

(No Model.)

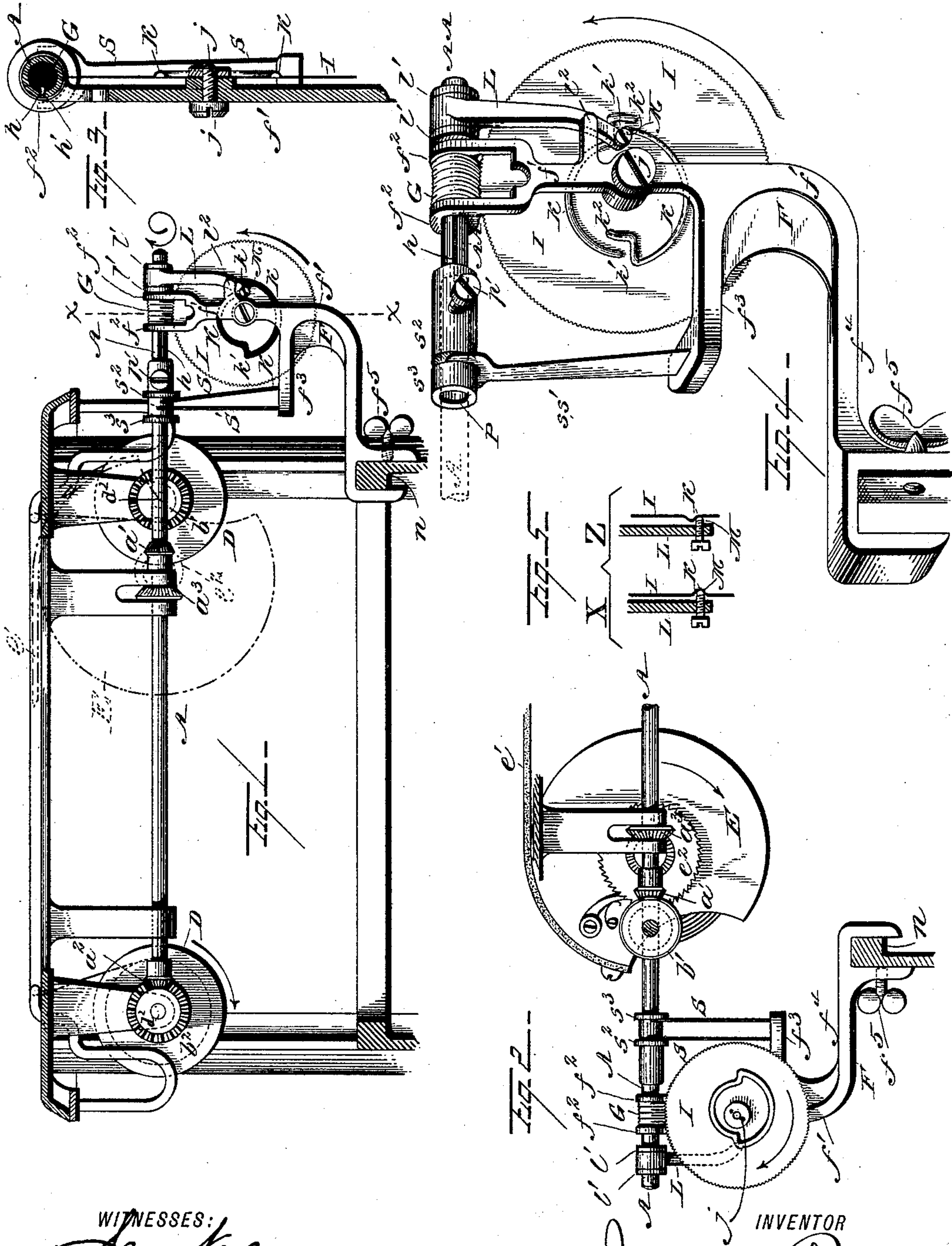
2 Sheets—Sheet 1.

J. PUSEY.

RIBBON FEED REVERSING MECHANISM FOR TYPE WRITING MACHINES.

No. 446,886.

Patented Feb. 24, 1891.



WITNESSES:

John Nolan
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(No Model.)

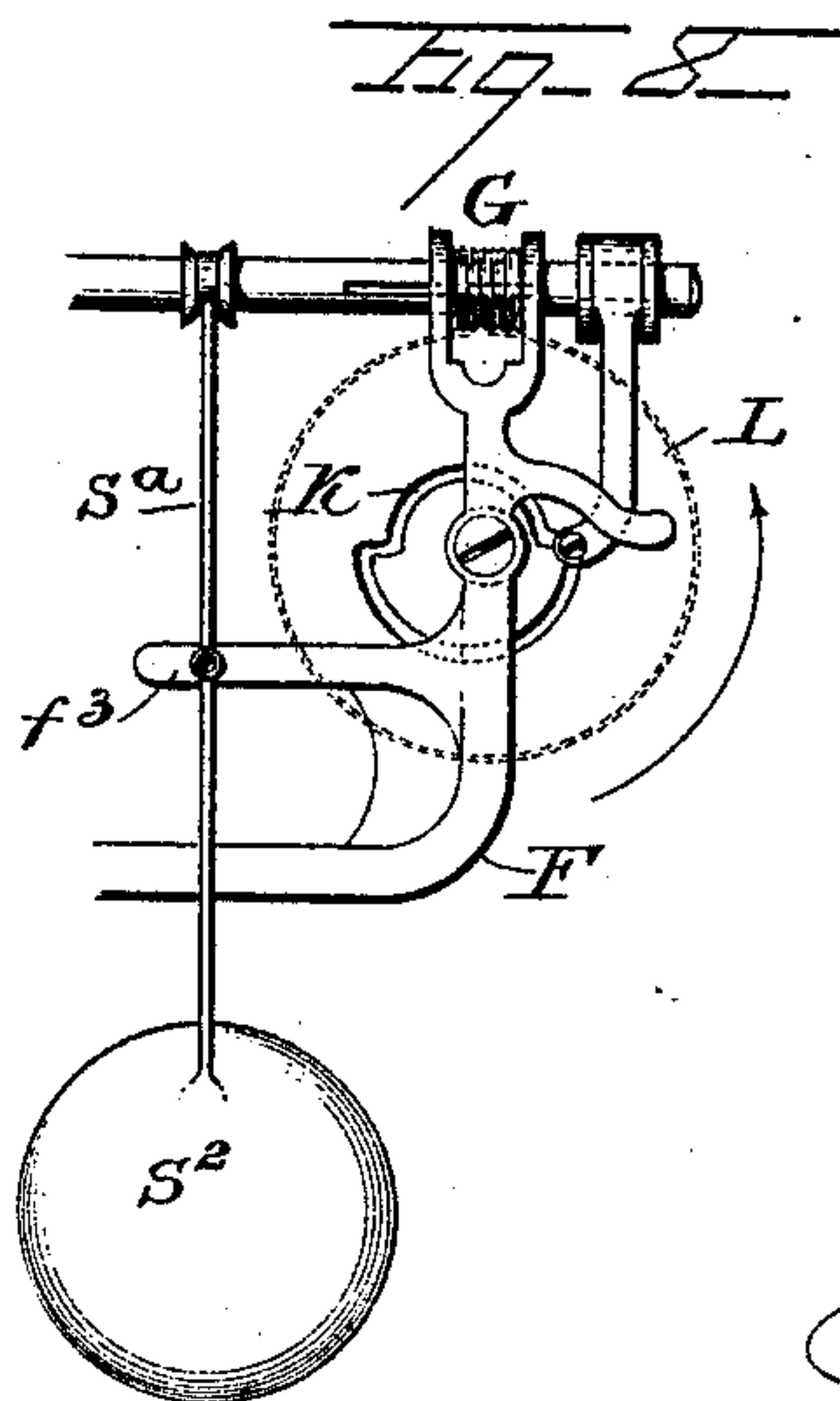
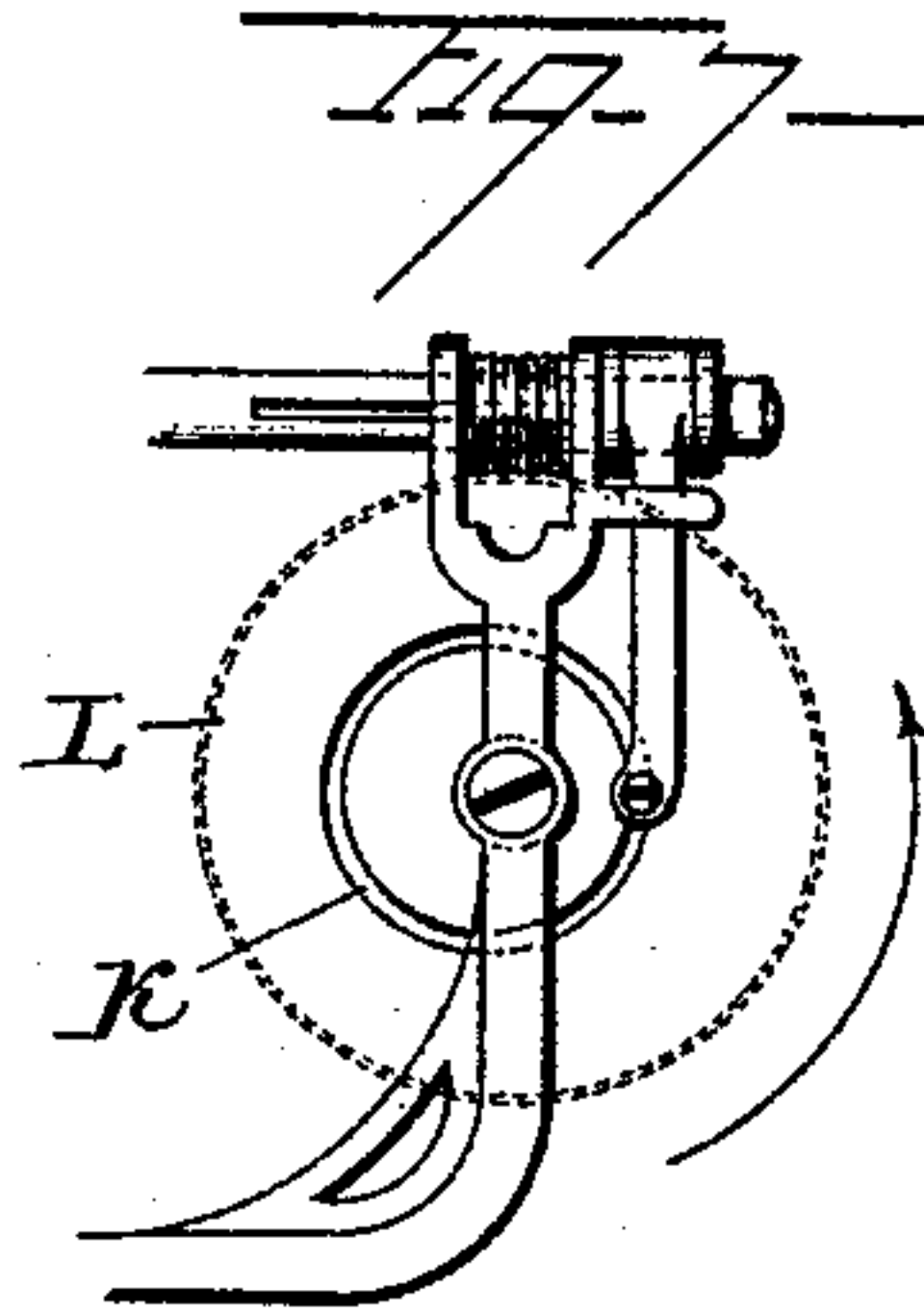
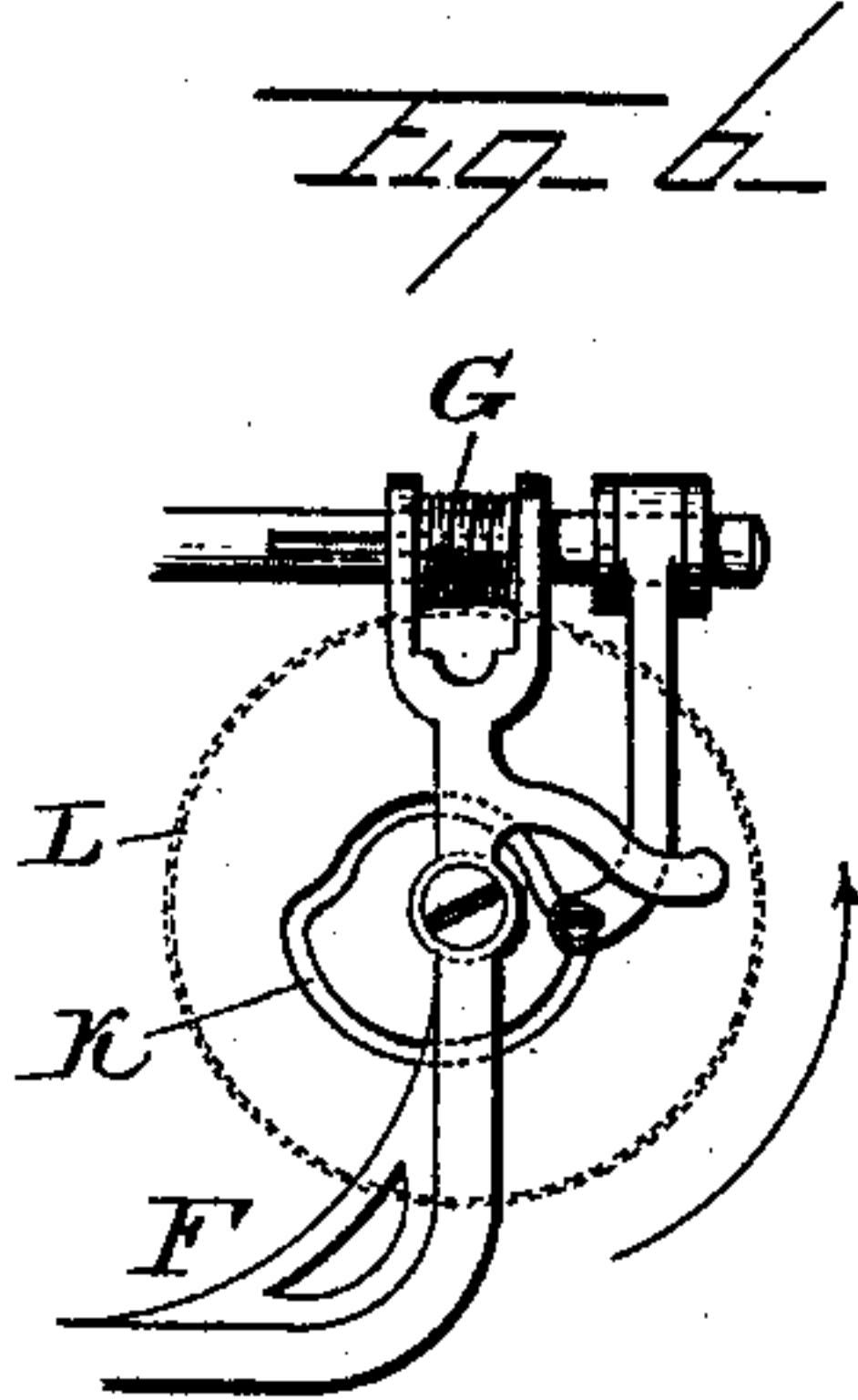
2 Sheets—Sheet 2.

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RIBBON FEED REVERSING MECHANISM FOR TYPE WRITING MACHINES.

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WITNESSES

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RIBBON-FEED-REVERSING MECHANISM FOR TYPE-WRITING MACHINES.

SPECIFICATION forming part of Letters Patent No. 446,886, dated February 24, 1891.

Application filed November 16, 1889. Serial No. 330,541. (No model.)

To all whom it may concern:

Be it known that I, JOSHUA PUSEY, a citizen of the United States, residing at Lima, in the county of Delaware and State of Pennsylvania, have invented certain new and useful Improvements in Ribbon or Belt Reversing Mechanism for Type-Writing and other Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, of which—

Figure 1 is a rear elevation of a "Remington" type-writer provided with my invention, the parts not necessary to the understanding of the improvement being omitted. Fig. 2 is a partial front elevation at the instant the shaft A and adjuncts have been shifted from the position seen in Fig. 1. Fig. 3 is a section, as on line x , Fig. 1. Fig. 4 is a rear perspective view of the device (with slight modifications) detached from the type-writer. Fig. 5^x is a vertical section of detail of Figs. 1 and 2, and Fig. 5^z of like parts of Fig. 4. Figs. 6, 7, and 8, Sheet 2, are views of modifications hereinafter referred to.

As broadly stated, it consists in the combination, in a type-writing or analogous machine, with the ribbon spools or drums, of a shaft or bar carrying gears adapted to engage with gears on or connected to the ribbon spools or drums, together with devices or mechanism operated independently of said spools or drums from the main source of power (such as spring power or the stroke of the fingers of the operator upon the keys) for reciprocating said shaft or bar a certain distance at predetermined intervals alternately in opposite directions, whereby the spools or drums are alternately step by step or gradually rotated in opposite directions, the one positively driven, while the other is turned by the stress of the moving ribbon, and so on in continuous alternations, the ribbon thus being automatically reversed at the predetermined times.

The invention consists of the following elements or their respective mechanical equivalents, in combination, to wit: a worm and peculiar toothed cam-wheel pivoted on an arm or bracket attached to the type-writer frame and gearing with said worm, which latter is upon or connected to the usual rotating and sliding shaft driven from the spring

which operates the carriage of the machine, and which shaft carries the gear driven by said spring, as also the two gears which engage, respectively and alternately, with gears upon the arbors of the ribbon-spools, an arm pivoted on said sliding shaft carrying at its free end a pin or stud that engages with the cam of said cam-wheel, together with springs or a spring arranged to bear against collars or shoulders upon said shaft, the construction and operation being such that while the shaft rotates always in one direction it is caused by the said worm, cam, &c., to be reciprocated longitudinally, so that the gears which engage those upon the ribbon-spool arbors are brought alternately into engagement, the space between the respective gears of the shaft and of the spool-arbors being instantly traversed by the action of said springs or spring in alternate directions, and which springs are made active, or, so to say, wound up by the continued operation of the cam as the said cam-wheel rotates, whereby the ribbon is caused to travel first in one direction and then in the opposite direction—that is, to be wound up first on the one spool, then on the other, and so in continuous succession, as hereinafter fully described.

The invention consists, also, in certain details of construction, which will be clearly pointed out.

The annexed drawings represent the device as applied to the "Remington" type-writer. As this machine is in wide use and is well known, I have shown only such portions thereof as are requisite to an understanding of the present improvement.

A, Figs. 1, 2, and 3, marks the usual sliding shaft, whose bevel-gears a' a^2 , Figs. 1 and 2, are caused to engage, alternately, the corresponding gears b' b^2 on the ends of the arbors d' d^2 of the ribbon-spools D. This shaft is rotated always in one direction, step by step, as the type-writer is operated, by the spring-actuated let-off wheel E, Figs. 1 and 2, (to which is secured the strap e' , that is connected to the carriage of the machine,) the journal of which has a gear e^2 , which engages with a gear a^3 , Figs. 1 and 2, on the shaft A. As type-writers of the class mentioned are now constructed, this shaft is adapted to be shifted longitudinally in its bearings by hand—that

is, by pushing or pulling the free end thereof, as may be necessary—in order to cause the engagement of the gears thereon, respectively, with those of the spool-arbors, thereby effecting the reversal of the direction of movement of the ribbon by winding the same off the full spool onto the empty spool. Now it frequently happens that the ribbon is wound up on one of the spools—*i. e.*, comes to a stop—and, the operator failing at first to observe the fact, not only does a strain come upon the machine and the ribbon, but the type continues to strike the ribbon at the same spot repeatedly. Consequently the printing during this period until the condition is discovered is quite indistinct, and the operator shifts the shaft A to reverse the movement of the ribbon.

I shall now proceed to describe my device with relation to the shaft A, or, rather, in the present instance, to a prolongation of one end of the same.

F is an L-shaped bracket attached to the frame of the type-writer, having a vertical limb f' , bifurcated at its upper end, as seen, so as to form bearings f^2 for the shaft A and for the reception and lateral retention of a worm G. This part of the shaft has a groove h and the worm a corresponding interior spline h' , Figs. 1 and 2, so that while the worm shall rotate with the shaft the latter may slide longitudinally within it. The worm engages with teeth in the periphery of a wheel I, which turns on a pivot-pin j in the bracket-limb f' . In the face of this wheel is an eccentric cam or cam-groove K of the form shown, with two opposite straight channels k' connecting the two halves or parts of said groove. These channels, when performing their designed function, are always parallel with the shaft A, as will hereinafter appear. An arm L, pivoted on shaft A, between collars l' extends down over part of the face of wheel I and has at its lower end a stud M, preferably a screw-stud, so that it may be adjusted with relation to the cam, whose inner extremity engages with said arm. A lug l^2 , projecting laterally from the bracket-limb f' over the arm L, holds it in place—that is, prevents it from being swung outwardly away from the cam by the friction of rotation of shaft A—and so keeps the stud in engagement with the cam.

A horizontal arm f^3 , extending from the limb f' , has attached thereto two similar springs S S', Figs. 1 and 2, (or it may be a single spring, as hereinafter explained.) whose upper or free ends are arranged to engage alternately or bear against shoulders s^2 s^3 on shaft A.

Having described the construction and arrangement of the mechanism, I shall now proceed to explain the *modus operandi*, premising that in Fig. 1, (as in Fig. 4,) the view is taken at the instant the shaft A is about to be shifted to cause the reversal of the direction of movement of the ribbon—that is to say, just as the teeth of gear a' on the shaft

will be brought into engagement with those of the adjacent gear b' of the ribbon-spool arbor. It will be observed that the spring S is flexed and potential and bears against the shoulder s^2 , while its fellow S' is idle. The stud M is in line with one of the channels k' of the cam. At this instant the recoil of the spring S pushes outwardly the shaft A, and with it the arm L, and the stud slides along the channel until it is stopped by the outer edge or wall of the same. (See Fig. 2.) The throw is sufficient to bring the gears a' b' into engagement, or, in other words, the space between the two gears is somewhat more than bridged. This must be done practically instantaneously in type-writing machines wherein the movement of the ribbon, &c., is so very slow. While the throw given to shaft A is such as to cause the engagement of the gears sufficiently to produce the rotation of the ribbon-spool as said shaft is rotated, yet it is not sufficient to engage them to the full extent or depth of their teeth. If it were not necessary to potentialize the other spring S' in order at the proper predetermined moment to cause a reverse shifting of the shaft, it would be immaterial whether the gears were engaged to their full extent or not; but in order to accomplish this result of potentializing said spring the cam is so curved out from the center of wheel I, as shown, that as the latter continues its rotation the stud M of arm L will be forced to take a path which compels the shaft A, with its shoulders s^2 s^3 , still farther outwardly, thus of course bringing the teeth of gears a' b' into deeper engagement. At the same time the shoulder s^3 , bearing against the spring S', bends the latter outwardly and continues to thus, so to say, wind it up until the rotation of the cam-wheel brings the other channel of the cam opposite stud M, whereupon said spring S' forces the stud, arm L, and shaft A inwardly, and thus releases the gears a' b' and brings the corresponding gears a^2 b^2 into engagement, and thereby causes the reversal of the direction of movement of the ribbon. As the cam-wheel continues to revolve, the portion of the cam then traversed by the stud brings the last-mentioned gears into fuller engagement and sets the first spring S, and so on in continuous repetition. It will of course be understood that the relation of the worm and the teeth on the cam-wheel and the length of the ribbon is such that the reversal of movement takes place near each end of the latter alternately.

I have described my device or mechanism as a permanent part or connection of the type-writer or other machine. I, however, sometimes make the device as an attachment adapted to be applied to and detached from the typewriters as they are now constructed and in use. This construction is shown in the drawings detached in Fig. 4. The bracket F, to the vertical limb f' of which the cam-wheel is pivoted, has a horizontal limb f^4 , slotted at

the end, as shown, so as to fit not too closely over the cross-bar *n*, Figs. 1 and 2, of the frame of the type-writer, to which it (the bracket) is secured by means of a thumb-screw *f*⁵. The shaft A A, Fig. 4, which carries the worm, &c., and which is practically an extension of shaft A, is enlarged at the inner end and has a socket P, adapted to nearly receive the free end of shaft A. A set-screw *h'* serves to hold the latter in place and prevent it from turning in said socket. Of course it will be understood that the dimensions and arrangement of the parts are such that the two shafts may be brought into proper alignment.

It will be observed that in Figs. 4 and 5² the cam K, instead of being a groove, as in Figs. 1, 2, 3, and 5^x, is a bead with channels *k*, Fig. 4, corresponding to those of Figs. 1, &c., and stops *k*² to limit the throw of the springs; or, rather, in this modification I use but one spring S S' and bring the shoulders *s*² *s*³ closer together. It is practically immaterial whether a single spring or two independent springs are employed. In this bead-cam construction the stud M travels or bears against the outer edge of one half or arc of the cam—that is, the lower half, as in the position shown in Fig. 4—and against the inner edge of the other or upper arc as the wheel revolves.

I do not limit myself to the precise construction shown, as any intelligent and competent mechanic can vary the same without departing from the principles of the invention.

By the use of the word "gears" I do not wish to be understood as confining myself to toothed wheels; but it is intended to include any suitable well-known devices for imparting or conveying motion which come under that category in its broad terms.

I remark that in some instances, where it is not necessary that the shaft A (or A A) shall be shifted a considerable distance instantaneously, the channels *k'* may be inclined, so as to gradually force back or forth the stud M, arm L, and the shaft, as shown in Fig. 6, or the cam may be a continuous eccentric, as in Fig. 7. In such case the spring or springs would be dispensed with; also in lieu of a spring or springs, as S S', a spring controlled or pivoted gravity dog or dogs may be used for forcing the stud, its arm, and the shaft A the length of the channels *k'* at the predetermined moment. This construction is pictured in Fig. 8, wherein S^a is a vertical arm or bar corresponding to the spring or springs S S, pivoted on the bracket-arm *f*³, its lower end below the pivot carrying a heavy weight S². This so obviously serves a like purpose as the said spring or springs that further description is deemed unnecessary.

I may add that my invention is applicable not only to the "Remington" type-writing machines, but also to the "Caligraph" and other like machines. It is moreover applica-

ble to machines other than type-writers, wherein it is desirable to reverse at intervals the direction of motion of a ribbon or belt.

Having thus described my invention, I claim as new and useful and desire to secure by Letters Patent—

1. The combination, with the supporting-frame and the spools or drums mounted thereon, of a longitudinal bar arranged with near relation to said spools or drums, devices on said bar adapted alternately to engage and rotate the shafts of said spools or drums, a cam adapted to act upon said bar, and mechanism adapted to operate the said cam independently of said shafts, whereby the cam will shift the bar at predetermined intervals, and the devices thereon will be actuated at each of said intervals to reverse the direction of rotation of the spools or drums alternately, substantially as described.

2. The combination, with the spools or drums and mechanism for independently rotating the same, of a shaft or bar carrying gears adapted to engage with said mechanism, a worm upon said shaft in which the latter is adapted to slide, a cam-wheel connected with the shaft and gearing with said worm, together with mechanism for driving said shaft, its worm, and the cam-wheel, whereby, as the shaft, its worm, and the cam-wheel rotate, the shaft is shifted at predetermined intervals, and the gears thereon are actuated to reverse the direction of rotation of the spools or drums alternately, substantially as described.

3. The combination, with the spools and mechanism for rotating the same, of a shaft or bar carrying gears adapted to engage with said mechanism, a cam-wheel connected with said shaft and provided with the channels *k'*, mechanism for driving said cam, and a pressure device acting against said shaft, whereby, as the cam rotates, the shaft is reciprocated by the action of said cam and pressure device at the predetermined intervals, and the gears on the shaft are thereupon actuated to reverse the direction of rotation of the spools alternately, substantially as described.

4. The combination, with the spools or drums and mechanism for rotating the same, of a shaft or bar carrying devices adapted to engage with said mechanism, a cam-wheel connected with said shaft and provided with the straight channels *k'*, the spring or springs adapted to bear against shoulders on said shaft, together with mechanism for driving said cam, whereby, as the cam rotates, the shaft is reciprocated by the action of said cam and spring or springs at the predetermined intervals, and the devices on the shaft are thereupon actuated to reverse the direction of rotation of the ribbon-spools alternately, substantially as described.

5. In a mechanism for reversing the direction of movements of the ribbons of type-writing and analogous machines, the combination of the sliding shaft adapted to be ro-

tated from the main source of power, the gears a' a^2 thereon, the ribbon-spools provided with the gears b' b^2 , the worm on said shaft, the supporting-bracket, the wheel I, 5 provided with the cam and the channels k' , the arm L, pivoted on said shaft and having the stud engaging with said cam and channels, together with the springs or spring whose free ends bear against the shoulders 10 on said shaft, all constructed and adapted to operate substantially as and for the purpose described.

6. The ribbon-reversing attachment adapted to be applied to type-writing machines of 15 the character mentioned, consisting of the combination of the bracket F, provided with the arm f^1 , means, substantially as shown, for securing said arm to the frame of the type-writer, the sliding shaft A A, journaled on

said bracket and adapted to be secured to the 20 end of the shaft A of the type-writer, the wheel I, pivoted on the bracket and provided with the cam K, with channels k' , the arm L, pivoted on the shaft A A and having the stud M, engaging with said cam and channels, 25 the worm upon shaft A A, engaging with the cam-wheel, together with the spring secured to said bracket, having its free end bearing against shoulders on said shaft, substantially as and for the purpose described. 30

In testimony whereof I have hereunto affixed my signature this 15th day of November, A. D. 1889.

JOSHUA PUSEY.

Witnesses:

FRANCIS G. GALLAGHER,
JOHN NOLAN.