

(No Model.)

4 Sheets—Sheet 1.

J. W. MORRIS.  
TYPE WRITING MACHINE.

No. 534,072.

Patented Feb. 12, 1895.

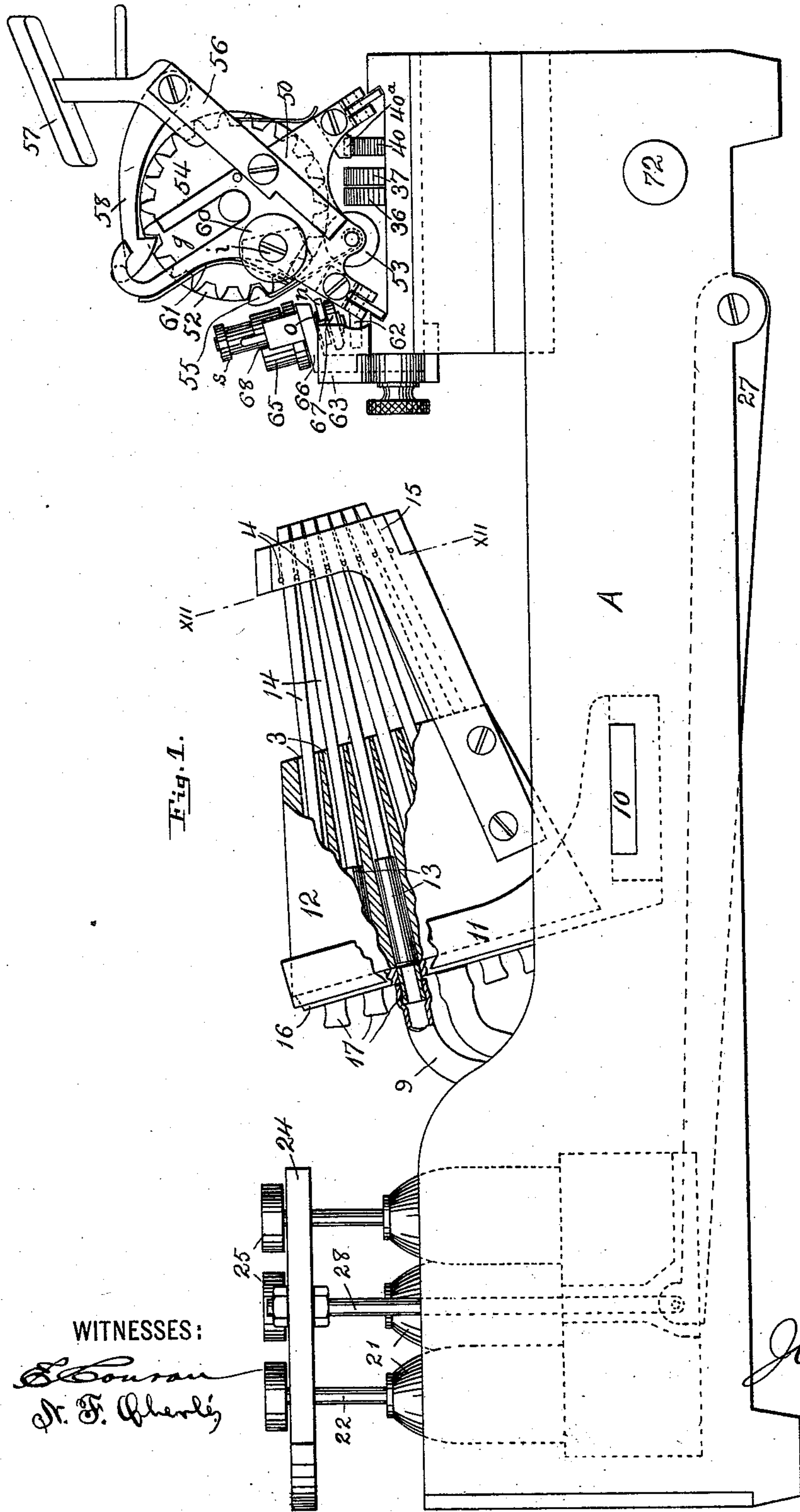


Fig. 1.

Fig. 2.



WITNESSES:

*E. Courant*  
*H. F. O'Brien*

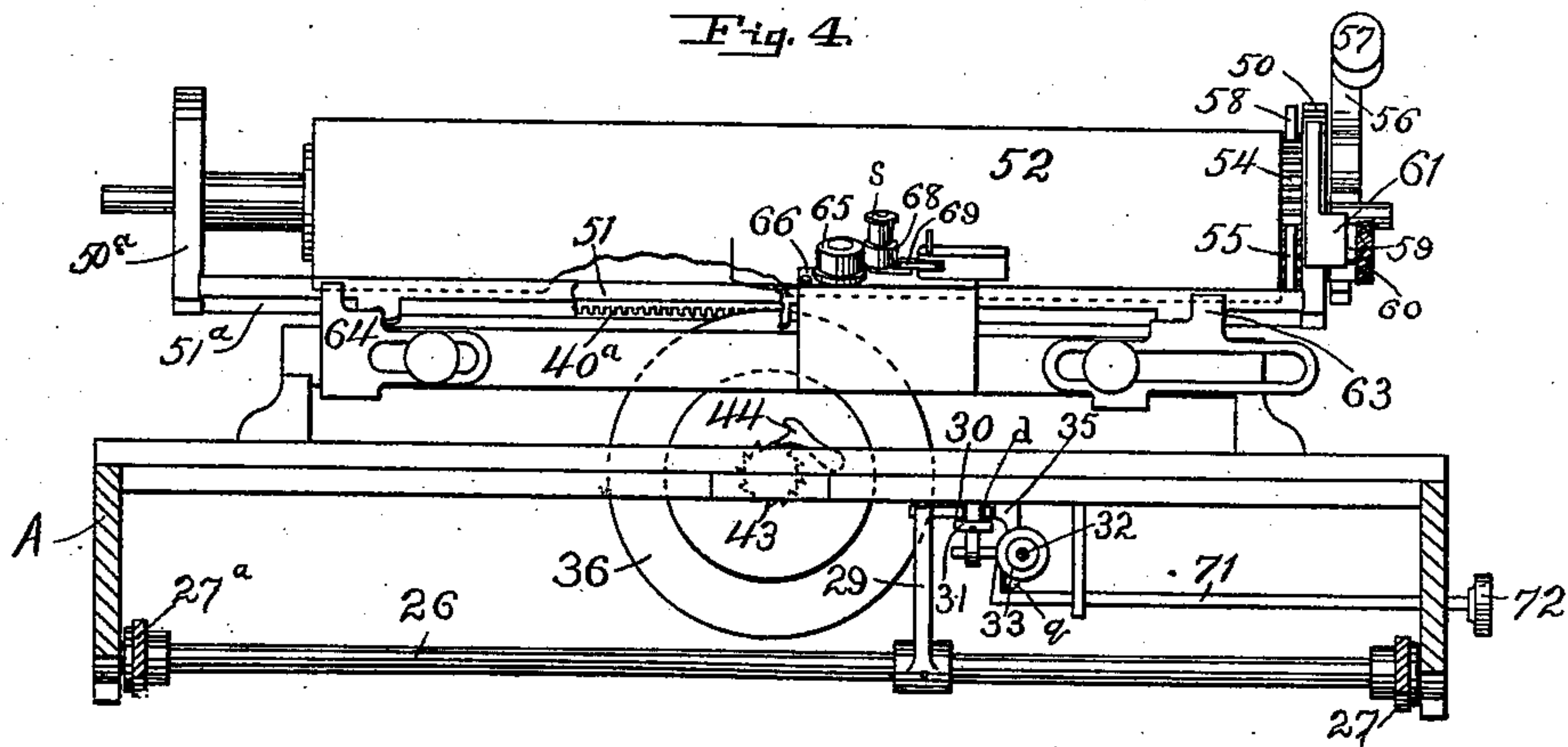
INVENTOR

*Willard Morris*  
BY *Dyer Healy*  
ATTORNEYS,

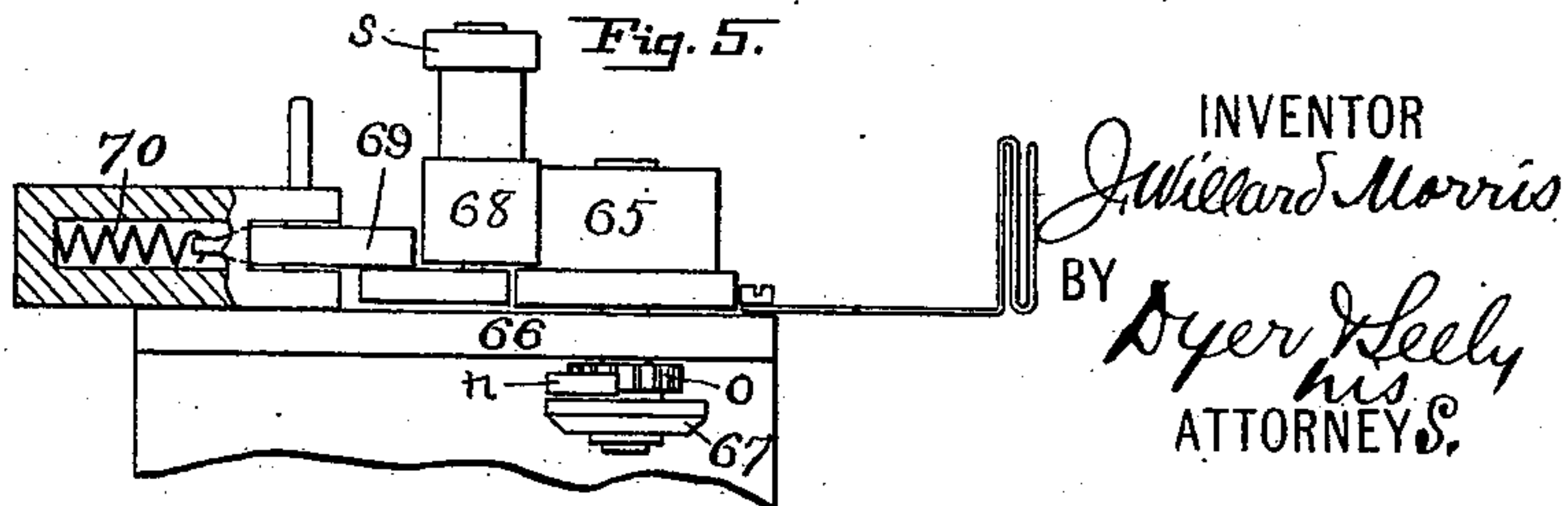
4 Sheets—Sheet 2.

No. 534,072.

Patented Feb. 12, 1895.



E. Courau  
N. F. Bherlé



INVENTOR

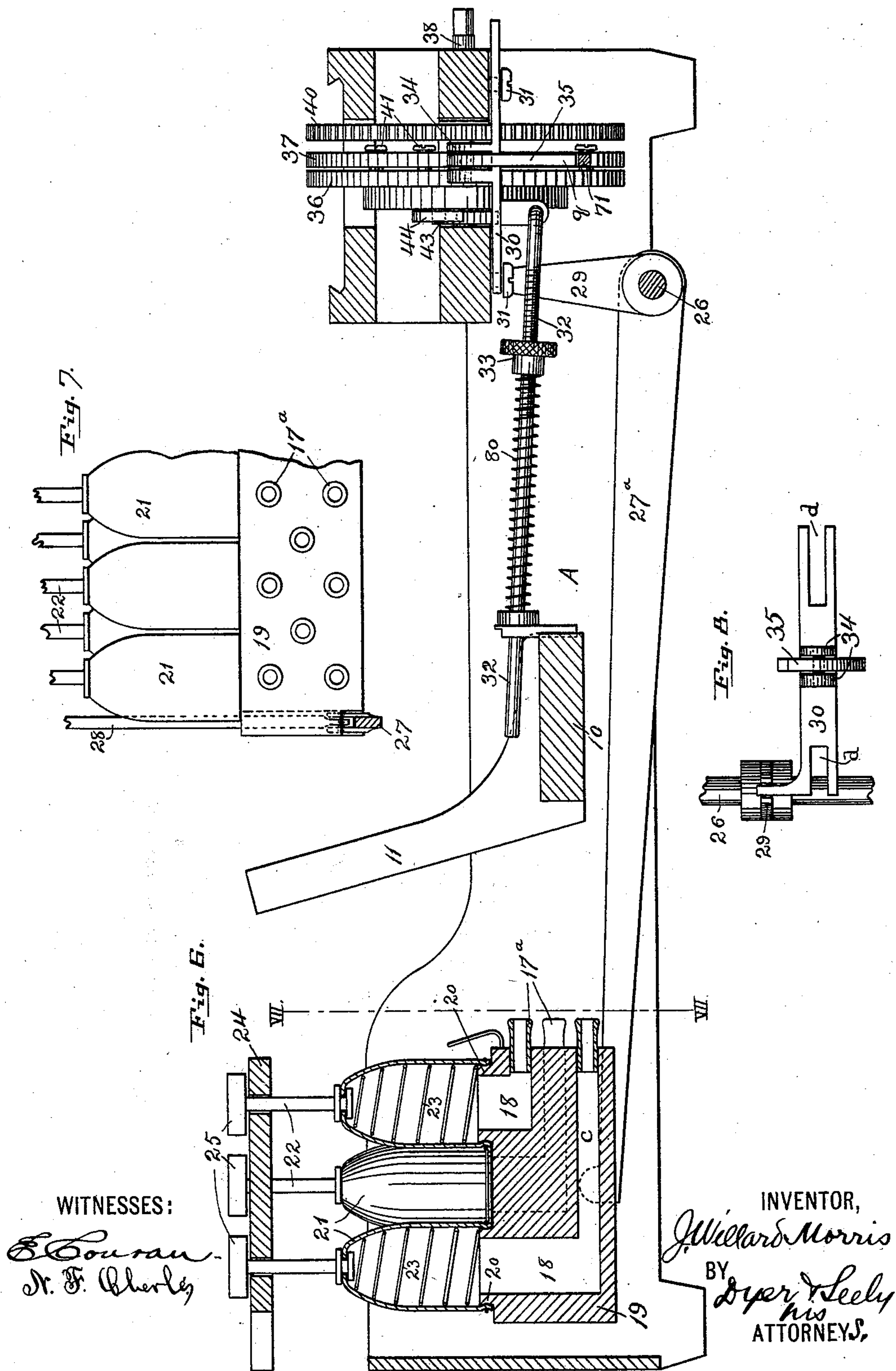
INVENTOR  
J. Willard Morris.

BY *Oyer & Seely*  
ATTORNEYS.

4 Sheets—Sheet 3.

No. 534,072.

Patented Feb. 12, 1895.





J. W. MORRIS.  
TYPE WRITING MACHINE.

No. 534,072.

Patented Feb. 12, 1895.

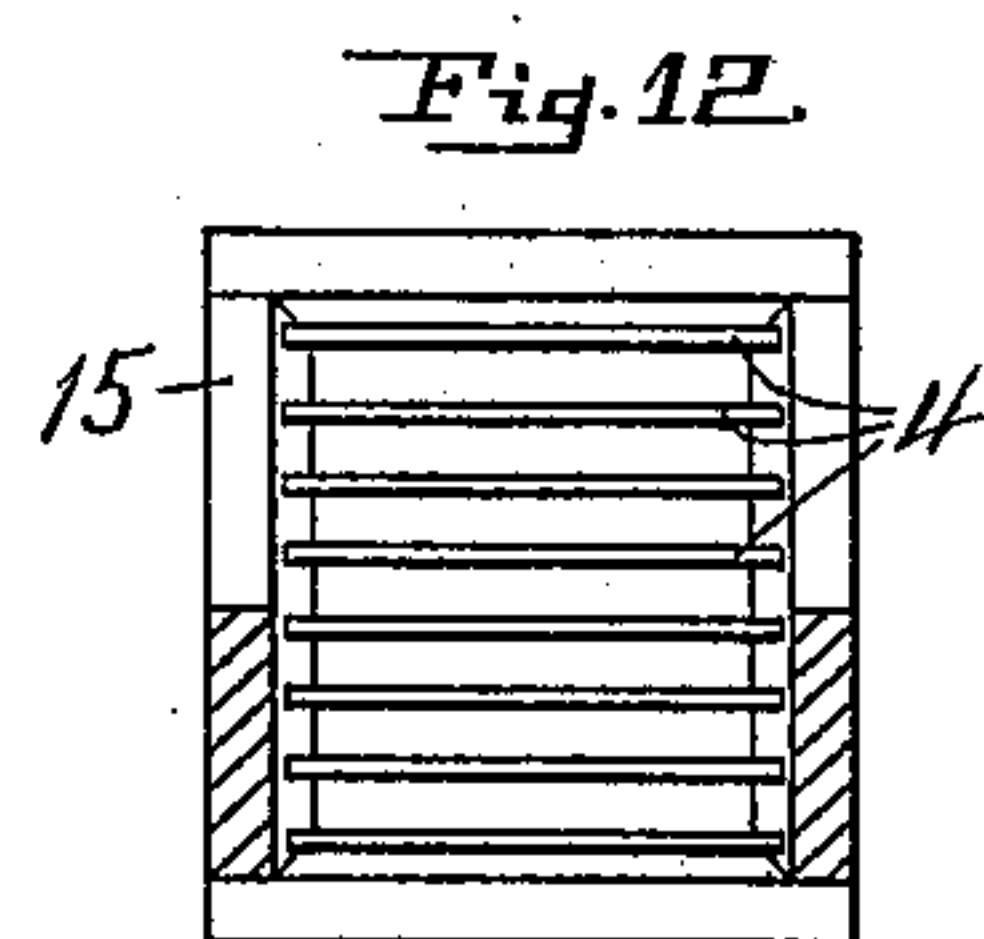
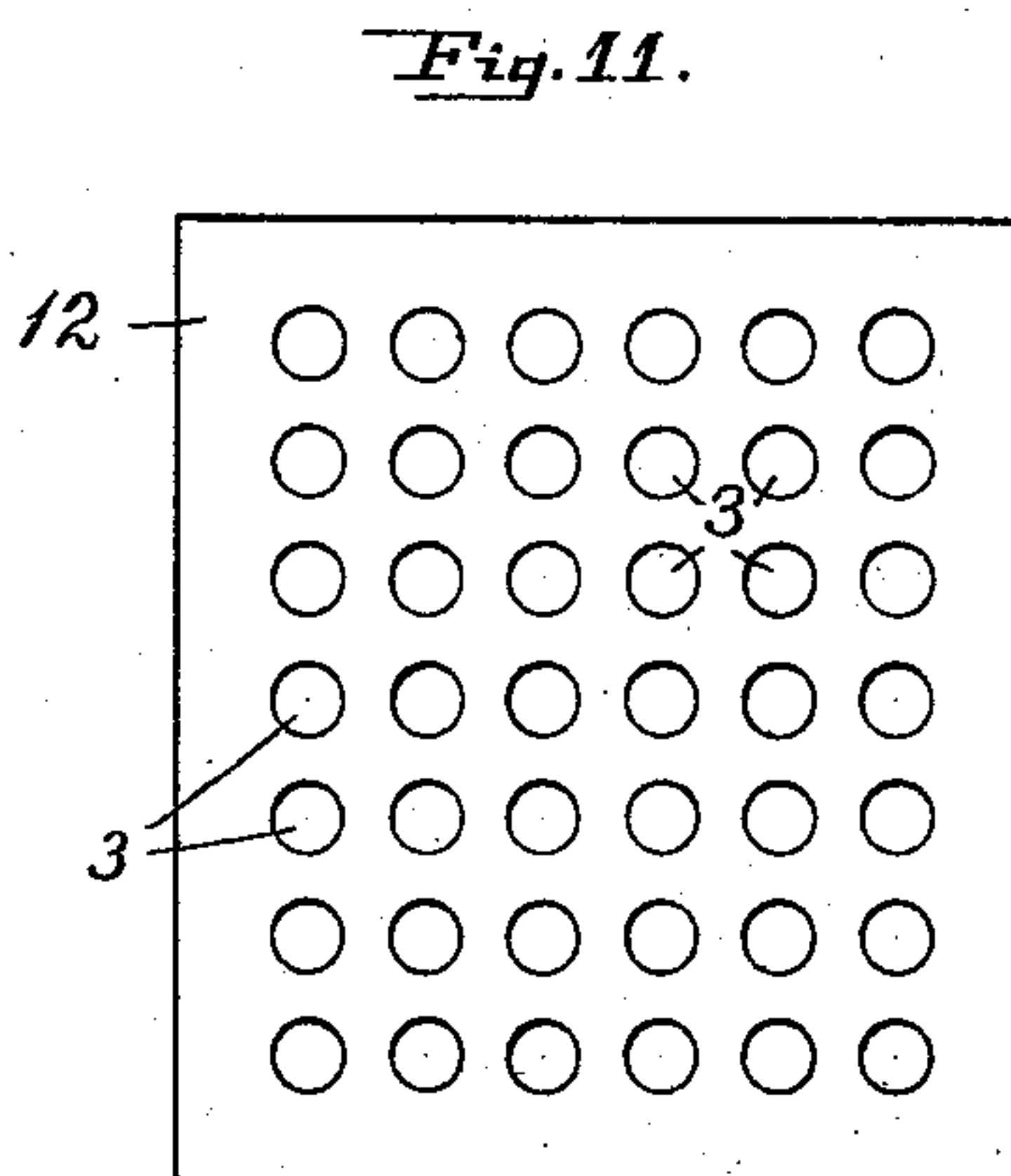
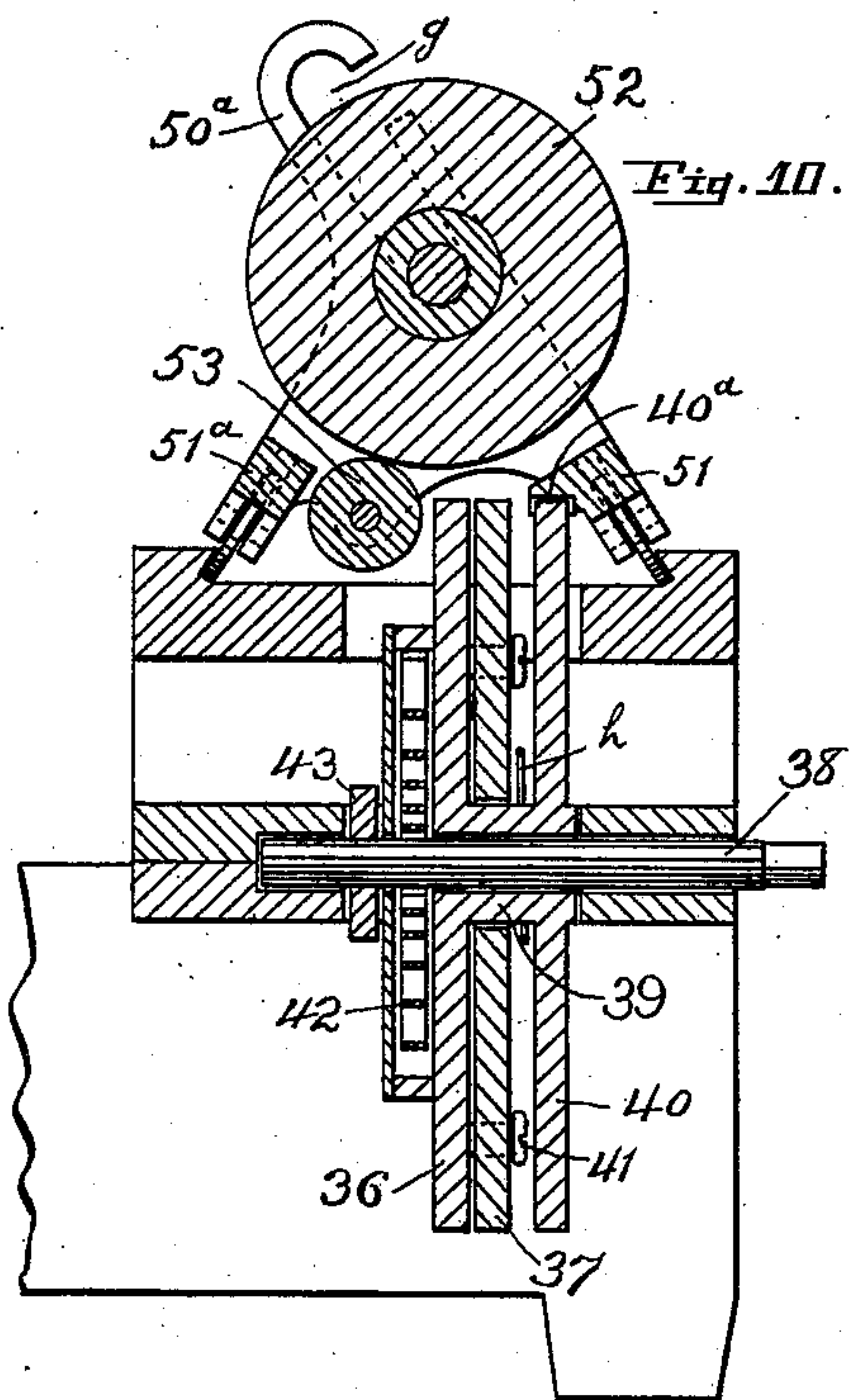
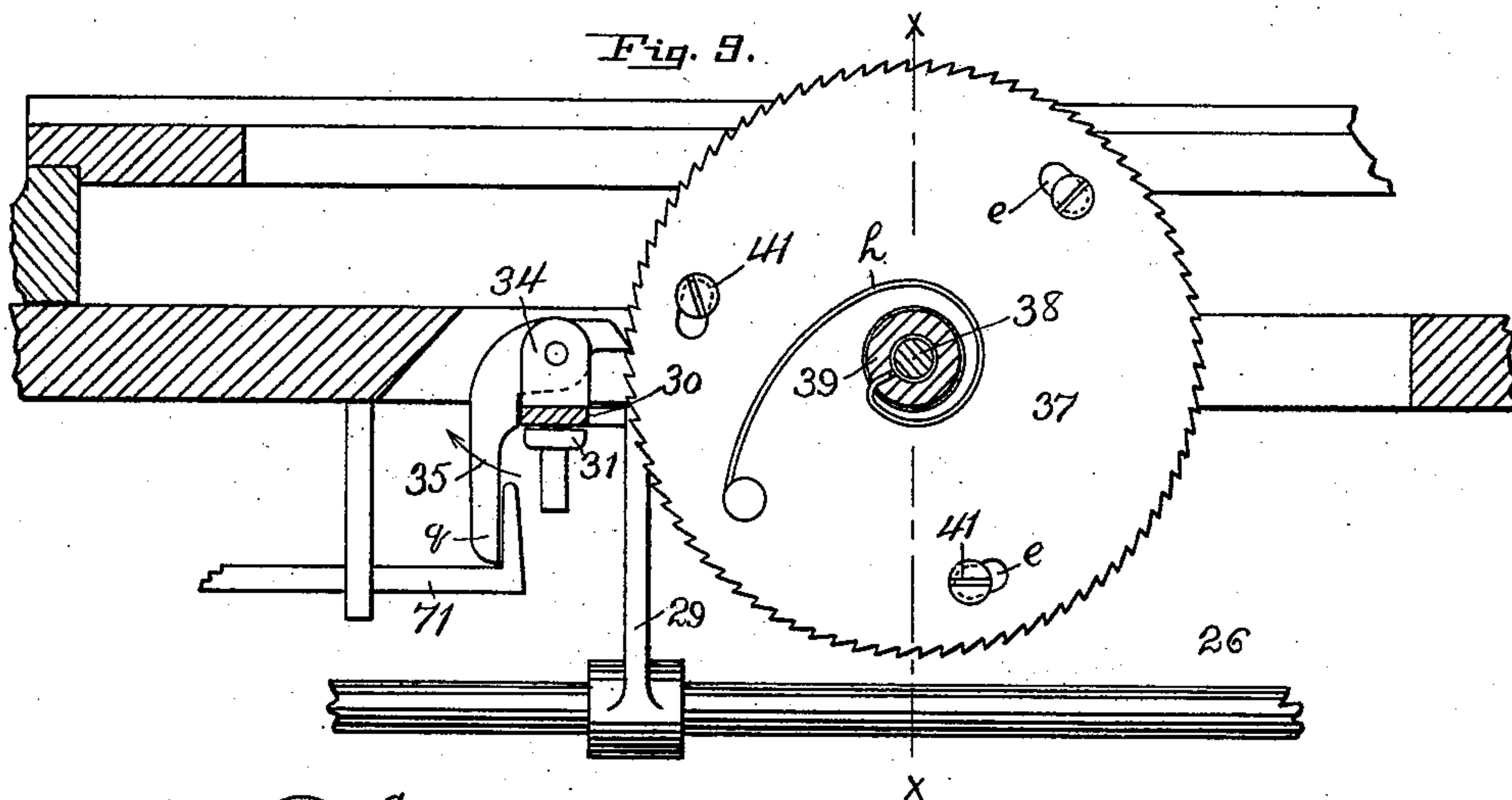
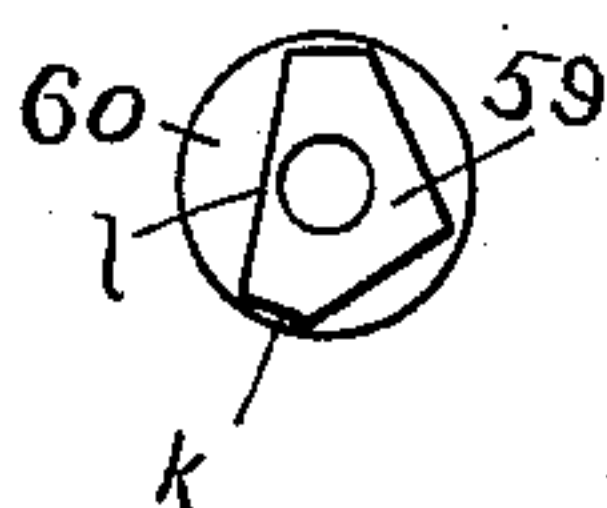


Fig. 13.



WITNESSES:

*E. Couran*  
*W. F. Oberly*

INVENTOR

*J. Willard Morris*  
BY *Dyer & Seely* his  
ATTORNEYS.



# UNITED STATES PATENT OFFICE.

JAMES WILLARD MORRIS, OF PLEASANT VALLEY, NEW JERSEY, ASSIGNOR,  
BY MESNE ASSIGNMENTS, TO PHILIP S. DYER, OF NEW YORK, N. Y.

## TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 534,072, dated February 12, 1895.

Application filed September 2, 1891. Serial No. 404,504. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES WILLARD MORRIS, a citizen of the United States, residing at Pleasant Valley, in the county of Bergen and State of New Jersey, have invented a certain new and useful Improvement in Type-Writing Machines, of which the following is a specification.

This invention relates to type writing machines and more especially to a means for operating the type-bars of such machines, and the invention consists essentially of a machine of the class referred to wherein the type are provided with plungers or pistons and operated through the medium of air contained in chambers preferably operating like a bellows, said chambers being controlled by finger-keys adapted to operate the bellows to drive the air therefrom, the main objects of the invention being to impart a quick movement to the type-bars, thereby providing for the rapid operation of the machine; to secure uniformity of impact and a consequent uniform imprint; to provide for the production of any reasonable and desired number of duplicate copies of the original, and to reduce the noise incident to the operation of the machine to a minimum, all with an expenditure of an exceedingly small amount of force or power on the part of the operator.

In addition to the above enumerated objects of invention many other objects are sought for and obtained by means of the novel constructions, arrangements and combinations of elements to be hereinafter described and specifically pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar reference figures and letters indicate corresponding parts in all the views.

Figure 1 is approximately a full sized side view of a typewriter organized to embody my invention, parts being removed, parts being broken away and parts being shown in section. Fig. 2 includes a side and an end view of a type-bar. Fig. 3 is a plan view of the machine given on a scale reduced about one-half from the scale of Fig. 1. Fig. 4 is a cross-sectional view taken on line *iv.*, *iv.* of Fig. 3. Fig. 5 is an enlarged detail view of a portion of the ribbon-controlling mechanism.

Fig. 6 is a longitudinal sectional view on line *vi.*, *vi.* of Fig. 3, the carriage and the type carrying blocks and connecting tubes being removed. Fig. 7 is a detail view on line *vii.*—*vii.* of Fig. 6. Fig. 8 is a plan view of the plate which carries the feeding roll. Fig. 9 is a sectional detail view illustrating the construction of the carriage-feeding mechanism, the carriage not being shown. Fig. 10 is a sectional view on line *x.*—*x.* of Fig. 9, the carriage, however being shown in position. Fig. 11 is a detail view of the forward face of the block in which the pistons or plungers ride; and Fig. 12 is a sectional detail view on line *xii.*—*xii.* of Fig. 1, the type-bars being removed. Fig. 13 is detail view of the stop employed in connection with the platen turning attachment.

I have found that air is a good medium to employ for the purpose of transmitting the power from the finger-key mechanism to the type pistons or plungers, and consequently I have selected a machine where air is used as the transmitting medium for the purpose of illustrating my invention, and although this "pneumatic type" of machine is susceptible of being embodied in many mechanical forms, I at present prefer substantially the construction illustrated in the drawings, wherein—

A represents the frame of the machine. Near the longitudinal center of the frame there is arranged a cross-bar 10, which carries two upwardly and rearwardly extending standards 11, that are formed with grooves 2, adapted to receive the rear edge of a block 12, that is pierced by a number of ducts or passages constituting cylinders 3, which conform with radii that extend from the printing point of the machine.

Within each of the cylinders 3 I place a type-bar 14, the type "a" being formed at the forward end of the bar, and the rear end acting as a piston being preferably provided with a head 13 as is clearly shown in Fig. 2. The leading ends of the type-bars 14 are supported and guided by a frame 15 that is connected to the block 12, each horizontal row of bars riding between cross wires or rods 4, and if deemed desirable similar vertical rods or wires might be placed between each vertical row of bars.

To the rear face of the block 12 I connect



a plate 16, which carries nipples 17 that register with the cylinders 3, said nipples being adapted to receive tubes 9, that are preferably made of rubber, and lead to other nipples 17<sup>a</sup>, which communicate directly, or through the medium of passages, with chambers 18 formed in a block 19. (See Fig. 6.)

From the construction described it will be seen that should any one or more of the type become worn or need adjustment, the tubes could be disconnected and the block 12 and the parts carried thereby removed bodily from the machine.

In connection with each of the chambers 18 there is arranged an annular flange 20, and to these flanges 20 I bind dome-like structures or bellows 21, preferably of sheet vulcanized rubber that are pierced at their apices to provide for the introduction of finger key stems 22, such stems being held to place by washers, as shown, or in any other proper manner.

Although not absolutely necessary to the proper operation of the machine, I greatly prefer to arrange springs or rings 23 within the domes 21, as such springs prevent all possible chance of the collapsing of the dome walls except under pressure. The stems 22 pass upward through a plate 24, and just above said plate the finger pieces 25 are mounted, the under faces of said finger-pieces resting directly on the plate.

The above is a general description of my type battery and its operating mechanism, and it will readily be understood that if any one of the finger keys be depressed, air from its chamber 18 and bellows 21, where it is found at atmospheric pressure will be forced bodily forward and into the corresponding cylinder 3, and hence that the type piston by the impact of the body of projected air within said cylinder will be moved outward and forward and that such piston will be drawn back the moment the pressure on the finger-key is relaxed by the suction arising from the expansion or filling of the dome or bellows 21. When the forward movement above described takes place the type is driven against the platen, the operating mechanism of which will now be explained.

Near the forward end of the machine there is mounted a rock-shaft 26, which carries two rearwardly extending levers 27, 27<sup>a</sup>, and these levers, in turn, carry pivotally mounted rods 28 that extend upward and through the plate 24, which said plate is held to the rods by clamping nuts, as shown. In addition to the levers 27 and 27<sup>a</sup>, the shaft 26 carries a lever 29, the upper end of which is slotted to engage a projection formed on a plate 30 that is held to slide upon the under face of the forward portion of the frame A by set-screws 31, which engage the frame and pass through slots *d* formed in the plate, the plate being normally held in the position in which it is shown in Fig. 6 by a spring 80 which is coiled about a rod 32 and passes through an abutment carried by the cross-bar 10, the spring

bearing against said abutment and against an adjusting nut 33 that is arranged as shown.

The plate 30 is formed with upwardly-extending lugs or projections 34, between which there is mounted a pawl 35 that engages the teeth of one or the other of two disks 36, 37, the disk 36 being loosely mounted on a shaft 38 and being formed with a sleeve 39, which carries a gear 40 that engages a rack 40<sup>a</sup> on the platen carriage, as will be presently explained, while the disk 37 is loosely mounted on said sleeve and is held to the disk 36 by set-screws or studs 41, which engage said disk 36 and pass through slots *e* formed in the body of the disk 37. In connection with the disk 36 and gear 40 I arrange a spring 42, one end of which is connected to the disk and the other to the shaft 38, whereby the disk and gear tend to move in a direction proper to carry the carriage forward.

In order that a proper tension may be imparted to the spring 42, I provide the shaft 38 with a ratchet 43 that is engaged by a pawl 44 carried by the frame A, the end of the shaft being shaped to fit a key socket.

The frame of the platen carriage is made up of end pieces or standards 50 and 50<sup>a</sup>, and connecting bars 51, 51<sup>a</sup>, the rack 40<sup>a</sup> being carried by the bar 51. The end pieces 50, 50<sup>a</sup> are formed with diagonal slots *g* adapted to receive the shaft of the platen or paper roller 52, which said platen rests directly upon a feed roller 53 when there is no paper in the machine, but should a number of sheets of paper and interposed carbon be placed in position the platen shaft will ride up in the slot *g*, the platen, however, bearing evenly upon the paper throughout its length, and consequently most any desired number of duplicate copies may be made.

From the construction above described it will be seen that if any one of the finger keys be depressed the levers 27, 27<sup>a</sup>, will be carried downward and the lever 29 will be carried backward, this backward movement of the lever 29 carrying the plate 30 backward and shifting the pawl 35 from engagement with the teeth of the disk 37 to a position such that it will engage the teeth of the disk 36. Just at this time a spring *h* that is arranged as best shown in Fig. 9, will act to shift the disk 37 forward a distance equal to the space between two of the disk teeth. When the pawl 35 moves from engagement with the disk 37 to engage the disk 36, it acts to hold the carriage against any possible forward movement, but when the pressure upon the finger-key is relaxed and the spring 80 acts to return the parts to their normal positions the pawl will move back to engage the disk 37, which, as before stated, has been advanced one tooth through the action of its spring *h*, and the spring 42 will then be free to act to advance the platen carriage one step forward.

To the right-hand end of the platen shaft I



secure a toothed wheel 54 that is held against accidental displacement by a retaining pawl 55, but when it is desired to turn the platen to feed the paper forward the pawl will slip from tooth to tooth. To turn the platen as just described and at the same time to return the carriage to a position to commence a line of print, I pivotally connect a bar 56 to the end piece or standard 50, which said bar carries a hand piece 57 and a toothed arm 58, said arm engaging the teeth of the wheel 54, the arrangement being such that if the hand-piece be thrown backward and then pressed to the right the carriage will be moved to the desired position and the platen turned to feed the paper forward, the throw of the bar 56 being limited by a stop 59 (see Fig. 13) that is held to the standard by a set screw *z*, this stop being rigidly connected to a thumb piece 60.

Sometimes it is desirable to double space the lines, and it is to this end that I form the stop 59 with faces, *k* and *l*, that are at unequal distances from the axis of the set screw and hence permit different degrees of movement of the bar 56, the stop being held in either position to which it may be adjusted by the spring 61.

In order that the range of motion of the carriage may be controlled, I provide said carriage with a forwardly-extending projection 62, and to the frame, A, I secure two adjustable stops, 63 and 64. (See Fig. 4.)

Although any proper form of ribbon carrying mechanism might be employed, I prefer to mount a roller 65 as represented, upon a shaft that is journaled in a shelf 66, carried by the frame A, the lower end of this shaft being provided with a friction wheel 67 which bears against the carriage bar 51<sup>a</sup>, such roller being loosely mounted on its shaft and carrying a pawl *n* that engages a ratchet *o*, said ratchet being rigidly connected to the roller 65, so that as the carriage is fed forward step by step the ribbon-carrying roller will be shifted at each movement of the carriage, but when the carriage is returned to the right the pawl will slip upon the ratchet and the ribbon will not be moved.

In order that the ribbon may be held to the roller 65, I provide a roller 68 that is carried by an arm 69 and furnished with a hand-piece *s*; said arm being borne upon by a spring 70 which tends to throw the roller 68 toward the roller 65, and consequently the ribbon will always be held in frictional contact between the two rollers. The ribbon is endless and may be guided in any proper manner, but I prefer to employ a set or series of supports and guides such as those illustrated in the drawings.

Ordinary spacing may be done by depressing the plate 24 the necessary number of times, but it is desirable that provision be made for advancing the carriage without resorting to this step by step movement, and to this end I provide the rod 71, which engages

the tail piece *q* of the pawl 35. When it is desired to advance the carriage quite a distance, say half a line, the operator grasps a knob 72 carried by the rod 71 and at the same time holds the carriage. The knob is then drawn outward and the pawl moved as indicated in Fig. 9. The first effect of this movement will be to move the disks 36 and 37 backward, but when the pawl passes from engagement with the disk teeth the spring 42 will be free to act to advance the carriage.

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

1. The combination with a platen and its operating mechanism, of a type bar provided with a piston or plunger, a cylinder therefor, a bellows, a finger-key adapted to compress said bellows and a duct connecting said bellows and said cylinder, whereby the type will be reciprocated with respect to the platen, substantially as described.

2. The combination with a type, of a reciprocating piston or plunger, a cylinder in which said piston or plunger rides, an air chamber containing normally uncompressed air and adapted to have its area reduced, opening into said cylinder, and a finger-key operating said chamber, substantially as set forth.

3. The combination of a type-bar, a piston or plunger in connection therewith, a cylinder in which said piston or plunger rides, and a chamber communicating with said cylinder having a compressible wall, substantially as described.

4. The combination with a type-bar, a piston or plunger in connection therewith, a cylinder in which the piston or plunger rides, of an air chamber formed with a compressible wall, with which chamber the cylinder is in communication, and a means for compressing said wall, substantially as described.

5. The combination with a type-bar of a piston or plunger arranged in connection therewith, a cylinder in which the piston or plunger rides, an air chamber formed with a dome-shaped compressible wall, with which chamber the cylinder is in communication, and a means for compressing said dome-shaped wall, substantially as described.

6. The combination of a type operating piston or plunger, of a cylinder in which the piston or plunger rides, an air chamber formed with a compressible wall, with which chamber the cylinder is in communication, and a spring arranged to bear against said wall, substantially as described.

7. The combination of a type operating piston or plunger, a cylinder in which the piston or plunger rides, an air chamber formed with a dome-shaped compressible wall, with which chamber the cylinder is in communication, and a spring arranged to bear against said wall, substantially as described.

8. The combination with a platen and its operating mechanism, of a type operating



piston or plunger, a cylinder in which the piston or plunger rides, a compressible air chamber opening into said cylinder and a key for operating said chamber, substantially as described.

9. In a typewriting machine the combination of a battery of type provided with pistons which ride in cylinders, said cylinders being arranged in banks on lines radiating from a common center, a platen, its operating mechanism, a series of air chambers containing normally uncompressed air, and finger-keys adapted to operate said chambers, to drive the air therefrom into said cylinders, as and for the purpose set forth.

10. In a type-writing machine, the combination with a platen and its operating mechanism, of a multiplicity of type-bearing bars mounted in individual cylinders and adapted to slide toward and from said platen, an air chamber for each type-bar compressing air and forcing the same against an individual type-bar, substantially as set forth.

11. In a type-writing machine, the combination with a platen and its operating mechanism, of a multiplicity of type-bearing bars mounted to slide toward and from the platen, a cylinder and finger-key for each type-bearing bar, and a chamber in which air is compressed, said chamber and cylinder being in communication, substantially as set forth.

12. The combination with a platen and its operating mechanism, of a series of type-bars mounted in banks and on lines which radiate from a common center, a pneumatic mechanism for each type bar adapted to drive normally uncompressed air against said type-bars, and a series of finger keys substantially as set forth.

13. The combination with a series of type controlling pistons or plungers actuated solely by a body of air, which ride in ducts or cylinders, of a finger-key mechanism, operating air chambers containing air normally uncompressed, and a series of tubes adapted to convey the air from said chambers to said ducts or cylinders, substantially as described.

14. In a typewriting machine the combination with a battery of cylinders, of type controlling pistons arranged therein, nipples arranged in connection with the cylinders, a set of air chambers, other nipples arranged in connection therewith, a set of tubes by which the two sets of nipples are connected, and a finger-key mechanism arranged in connection

with the air chambers, substantially as set forth.

15. In a typewriting machine, the combination with a series of cylinders, of type-bars that ride therein, a guide frame and guiding rods carried by such frame substantially as set forth.

16. In a typewriting machine, the combination with a pair of ribbon feeding rollers, one of which is yieldingly mounted and one of which is provided with a friction wheel that bears upon the carriage, of a pawl and ratchet arranged in connection with the friction wheel, an endless ribbon, and a series of ribbon guides, substantially as described.

17. In a carriage feeding attachment for typewriting machines, the combination with a main toothed disk, of a feeding spring connected thereto, a second toothed disk having a slight motion on the main disk, a shifting spring connected to the second disk, a disk actuating pawl, a means for shifting the pawl from engagement with the teeth of the second disk to engagement with the teeth of the main disk, a returning spring, and a means for throwing the pawl out of engagement with both disks at once, substantially as described.

18. The combination with a platen carriage that is provided with a rack, of a gear that engages said rack, a toothed disk rigidly connected to the gear, a spring, a toothed disk connected to the disk 36 by studs which pass through slots in the disk 37, so that the disk 37 has a limited play on the disk 36, a spring arranged in connection with the disk 37, a pawl, a means for shifting the pawl from engagement with the teeth of the disk 37 to engagement with the teeth of the disk 36 at each depression of a finger-key, a returning spring, and a means for throwing the pawl out of engagement with both disks at the same time, substantially as described.

19. In a typewriting machine, the combination with a battery of cylinders, of type carrying bars arranged therein, a set of air chambers, ducts connecting the cylinders and the air chambers, and finger-key mechanism arranged in connection with the air chambers, substantially as described.

This specification signed and witnessed this 31st day of August, 1891.

J. WILLARD MORRIS.

Witnesses:

D. H. DRISCOLL,  
EUGENE CONRAN.