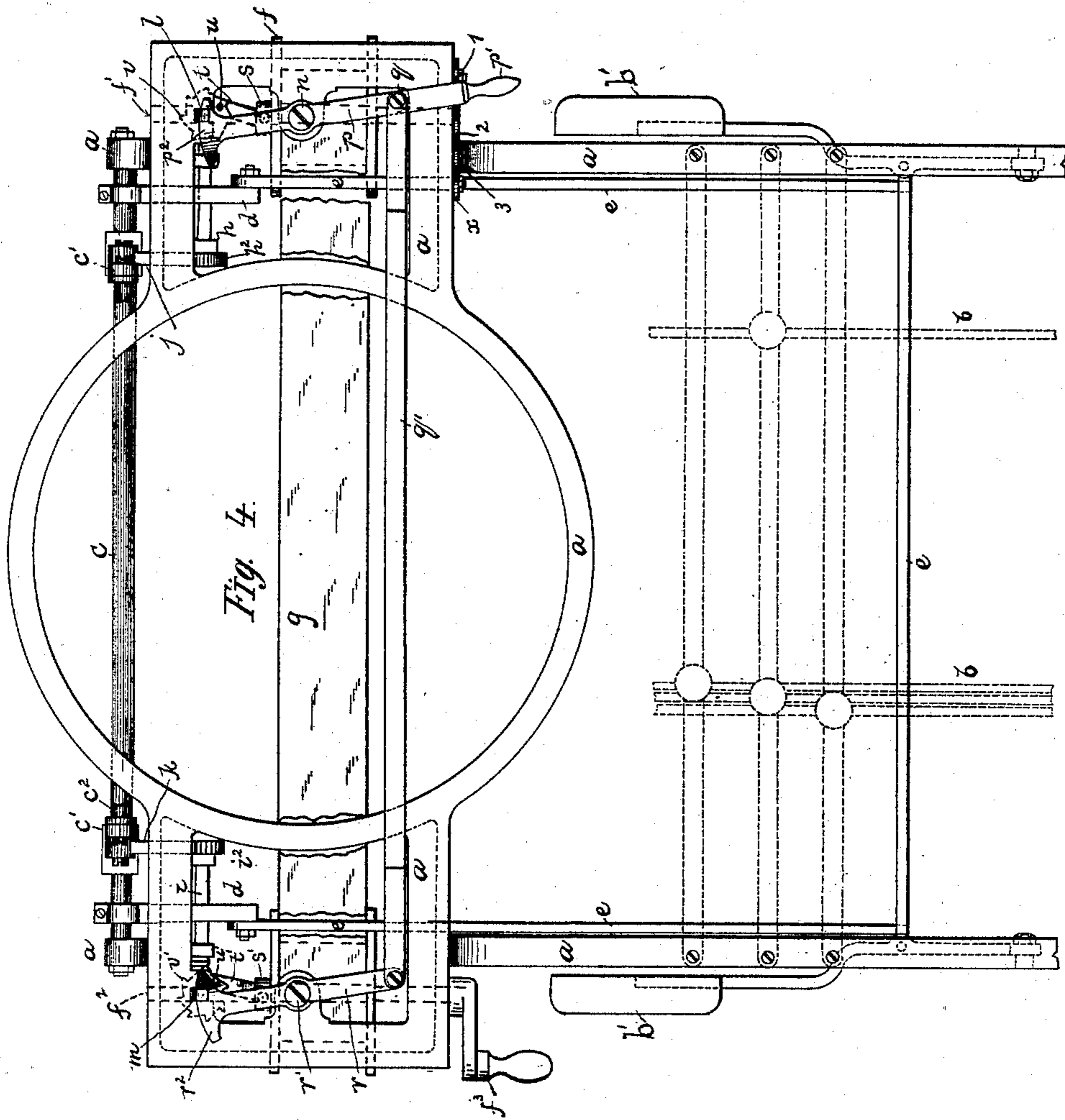
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Inventor
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UNITED STATES PATENT OFFICE.

GRAHAM INGLESBY FRANCIS, OF HARTFORD, CONNECTICUT, ASSIGNOR TO
THE AMERICAN WRITING MACHINE COMPANY, OF SAME PLACE.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 448,646, dated March 24, 1891.

Application filed June 28, 1888. Serial No. 278,497. (No model.)

To all whom it may concern:

Be it known that I, GRAHAM INGLESBY FRANCIS, a subject of the Queen of England, and a resident of Hartford, in the county of
5 Hartford and State of Connecticut, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

My invention relates particularly to the ribbon movement of type-writing machines, and has for its object to provide simple and efficient means for feeding the ribbon both longitudinally and transversely; and to this end it consists in the features of construction and
15 combinations of devices hereinafter more fully described, and particularly pointed out in the appended claims.

In the accompanying drawings, Figure 1 is a top view of a portion of a type-writing machine embodying my invention. Fig. 2 is an
20 end view of the same. Fig. 3 is a rear elevation, and Fig. 4 is a top view to better show the arrangement and relationship of the parts.

In the several views the same part will be
25 found designated by the same letter or figure of reference.

a designates the frame-work of the machine; *b*, the key-levers, which are shown in dotted lines; *b'*, the spacing-keys at the right and
30 left hand side of the frame-work. At the rear of the machine and extending transversely near its bottom is a rocker-bar *c*, from which project inwardly two arms *d d*, that are connected to a spacing-frame *e*, consisting of longitudinal-arranged bars and one transverse
35 bar beneath the key-levers. From each end of the rocker-bar *c* extends upwardly an arm or bar *c'*, and these bars are connected at their upper extremities by a horizontally-arranged rod *c''*. The parts *c*, *c'*, and *c''* form
40 the rocking frame.

f designates the ribbon-spools at opposite sides of the machine.

f' *f''* are the ribbon-spool shafts, and *g* the
45 inking-ribbon running over guide-wires *g'*, fastened to the top plate of the machine. Each ribbon-spool shaft is provided with a crank-arm *f''* and with a worm-gear *f'''*.

h represents a worm-shaft journaled in
50 suitable bearings *h'* at the right of the machine, and *i* represents a similar shaft rotat-

ing in similar bearings at the left of the machine. The right-hand worm-shaft is provided at its inner end with a ratchet-wheel *h''*, and the left-hand worm-shaft with a ratchet-wheel
55 *i''*. Projecting inwardly from the right-hand side of the rocking frame is a push-pawl *j*, and from the left-hand side a similar pawl *k*, said pawls being adapted to respectively engage with the ratchet-wheels *h'' i''* on the
60 worm-shafts. At the outer ends of the worm-shaft *h* is connected a bent lifting-rod *l*, which extends up over the frame-work of the machine and is formed with a transverse slot at its upper extremity, and at the outer end of
65 the worm-shaft *i* is provided a similar lifting-rod, which I have designated by the letter *m*.

Pivoted at *n* is a lever *p*, provided at its front end with a handle portion *p'*. The rear end of said lever is bent up to form a cam *p''*,
70 which engages with the transverse slot in the upper end of the lifting-rod *l*. At *q* is connected one end of a bar or rod *q'*, which extends from the lever *p* on the right of the machine to a lever *r* on the left, the fulcrum of
75 said lever being at *r'*. The rear end of the last-mentioned lever is also provided with an oppositely formed or disposed cam *r''*, which engages with the transverse slotted or hook-shaped upper end of the lifting-rod *m*. The
80 connecting-rod *q'* is provided to actuate the lever *r* simultaneously with the lever *p*. The levers *p* and *r* and the connecting-rod may be designated as the "ribbon-switch" mechanism.

The ribbon-spool *f* on the right is provided
85 with a hub or boss *s*, to which is pivoted the lower end of a bent connecting-rod or pitman *t*, the upper end of which is connected by a crank-pin *u* to a horizontally-arranged ratchet-wheel *v*. From the under side of the lever
90 *p* depends a push-pawl or tooth *w*, which engages with said ratchet-wheel. The ribbon-spool on the shaft *f''* is also provided with a boss or hub *s'*, to which the lower end of a
95 bent pitman *t'* is connected, the upper end of said pitman being connected to a horizontally-arranged ratchet-wheel *v'* by a crank-pin *u'* thereon, and to the under side of the switch-lever *r* is attached a downwardly-projecting
100 pawl or tooth similar to *w*, which engages with the ratchet-wheel *v'*.

At the front edge of the top plate or frame-work *a* is secured a plate *x*, provided with three notches 1 2 3, with which the front end of the switch-lever *p* engages; but in lieu of said notched plate *x* three pins or short studs may be provided and the lever *p* slotted out for engagement therewith, as seen at Fig. 1. These notches or pins act as stops or guides for the lever, as will hereinafter more fully appear.

Having sufficiently described the construction of a machine embodying my invention, I shall now proceed to explain the operation thereof.

At each depression of a key-lever *b* or of either of the spacing-levers *b'* the spacing-frame *e* is depressed and the rocking frame vibrated. As the arms *c'* of the rocking frame are vibrated forwardly the push-pawls *j* and *k* secured thereto turn the ratchet-wheels *h²* and *i²* and partially rotate the worm-shafts *h* and *i*. In the several figures of the drawings the switch-lever *p* is represented as having been moved to the extreme right and into engagement with the notch 1. In this position of the lever *p* the lifting-rod *m* is elevated and the worm-shaft *i* journaled at its outer end in said rod, raised from out of engagement with the worm-gear *f¹* on the ribbon-spool shaft *f²*, and the lifting-rod *l* is depressed and the worm-shaft *h* lowered into engagement with the worm-gear *f¹* on the ribbon-spool shaft *f'*, and at each vibration of the rocking frame the ribbon-spool shaft *f'* will be turned and the ribbon-spool *f* splined thereon will be turned and the ribbon *g* fed toward the right of the machine a distance of one tooth on the ratchet-wheel *h²*. When the ribbon shall have thus step by step been unwound from the spool *f* on the left onto the spool on the right, the lever *p* may be vibrated to have its outer end occupy the notch 3 on the plate *x*. During the movement of the lever *p* from notch 1 to notch 3 the connecting-bar *q'* vibrates the lever *r* in unison and to the same extent, and the cam end of the lever *r* will depress the lifting-rod *m* and worm-shaft *i* into engagement with the worm-gear *f¹* on the ribbon-spool shaft *f²*, and at the same time the cam end of the lever *p* will elevate the lifting-rod *l* and throw the worm-shaft *h* out of engagement with the worm-gear *f¹* on the spool-shaft *f'*. When the parts have been made to assume this relationship, the ribbon will be wound from the spool on the right to the spool on the left with a step-by-step movement at each vibration of the rocking frame, the pawl *k* thereon turning the worm-shaft *i* and the latter turning the spool-shaft and spool splined thereon. If it be desired to wind the ribbon quickly from one spool to another, or if it be desired to remove an old or insert a new ribbon, the lever *p* may be moved into the second notch on the plate *x*, and this will effect a disengagement of the ribbon-feeding devices and the ribbon-switching mechanism. When the lever

shall have been moved into the second notch, either crank-arm *f³* on the ribbon-spool shafts may be turned as quickly as desired and the ribbon wound from one spool to another, or the ribbon may be conveniently removed and another one inserted in its place. At each vibration of the outer ends of the switch-levers *p* and *r* toward the left the pawls or teeth *w*, depending from the rear ends of said levers, engage with the horizontally-arranged ratchet-wheels *v* and *v'* and turn them around the distance of one notch or tooth and move the crank-pins *u* and *u'* a similar distance. The pitmen *t* and *t'*, connected to said crank-pins and to the ribbon-spools, operate to draw said spools longitudinally of their shafts, and hence to move the ribbon laterally with reference to the printing-point of the machine. When the crank-pins have been turned to the front or over the axes of the ribbon-spool shafts, the ribbon-spools occupy positions nearer the front ends of said shafts and the rear portion of the ribbon is located over the printing-point. As the crank-pins are turned round, the ribbon-spools are gradually drawn rearwardly until the crank-pins arrive at the rear of the machine and over the axes of the ribbon-spool shafts again, when the continued rotation of the ratchet-wheels through the medium of the pitmen forces or pushes the ribbon-spools toward the front of the machine.

In the machine which I have constructed I have so made the devices for moving the ribbon laterally that when the levers have been moved to the right eight times the ribbon-spools will have traveled their full distance rearwardly, and on the next movement of the levers will commence to travel forwardly. The horizontal ratchet-wheels, the crank-pins, and the pitmen are so connected or arranged that the ribbon-spools will be moved along their shafts exactly the same distance, so that the ribbon will always travel at right angles to the printing-point or parallel with the connecting-rod *q'*.

It will be seen that the whole width of the ribbon may be utilized in the operation of the machine by shifting it laterally or transversely, and thus the life of it is greatly prolonged.

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

1. In a type-writing machine, the combination of the ribbon-spool, the ribbon-spool shaft provided with a worm-gear, the worm-shaft, means for turning the same, the lifting-rod, a switch for raising the same, a pitman, a ratchet-wheel, a crank or wrist pin, and a driving-pawl connected to the switch, whereby the said switch is adapted to raise the worm-shaft and simultaneously turn the ratchet-wheel and move the ribbon-spool, substantially as set forth.

2. In a type-writing machine, the combination of the ribbon-spool shaft provided with a worm-gear, the worm-shaft, the lifting-rod, and means, substantially as described, for

raising said rod and disengaging the worm-shaft.

3. In a type-writing machine, the combination of the ribbon-spool shaft provided with a worm-gear, the worm-shaft provided with a ratchet-wheel, the lifting-rod, the switch provided with a cam, and the rocking arm provided with a push-pawl.

4. In a type-writing machine, the combination of the ribbon-spool shafts provided with worm-gears, the worm-shafts, the lifting-rods, the switch-levers provided with oppositely-disposed cams, and the connecting-rod between said levers.

5. In a type-writing machine, the combination of the ribbon-spool shafts provided with worm-gears, the worm-shafts provided with ratchet-wheels, the lifting-rods, the switch-levers provided with oppositely-disposed cams, the connecting-rod between said levers, and the rocking arms provided with push-pawls.

6. In a type-writing machine, the combina-

tion of a ribbon-spool shaft, a ribbon-spool adapted to slide endwise thereof, a pitman connected at one end to said ribbon-spool, a horizontally-arranged ratchet-wheel, a crank or wrist pin connected thereto and engaging with said pitman, a horizontally-arranged hand-lever, and a driving-pawl thereon for engaging with said ratchet-wheel, whereby the ribbon-spool may be moved back and forth, substantially as described.

7. In a type-writing machine, the combination of the ribbon-spools, the ribbon-spool shafts, the pitmen, the ratchet-wheels, the crank or wrist pins, the connected switch-levers, and the push-pawls.

Signed at Hartford, in the county of Hartford and State of Connecticut, this 18th day of June, A. D. 1888.

GRAHAM INGLESBY FRANCIS.

Witnesses:

GEO. A. REYNOLDS,
PHILETUS C. LATHROP.