

No. 681,270.

Patented Aug. 27, 1901.

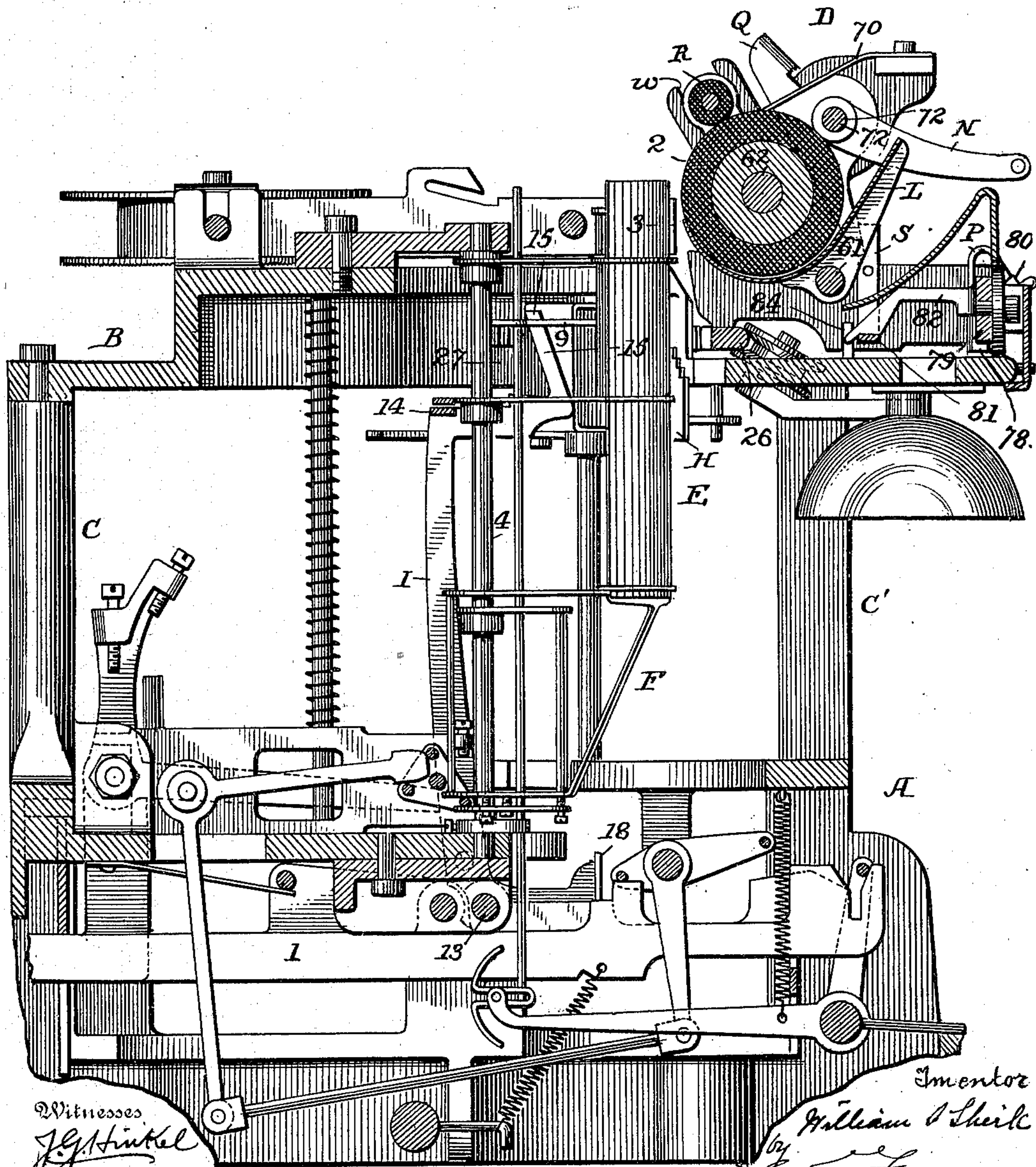
W. S. SHIRK.
TYPE WRITING MACHINE.

(Application filed Nov. 4, 1899.)

(No Model.)

6 Sheets—Sheet 1.

Fig 1.



Witnesses
J. G. Hinkel
H. M. Gillman, Jr.

Inventor
William S. Shirk
by *Forster & Freeman*
Attorneys

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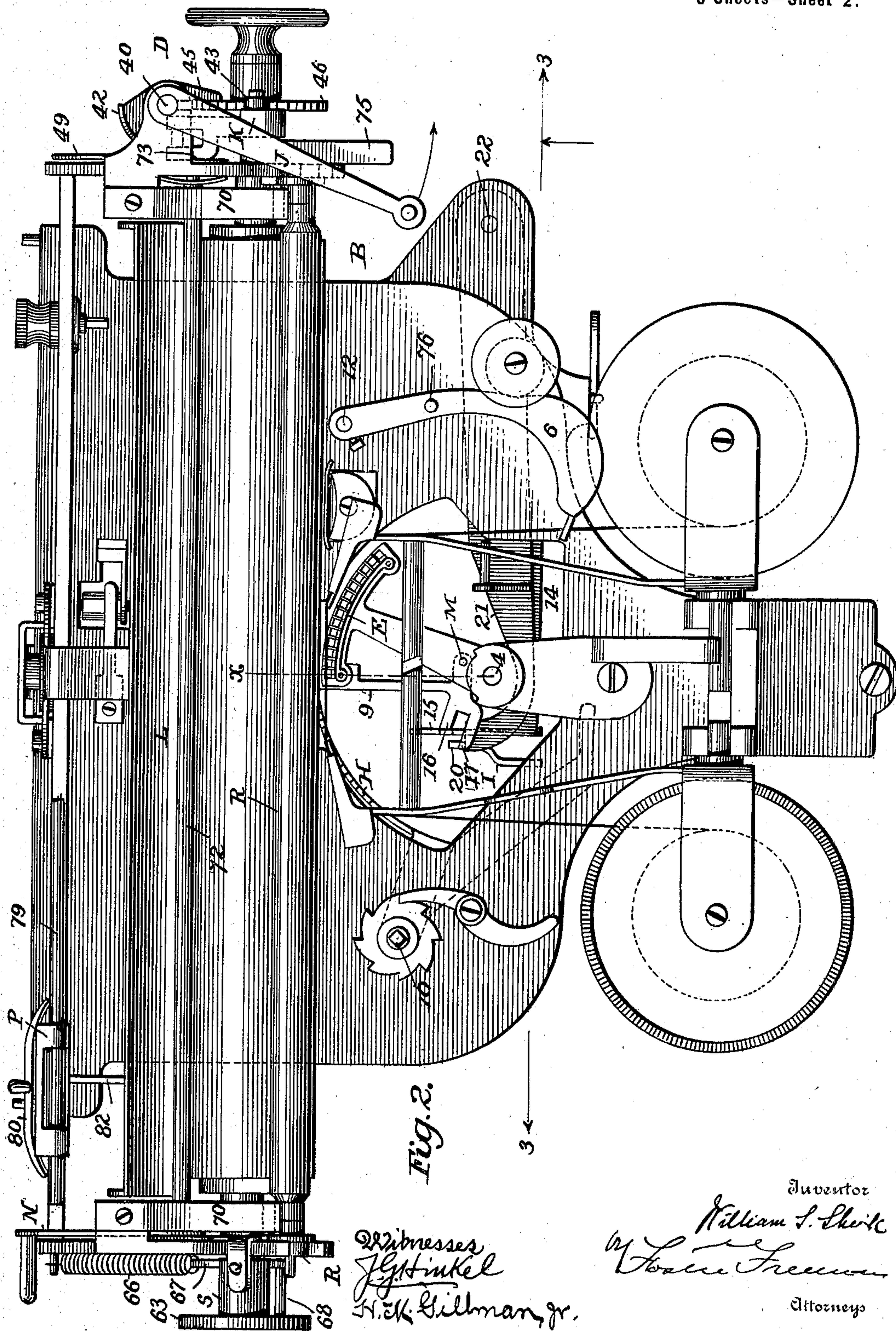


Fig. 2.

Witnesses
J. H.inkel
H. K. Gillman, Jr.

Inventor
William S. Shirk
by
Loam Freeman
Attorneys

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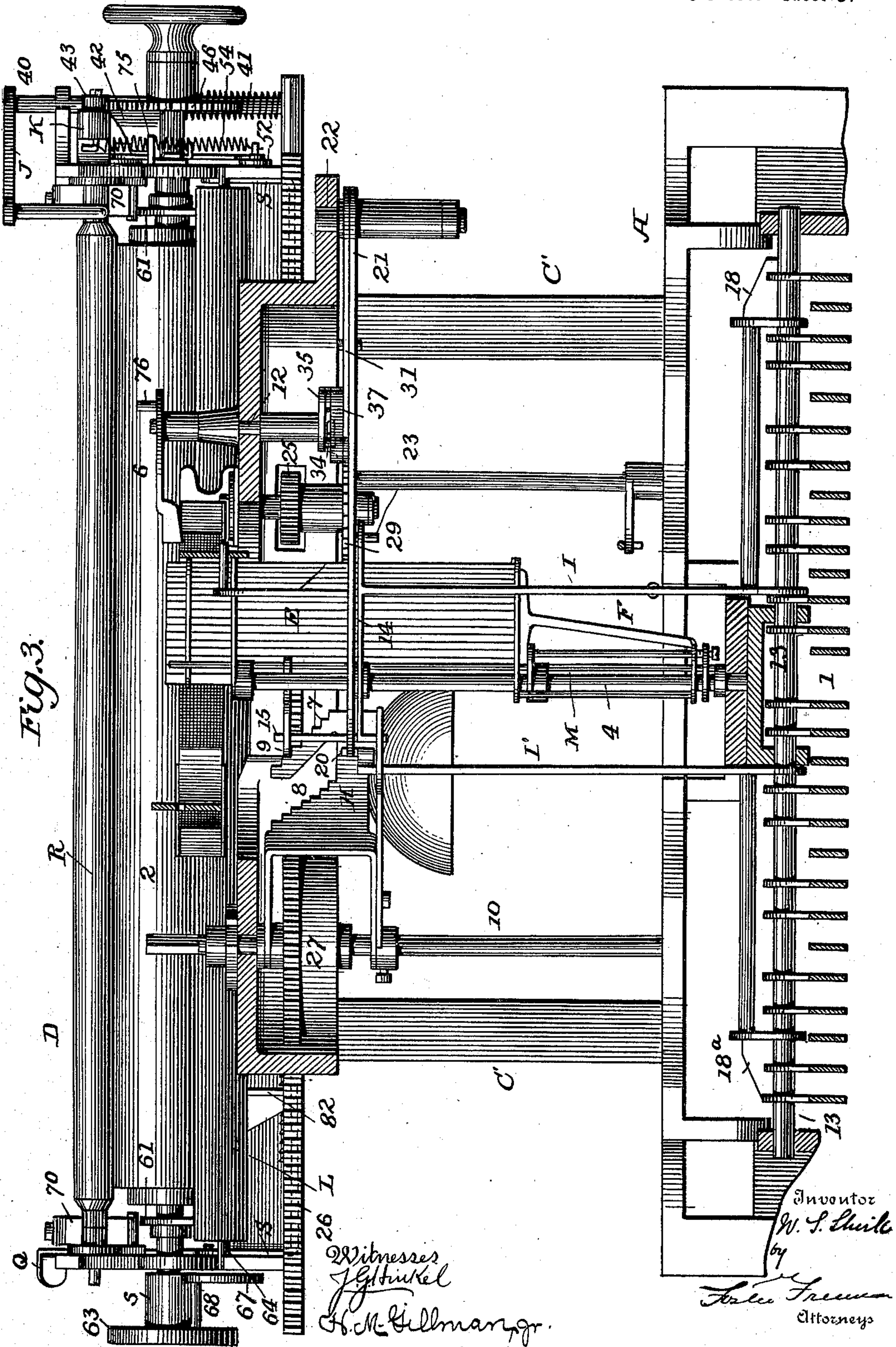
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6 Sheets—Sheet 3.



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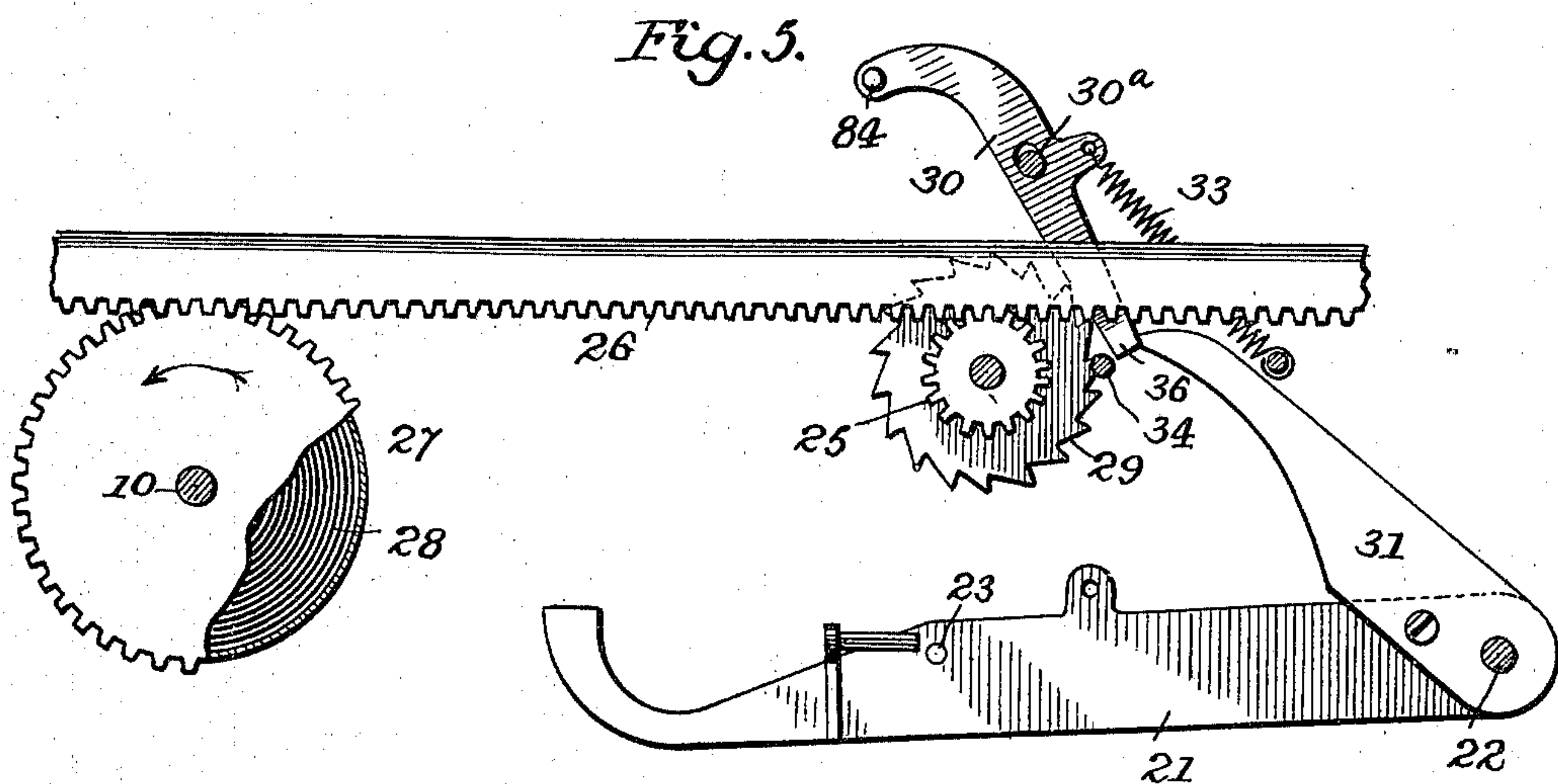
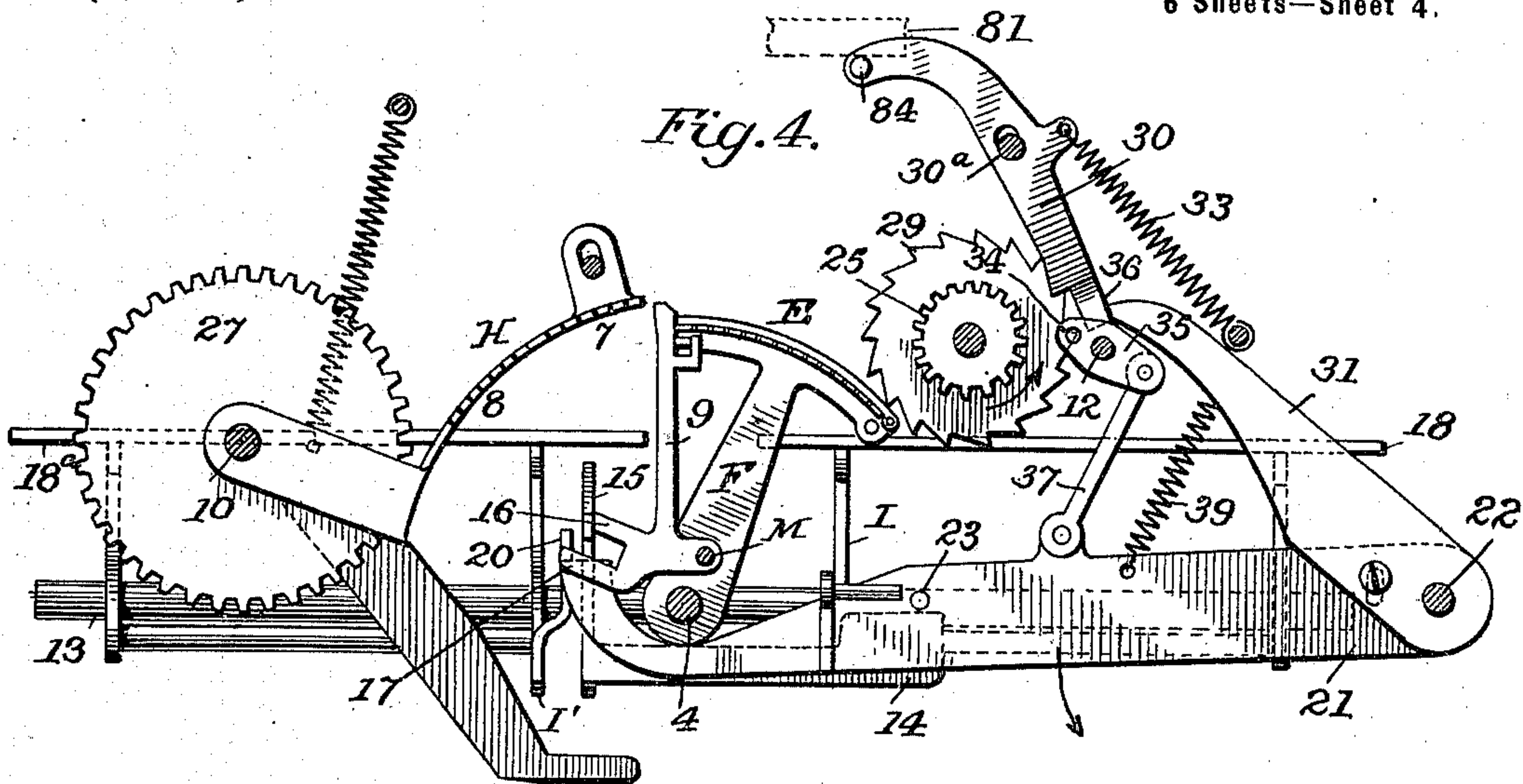
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6 Sheets—Sheet 4.



Witnesses
J. H. Hinkel
H. M. Gellman

Inventor
William S. Shirk
by *John Freeman*
Attorneys

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6 Sheets—Sheet 5.

Fig. 6.

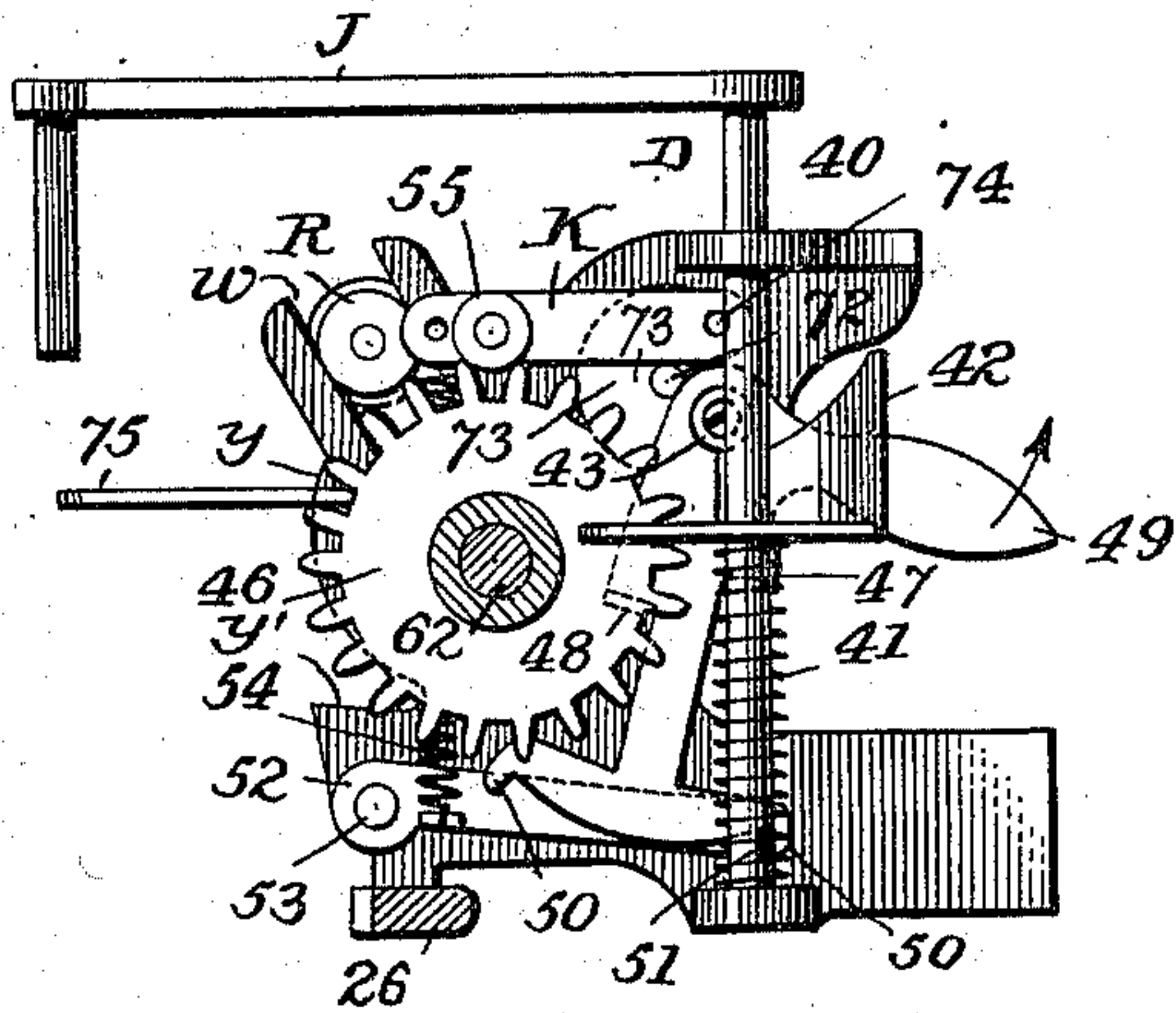


Fig. 7.

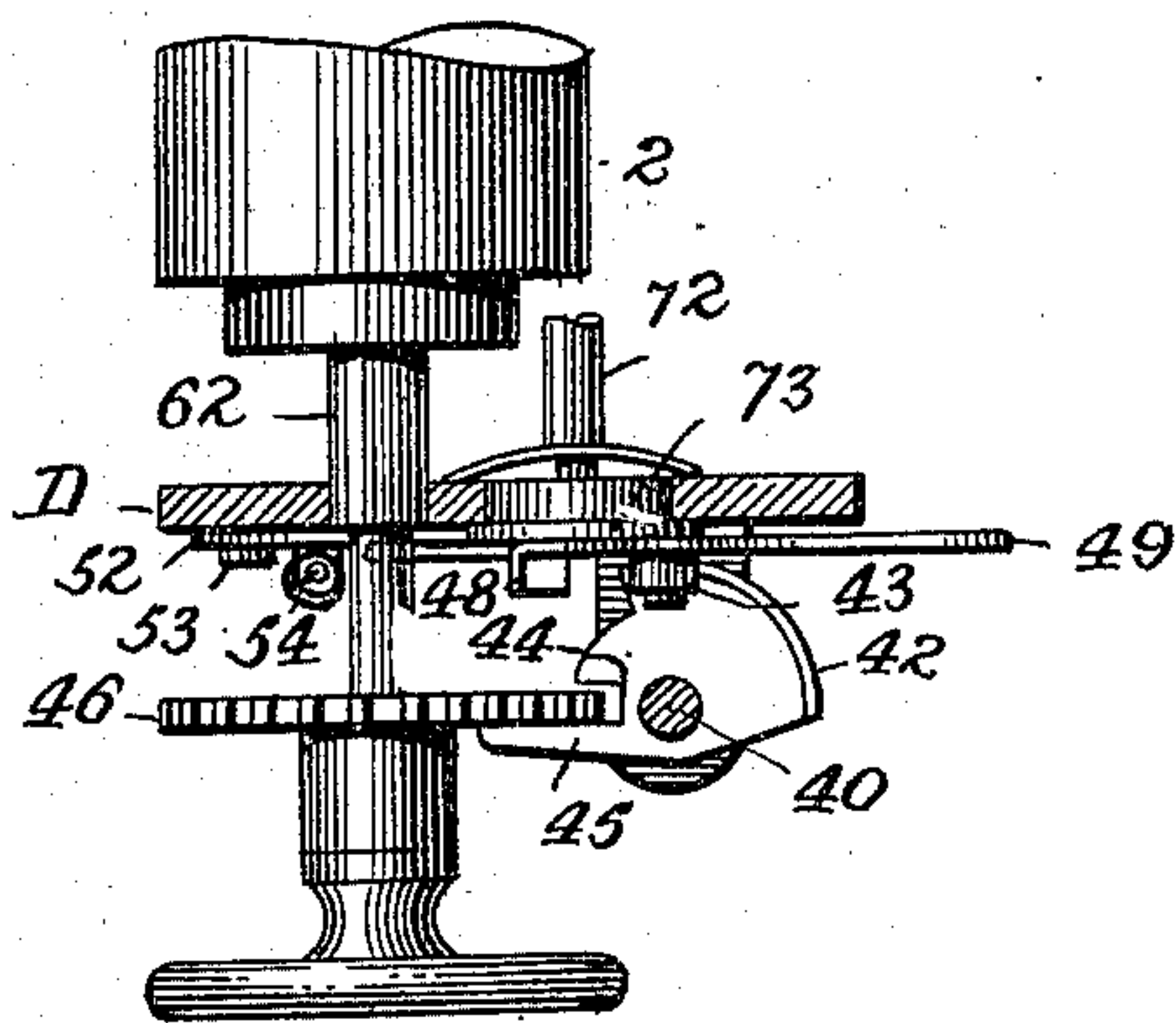
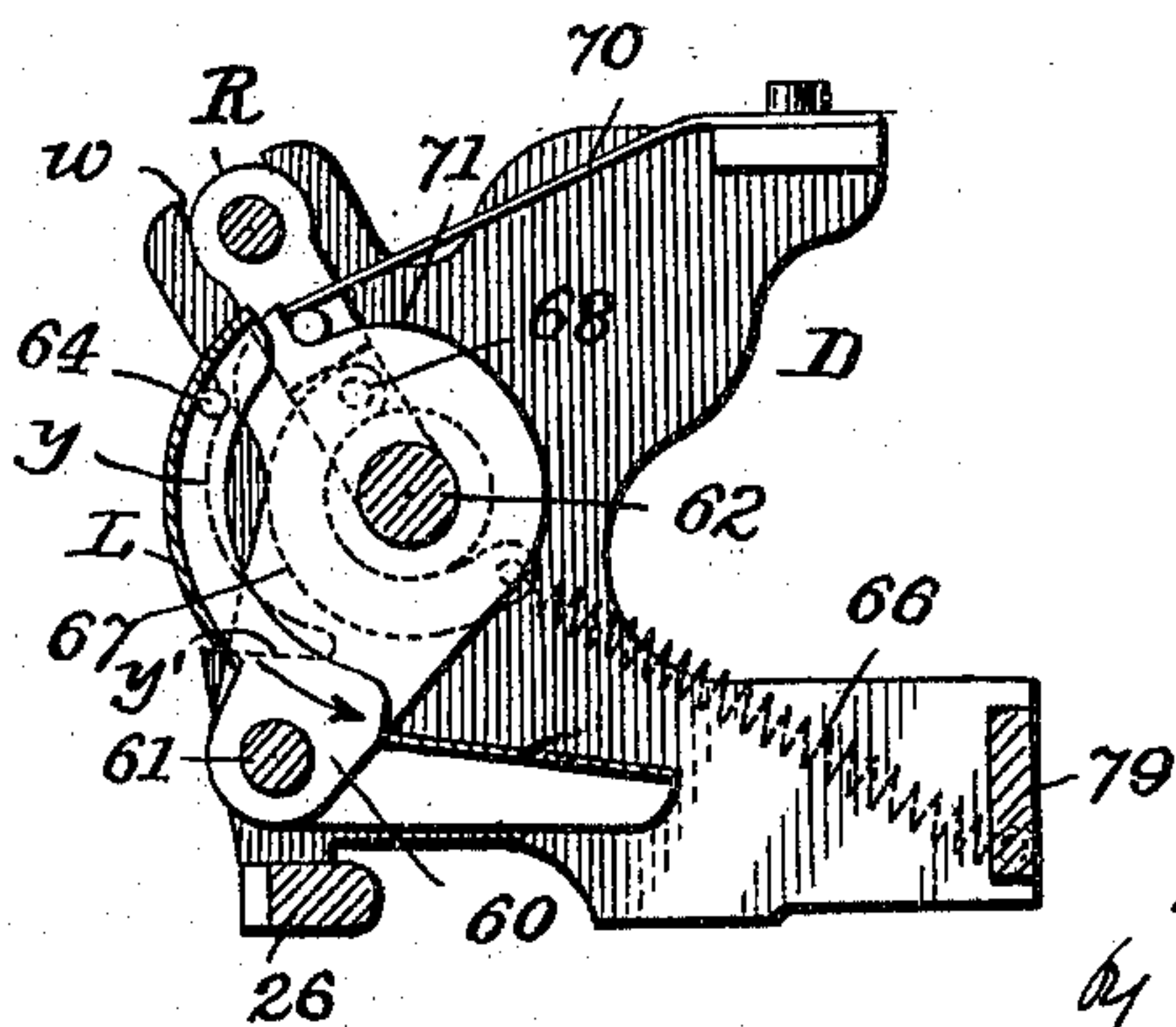


Fig. 8.



Witnesses
J. Hinkel
H. M. Gillman, Jr.

Inventor
William S. Shirk
by *Sam Freeman*
Attorneys

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6 Sheets—Sheet 6.

Fig. 9.

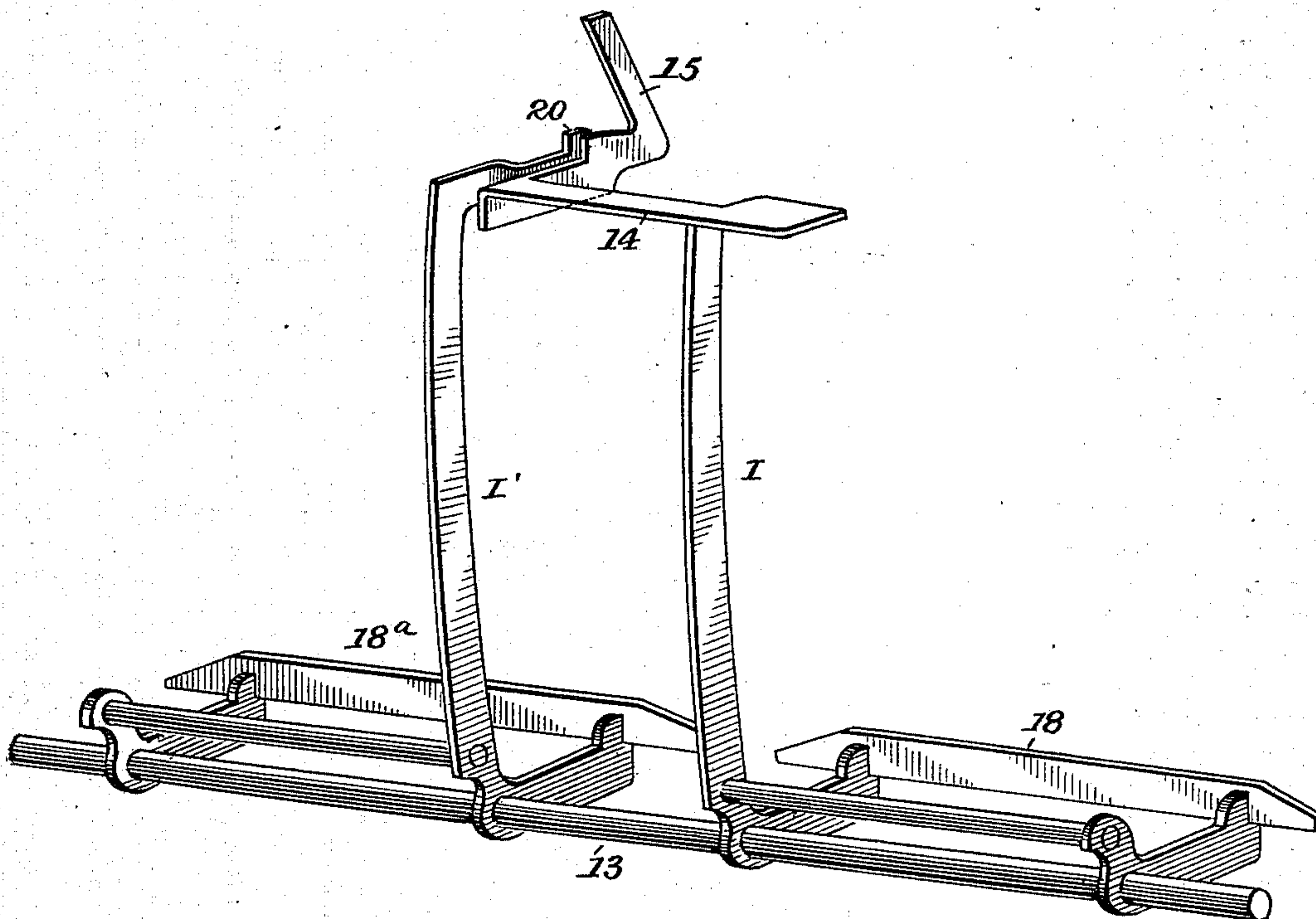


Fig. 10.

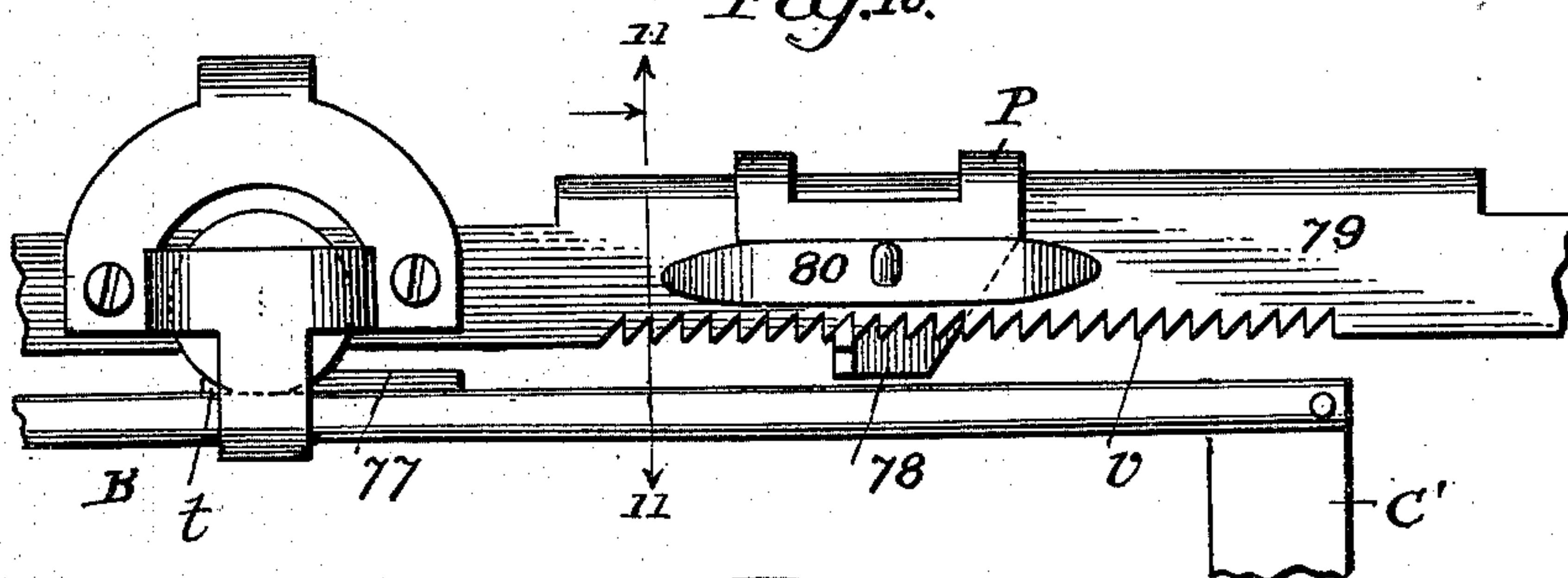
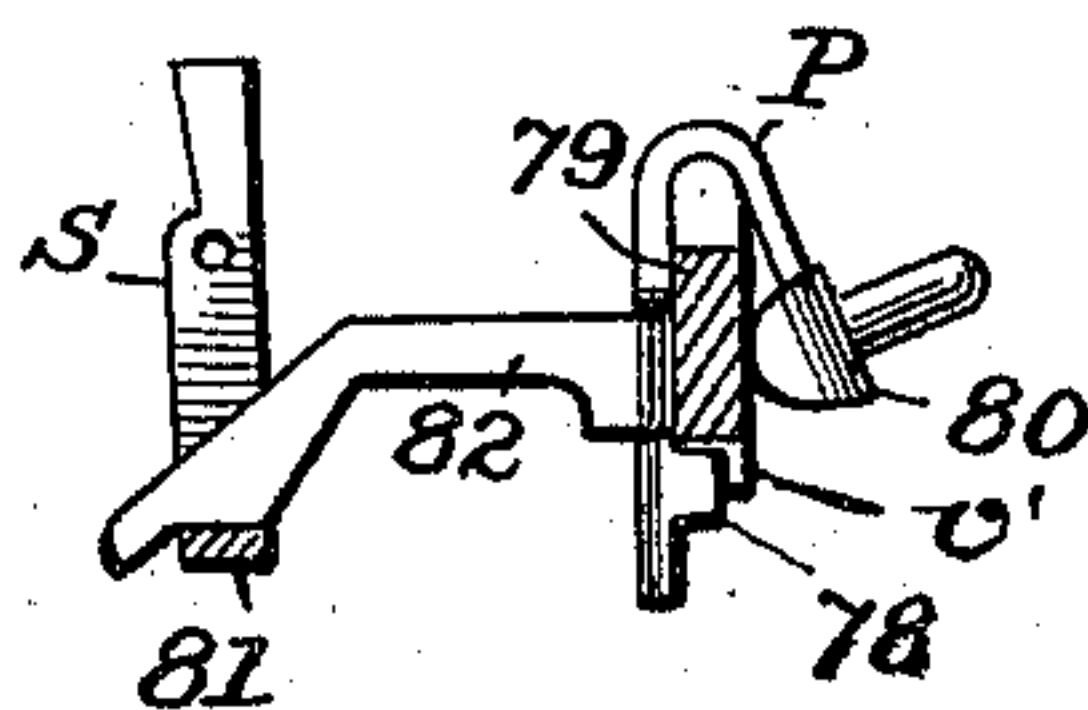


Fig. 11.



Witnesses

J. G. Hinkel

H. M. Gillman, Jr.

Inventor

William S. Shirk

by Louis Freeman

Attorneys

UNITED STATES PATENT OFFICE.

WILLIAM S. SHIRK, OF ANDERSON, INDIANA.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 681,270, dated August 27, 1901.

Application filed November 4, 1899. Serial No. 735,764. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM S. SHIRK, a citizen of the United States, residing at Anderson, in the county of Madison and State of Indiana, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

My invention relates to type-writing machines of the class illustrated in Letters Patent of the United States No. 588,608, issued to me August 24, 1897; and my invention consists in certain improvements in the construction and operations of parts of the said machine which simplify the said machine, facilitate its manipulation and construction, and increase the effective speed of operation, as fully set forth hereinafter and as illustrated in the accompanying drawings, in which—

Figure 1 is a transverse central sectional elevation showing a machine embodying my improvements except the keyboard. Fig. 2 is a plan of the parts shown in Fig. 1. Fig. 3 is a sectional elevation on the line 3-3, Fig. 2. Fig. 4 is a plan view showing the type-wheel and platen-carriage devices and adjacent parts cooperating therewith; Fig. 5, a view showing the devices for feeding the platen-carriage. Fig. 6 is an end view of the platen-carriage in part section; Fig. 7, a sectional plan of Fig. 5. Fig. 8 is a transverse section through the platen-carriage; Fig. 9, a detached perspective view of part of the devices for oscillating the type-wheel; Fig. 10, a rear view of part of the platen-carriage with an adjustable margin-stop. Fig. 11 is a section on the line 11-11, Fig. 9.

The frame of the machine consists of the base A, a platform B, and intermediate supporting-standards C C'. Upon the platform slides the carriage D, which moves step by step under the operation of the keys attached to the key-levers 1, and which is provided with the cylindrical platen-roller 2, around which the paper is passed and against which the ink-ribbon 3 is pressed by type upon the type-wheel E, consisting of a series of parallel type-bars arranged to coincide with part of a circle and carried by a frame F, which slides and vibrates upon a rod 4. The bars of the type-wheel are provided each with a number

of type or forms arranged upon the outer faces at different distances from the top.

In the operations of the machine the type-wheel is swung upon its pivotal bar or rod 4 to bring the proper type-bar in printing position, and if the upper type upon said bar is not the proper type to be used the type-wheel is elevated, sliding on the rod 4 until the proper type is in printing position, when a hammer is brought against the inner side of the type-bar and drives the latter out against the ribbon, bringing the latter into contact with the paper. These general operations do not materially differ from those of the machine of my aforesaid Letters Patent. In said machine, however, the normal position of the type-wheel is a central position, so that the type-bars normally obstructed the sight of the printed line. To avoid this objection, I now so construct and arrange the parts that the type-wheel normally occupies a position to one side of the printing-line x , Fig. 2, so that after a letter is printed and the type-wheel goes back to position the said letter can at once be seen.

As a result of this improvement the "gage" or stop device H, which determines the extent of lateral movements of the type-wheel, is placed wholly at the side opposite that occupied by the type-wheel in its normal position instead of occupying positions on both sides of the central line, as in the construction of my aforesaid Letters Patent. The gage has shoulders of any suitable number and, as shown, the shoulders are arranged in two series 7 8 of seven shoulders each. With the type-wheel E vibrates a striker-bar 9, the end of which normally traverses a path within the gage H; but when the gage is moved inward the bar 9 strikes one of the shoulders of the gage, according to the vertical position of the bar, which is secured to a rod M, sliding in the type-wheel frame, and to which a vertical movement is imparted varying according to the key which is struck.

The gage H is upon arms vibrating on a shaft 10, Fig. 4, and there are suitable connections whereby when any one of the series of keys at the right-hand side of the keyboard is depressed the gage will be swung inward, so that the bar 9 will strike one of the shoulders

of the series 7; but when any one of the series of keys at the left hand of the keyboard is depressed the gage will not be swung until the bar 9 has passed the series of shoulders 7, when the bar will make contact with one of the series of shoulders 8. The number of shoulders corresponds to one-half the number of keys of the keyboard, and they might be arranged in one inclined row, but are divided into sections to avoid the necessity of imparting such extended vertical movements to the type-wheel with corresponding reduction of speed. If desired, the shoulders of the gage might be in three or more series. In all cases, however, the single bar 9 coöperates with all the shoulders. For each case of letters with fourteen type-bars, fourteen shoulders, and twenty-eight keys there will of course be two type upon each bar, one above the other, and one-half the keys must act to lift the type-wheel into printing position.

In the construction of my prior patent the hammer dropped toward the front, swinging about a horizontal axis, and was somewhat in the way. To avoid the objections to this construction, the hammer 6 is secured to a vertical shaft 12, Fig. 2, and swings in a horizontal plane to the right and avoids any obstruction.

In the present construction the same means are employed as in my aforesaid patent for imparting the varying vertical movements to the rod M, carrying the striker-bar 9; but I avoid the complicated mechanism of the said patent for vibrating the striker-bar and the type-wheel by the construction which I will now describe.

An operating-lever I, pivoted to a rod 13, Figs. 1, 3, and 9, carries a cross-head 14, from which extends an L-shaped arm, the vertical member 15 of which is inclined, as best shown in Fig. 9, and this arm extends normally in a position across the end of one finger 16, Fig. 2, of a fork projecting from the striker-bar 9 and opposite the edge of the other finger 17 of said fork. When in this position, the contact of the end of the finger 16 of the fork with the side of the blade 15 will hold the type-wheel E in its normal position. This prevents the displacement of the type-wheel under rapid operation. The greater the extent to which the striking-bar 9 is carried down the less the oscillation required to bring it against the shoulders of the gage. If the blade 15, which operates the striking-bar, were vertical, it would therefore be necessary to vary the extent of its swinging movement according to the vertical position of the striking-bar. By inclining the blade 15, however, a uniform swinging movement may be imparted to the blade and its supporting-frame, so that it will, notwithstanding its uniform motion, operate properly with the striking-bar, whatever may be the vertical position of the latter. The operating-lever I is oscillated directly from one section of the series of key-

levers by means of a cross-bar 18, connected with the lever I, as shown in Figs. 1 and 9, the upward movement of any one of the levers 1 lifting the bar 18 and swinging the lever I toward the operator. The lever I, however, derives a similar motion less in extent from the remaining portion of the keys indirectly through the medium of another operating-lever I', also provided with a cross-bar 18^a and provided at its upper end with a lug 20, which engages the end of a lever 21, Fig. 4, pivoted to a pin 22 below the platform B and provided with a lug 23, which when the lever 21 is thrown toward the operator engages the edge of the cross-head 14 and carries with it the lever I. The inclined blade 15 thus derives its motion from each of the key-levers, but one section of the key-levers operates through different devices from the other. It would be practicable to operate the blade 15 from a single bar 18, engaging all of the levers and connected with the lever I; but this would necessitate imparting a greater angle to the blade 15 and so fine an adjustment that the parts might not operate so accurately under rapid movements. Further, if but one bar were used the inclined blade 15 would have to be moved as far by the action of one section of keys as it is from the other, while by the use of two sets of operating devices the movement of the blade 15 to carry the wheel and the striker-bar to coöperate with the series of steps 7 is only part of the extent of the movement imparted to that blade in bringing the striker-bar to coöperate with the series of steps 8. Thus with one-half the keys the motion of the operating-blade is much less than would otherwise be necessary, and the parts may be made lighter in weight and operate with less momentum and more rapidly.

The platen-carriage D is moved in one direction by a toothed drum 27, containing a coiled spring 28 and provided with teeth engaging a rack-bar on the carriage, and the step-by-step action results from the movement of a pinion 25. To this pinion 25 is connected a ratchet-wheel 29, with the teeth of which engages a spring-actuated pawl 30, and from the lever 21 extends an arm 31, so arranged that as the lever 21 is thrown out in the direction of the arrow, Fig. 4, the point of the arm 31 takes its position back of one of the ratchet-teeth and prevents the ratchet-wheel from turning when the pawl 30 is thrown out of engagement with the teeth of said ratchet. When the key is released, the lever 21 and arm 30 start toward their normal positions, permitting the ratchet-wheel 29 to turn in the direction of its arrow, Fig. 4, the pawl 30 meanwhile swinging inward, so as to engage the succeeding tooth of the ratchet-wheel, which derives its movement from the traverse of the carriage D under the action of the spring 28. The pawl 30 is carried in one direction by a spring 33 and is carried outward as the lever 21 swings toward the

operator by the contact of a pin 34 on an arm 35 with a lug 36 at the end of the pawl. The arm 35 is on the end of the hammer-shaft 12 and is connected by a link 37 with the lever 21. As the lever 21 therefore swings toward the operator the pawl 30 is thrown out, while at the same time the hammer is thrown in under the action of the key.

While I have shown the arm 31, which acts as on escapement pawl or dog, as connected to the lever 21, it is obvious that it may be connected with any other part of the machine operating in unison with the said lever 21, while the hammer-shaft also may be operated from any other part of the machine which is actuated as a key is depressed.

The pawl 30 vibrates on a pin 30^a, passing through a slot in the pawl, so that the latter on escaping from a tooth is drawn back by the spring 33 and cannot therefore fly back into engagement with the tooth from which it has just been withdrawn.

By the arrangement described whereby the parts connected with the hammer are made the means of throwing out the pawl 30 I insure the feeding of the carriage the instant the hammer has taken its action and without waiting for the upper movement of the key.

Any suitable means may be provided for throwing the lever 21 away from the operator—as, for instance, a spring 39, Fig. 4.

The platen-roll is turned by hand through the medium of a hand-lever J. This is connected with a shaft 40, turning in bearings on the carriage and capable also of a vertical movement, and a spring 41, coiled around the lower part of the shaft 40, tends to throw it upward and also to turn the lever J toward the center of the machine. The shaft 40 carries a cam 42, which when the lever J is thrown to the right is brought against a roller-stud 43, the shaft 40 being thereby depressed. On the shaft 40 is a lug 44, Fig. 7, and a short distance therefrom a finger 45, and between the lug and the finger extends normally the edge of a pinion 46 upon the platen-roller shaft. When the shaft 40 is turned to the right, Fig. 2, the lug 44 is brought between the teeth of the pinion 46, and as the shaft 40 descends under the action of the cam 42 the pinion 46 and the platen-roller 2 are turned together in the direction of the arrow, Fig. 2. When pressure on the lever J is released, the spring 41 swings the shaft 40 and its connected parts back to the position shown in Fig. 2 and to the extent limited by the contact of the finger 45 with the face of the wheel.

The downward motion of the shaft 40 and its cam to vary the space between lines in printing is limited by lugs 47 48 on a stop-lever 49, pivoted to the frame. When the lever 49 is in the position shown in Fig. 6, the shaft 40 can only descend until the contact of the bottom of the cam 42 with the lug 47; but when the outer arm of the lever 49 is lifted, the lug 48 is brought below the cam

and the latter can descend to a greater extent. Any other suitable arrangement of movable stops for determining the throw of the cam may be employed.

The lever 49 is limited in its movements by means of two lugs 50 50 upon an arm of the said lever, which alternately makes contact with a lug 51 on an arm 52, pivoted at 53 to the carriage and pressed upward by a spring 54 to create a slight frictional resistance to the movement of the lever 49.

A dog K (consisting of a lever) carries a roller-lug 55, which engages the teeth of the pinion 46 and prevents the turning of the latter except when sufficient pressure is applied to lift the dog against the power of the spring 54, which is connected at one end with the dog.

In order to permit the proper placing of the paper upon the platen-roller 2 and yet clamp it firmly against the face thereof at the point adjacent to that where the type strikes the same, I make use of a curved clamping-plate L, pivoted to a cross-bar 61, connected at opposite ends to arms 60, which swing upon the shaft 62 of the platen, and one of which is connected to a sleeve s, Figs. 2 and 8, extending through the side of the carriage and provided with a head 63, which may be grasped by the fingers to swing the arms 60, the shaft 61, and the clamping-plate L. The clamping-plate carries at each end a pin 64, adapted to bear against cam edges $y y'$, Fig. 8, at the side of the frame of the carriage D and of such shape that when the clamping-plate is thrown to the position shown in Fig. 8 there will be a free space between the clamping-plate and the periphery of the roller within which to pass the paper; but when the clamping-plate is thrown into the position shown in Fig. 1 its upper edge will be swung inward and pressed tightly against the paper and carry it close against the face of the roll at the point adjacent to that where the type strikes the paper. Imperfect printing from the failure of the paper to lie close against the roll is thus prevented. It will be evident that any other means for carrying the clamping-plate eccentrically, so as to be free from the roller when elevated and pressed against the roller when depressed, might be employed. A spring is suitably connected with the plate, so as to tend to hold the clamping-plate at the limits of its movements. As shown, a spring 66 is connected by a crescent-shaped bar 67 with a pin 68 upon the head 63 and by tending to turn the head in the direction of its arrow, Fig. 8, brings the pins 64 against cam edges $y y'$, which throw inward the edge of the clamping-plate. When the clamping-plate is in the position shown in Fig. 8, the pin 68 is above the line of the spring—that is, above the dead-center—and the parts thus are held in place. In order to hold the paper still more closely against the platen and opposite the type-bars, I make use of a roller R, which presses upon

the paper along the extent of the platen-roll above the printing-point. As shown, the roller R is secured to a shaft having its bearings sliding in radial slots *w* of the carriage, and a blade-spring 70 at each end bears upon a lug of the roller-bearing and tends to maintain the roller in contact with the face of the platen-roll with a pressure that aids in the feed of the paper.

It is of course necessary to lift the roller R when the paper is to be inserted, and this is effected by means of the cam ends 71 of the arms 60, Fig. 8, which as said arms are turned to raise the upper edge of the clamping-plate lift the springs 70 and the bearings of the roller R.

When it is desired to make use of means for securing an additional adjustment of the paper independent of that effected from swinging the lever J—as, for instance, when it is necessary to bring the paper in position to print on or between ruled lines—I effect this to any desired extent through the medium of a lever N and connections, Figs. 1, 6, and 7, whereby the platen-roller shaft is turned to the extent proportioned to that to which the lever N is swung. Thus the lever N is connected to a rock-shaft 72, carrying at one end a disk or arm 73, upon which is the pivot 74 of the dog K, so that on turning the shaft 72 the dog is carried in one direction or the other and carries with it the pinion 46, connected with the platen-roller shaft, and thus turns the platen-roller. A friction-spring may be arranged at any point to create sufficient resistance to hold the above-described parts in any position to which they are adjusted. It will be evident that if the platen-shaft and its pinion 46 were turned and the stud 43 were in a stationary position the feed of the platen-shaft by the action of the lever J would be altered. I therefore secure the stud 43 to the disk 73, and thus maintain the relation of these parts, and I also hang the lever 49 to the stud 43, and thus maintain the relation of the latter to the other parts. By this means I am enabled to turn the platen-lever to any desired position by hand and yet secure a regular automatic feed.

To prevent the hammer from being operated so as to strike the type after the carriage has reached the end of the line, I provide the carriage with a projecting plate 75, Fig. 2, in position to be struck by a pin 76 on the hammer-arm after the carriage has traveled a sufficient extent toward the left.

In order to so arrest the carriage as to secure any desired margin, I provide the platform B with a stop 77, Fig. 10, and I arrange upon one of the bars of the carriage an adjustable stop 78. This stop 78 is carried by a yoke P, which slides upon the bar 79 and carries a spring 80, which holds the yoke frictionally in contact with the bar and causes it to swing inward to bring the stop 78 into engagement with a tooth of a series of ratchet-teeth *v* at the under side of the bar 79. By

pushing on a handle 80 the yoke may be swung to carry the stop 78 away from the teeth, when the yoke may be adjusted to any desired position on the bar 79.

When it is desired to write in the left-hand margin, the lug 78 is carried away from position to make contact with the lug 77 by any suitable device operated from a finger-lever Q—for instance, the lever Q, Fig. 1, swings a pivoted frame S, carrying a longitudinal bar 81, Figs. 1 and 11, extending beneath a finger 82, projecting from the rear end of the yoke P, and when the lever Q is drawn toward the operator the frame S is swung to lift the finger 82 and carry the stop 78 out of position to contact with the stop 77, but not far enough to disengage it from the teeth of the rack *v*. As the margin is written in the stop 78 bears against the face of the stop 77, and this contact serves to hold the stop 78 in the position to which it has been set; but when the stop 78 thereafter passes from the end of the stop 77 the stop 78 springs in, so that the margin limit is thereafter preserved. The bar 81 also serves at the time the frame S is rocked to throw out the pawl 30 from the ratchet-wheel 29, so as to permit a free-hand adjustment of the carriage. This is effected by a pin 84, Fig. 4, extending upward from the pawl, Fig. 1, in position to be struck by the bar 81. The stop 77 is brought to a sharp edge at the end *t*, Fig. 10, so that when the stop 78 is carried to the left of the stop 77 and then thereafter traverses toward the stop 77 it will simply be pushed inward and not arrest the motion of the carriage.

In order to illustrate and describe the operating parts of the entire machine, I have included those in connection with the carriage for turning the platen-roll and regulating its movements and for clamping and adjusting the paper; but I do not here claim these features.

Without limiting myself to the precise construction and arrangement shown, I claim—

1. The combination with the platen and keys of a type-writer, of an oscillating type-wheel supporting a series of parallel type-bars, means for maintaining the type-wheel normally with all the bars at one side of the printing position, and means for swinging the type-wheel to bring the different type to printing position by the actions of the keys, substantially as set forth.

2. The combination with the platen and keys of a type-writer, of an oscillating type-wheel provided with a series of parallel type-bars, a hammer for striking said bars, means for maintaining the type-wheel normally with all the bars at one side of the printing position, and means for swinging the type-wheel to bring the different type to printing position by the actions of the keys, substantially as set forth.

3. The combination with the platen-roll and type-wheel, means for maintaining the latter normally at one side of the printing position,

and a striker-bar carried with the type-wheel, of a gage having a series of shoulders arranged at the opposite side of said position, substantially as set forth.

4. The combination with the platen-roll and type-wheel, means for maintaining the latter normally at one side of the printing position, and a striker-bar carried with the type-wheel, of a gage having shoulders in series and arranged at the opposite side of said position, substantially as set forth.

5. The combination with the platen-roll and vertically-adjustable and oscillating type-wheel, means for carrying the latter normally to one side of the printing position, and a striker-bar carried with the type-wheel, of a gage having shoulders in series and arranged at the opposite side of said position, and means for carrying the gage to and from the axis of the type-wheel, all arranged to permit the bar to operate with all of said shoulders, substantially as set forth.

6. The combination with the oscillating and vertically-movable type-wheel and striker-bar carried therewith, of a gage with shoulders in different position, and means for moving the gage to and from the axis of the type-wheel, substantially as set forth.

7. The combination with the oscillating type-wheel of a type-writer and with the keys, of a bar moving with said wheel and independent series of stops for limiting and defining the oscillation of the type-wheel, and means whereby to bring either series into operative position to cooperate with said bar, substantially as set forth.

8. The combination with the oscillating type-wheel of a type-writer and with the keys, of a gage provided with two series of stops, one beyond the other, and means for shifting the gage to bring either series into operative position, substantially as set forth.

9. The combination with the oscillating and vertically-moving type-wheel and striker-bar and keys of a type-writer, of a gage provided with different series of stops, and means connected with the keys whereby to move the gage inward and outward, substantially as set forth.

10. The combination with the oscillating type-wheel and its striker-bar, a gage having stops in different positions, and operating-keys, of an inclined blade 15 for operating the type-wheel, and means for imparting a movement of one extent thereto from one section of the keys, and a more extended movement thereto from the remaining keys, substantially as set forth.

11. The combination with the oscillating type-wheel and gage having series of stops arranged in different positions, of keys, a wheel-operating blade 15, and connections whereby the blade is moved to a limited extent from some of the keys to bring the wheel into operative connection with one series of stops, and other connections operated from the remaining keys to impart a more extended

movement to the blade to bring the type-wheel into operation with the other series of stops, substantially as set forth.

12. The combination with the oscillating type-wheel, keys, gage and operating-blade 15, of levers I I' and means for operating them from different sections of the keys, and connections whereby to impart a shorter movement to the blade 15 from the lever I', substantially as set forth.

13. The combination with the oscillating and vertically-moving type-wheel, of a gage provided with shoulders in different positions, a vertically-moving striker-bar for engaging said shoulders, and an operating-blade 15 engaging said bar and inclined substantially as and for the purposes set forth.

14. The combination with the blade 15 and lever I carrying the same, of keys, and means for operating the lever from a portion of the keys, a lever I' operated from the other portion of the keys, and a lever between the lever I' and the blade 15 for imparting a reduced movement to the latter, substantially as set forth.

15. The combination with the oscillating and vertically-movable type-wheel and striker-bar, of an inclined operating-blade and fingers 16, 17 extending from the striker-bar for engaging the blade, substantially as set forth.

16. The combination of the oscillating type-wheel having a series of type-bars and a hammer pivoted at one side of the axis of the wheel to swing in a horizontal plane, substantially as set forth.

17. The combination of the type-wheel, hammer and platen-carriage of a type-writing machine, of a rack on the carriage, a pinion engaging the same, and connected with a ratchet-wheel, detent-arm engaging the ratchet-wheel and supported to vibrate and slide on its fulcrum, and pawl also engaging the ratchet-wheel and connected to release the ratchet at the instant the hammer completes its action, substantially as set forth.

18. The combination of the type-wheel, hammer and platen-carriage of a type-writing machine, of a rack on the carriage, a pinion engaging the same, and connected with a ratchet-wheel, detent-arm engaging the ratchet-wheel, and pawl also engaging the ratchet-wheel, a key-operated lever 21 carrying the detent-arm, and shaft carrying the hammer and connected with the lever 21, and arm carried by the hammer-shaft arranged to make contact with the pawl, substantially as set forth.

19. The combination of the platen-roll carriage, platen-roll, its shaft, arms hanging on said shaft, clamp-plate carried by the arms, and provided with pins, and cam edges on the carriage, substantially as set forth.

20. The combination of the platen-roll carriage, platen-roll, its shaft, arms hanging on said shaft, clamp-plate carried by the arms and provided with pins, cam edges on the car-

riage, a roller R, springs for carrying it toward the platen-roll, and cam edges on the said arms for lifting the roller R when the clamp-plate is carried from the platen-roll,
5 substantially as set forth.

21. The combination with the platen-carriage, of a yoke P, a stop 78 carried thereby and adapted to engage a stop on the platform, a spring 80 and a hand-lever and connections
10 for shifting the stop 78 out of engaging po-

sition with the stop 77, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WM. S. SHIRK.

Witnesses:

CHARLES E. INTEO,
PAUL W. STEVENS.