No. 638,591. Patented Dec. 5, 1899.

D. MURRAY.

ACTUATING MECHANISM FOR KEY OPERATED MACHINES.

(No Model.) (Application filed May 4, 1899.)

16 Sheets—Sheet 1.

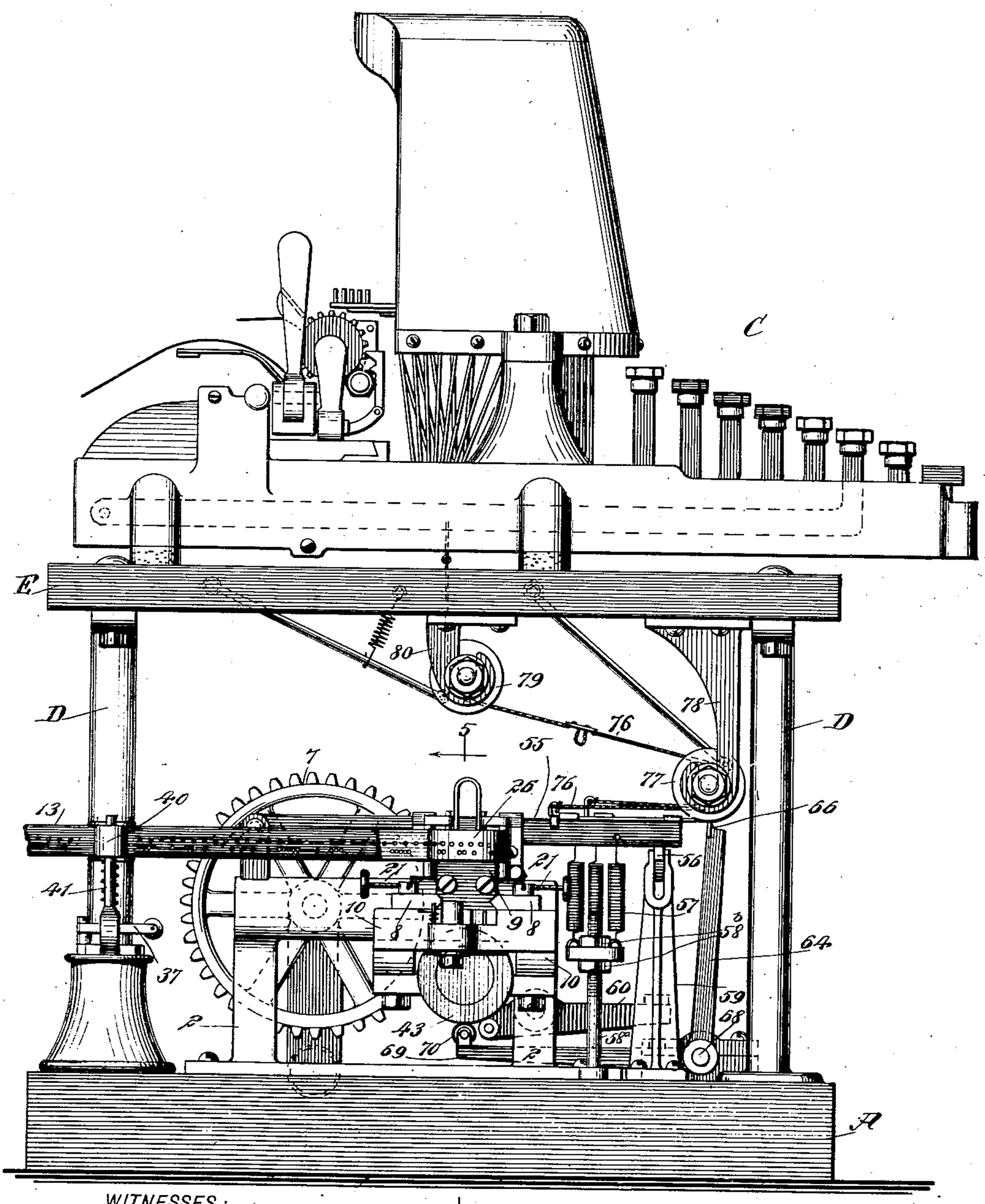

Fig 1.

WITNESSES:

John A. Berglund
C. R. Ferguson

INVENTOR
Donald Murray
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Munn & Co.
ATTORNEYS.

No. 638,591. Patented Dec. 5, 1899.

D. MURRAY.

ACTUATING MECHANISM FOR KEY OPERATED MACHINES.

(No Model.) (Application filed May 4, 1899.)

16 Sheets—Sheet 2.

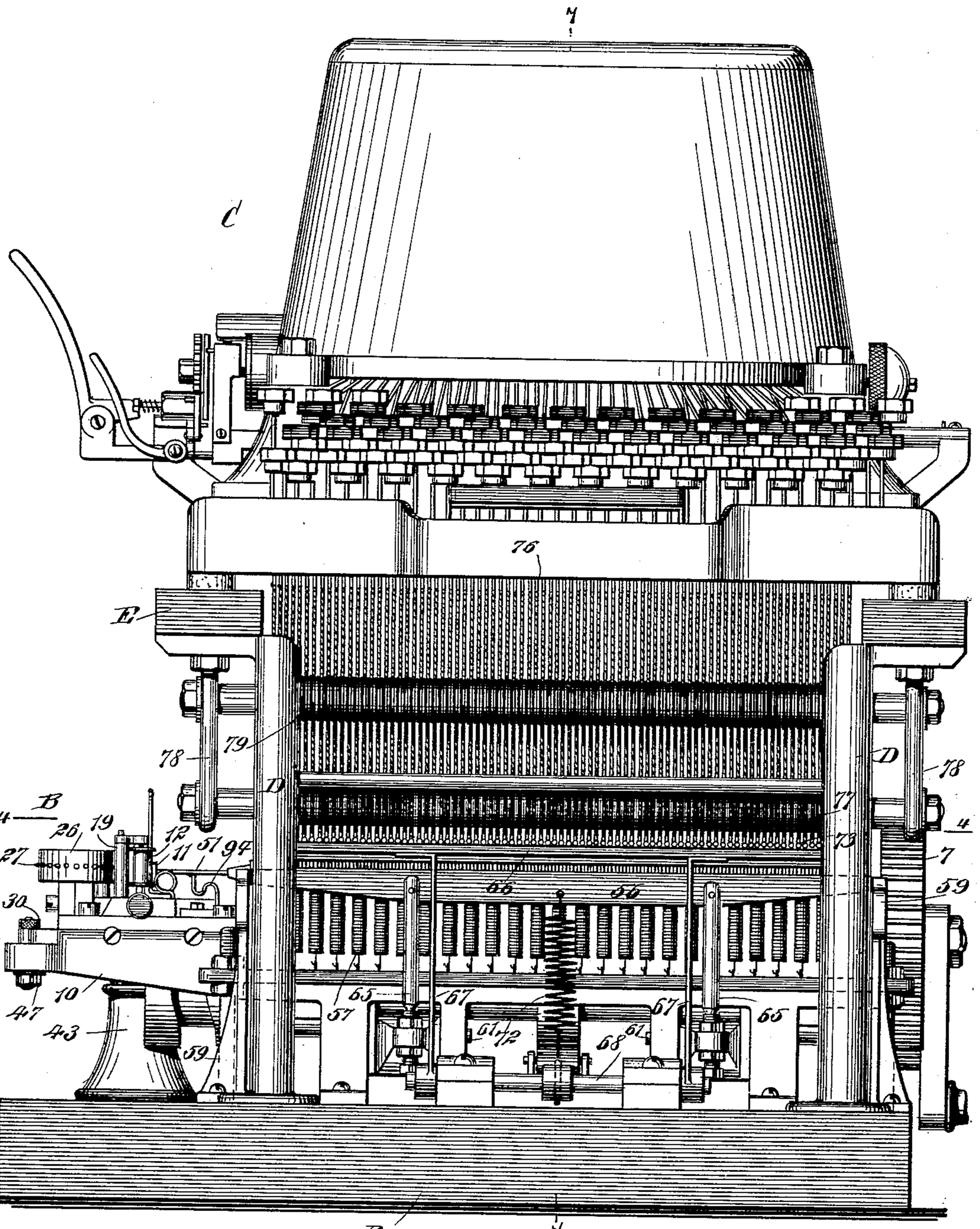

Fig. 2.

WITNESSES:

John A. Supplee
C. R. Ferguson

INVENTOR
Donald Murray
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No. 638,591. Patented Dec. 5, 1899.

D. MURRAY.

ACTUATING MECHANISM FOR KEY OPERATED MACHINES.

(Application filed May 4, 1899.)

(No Model.) 16 Sheets—Sheet 3.

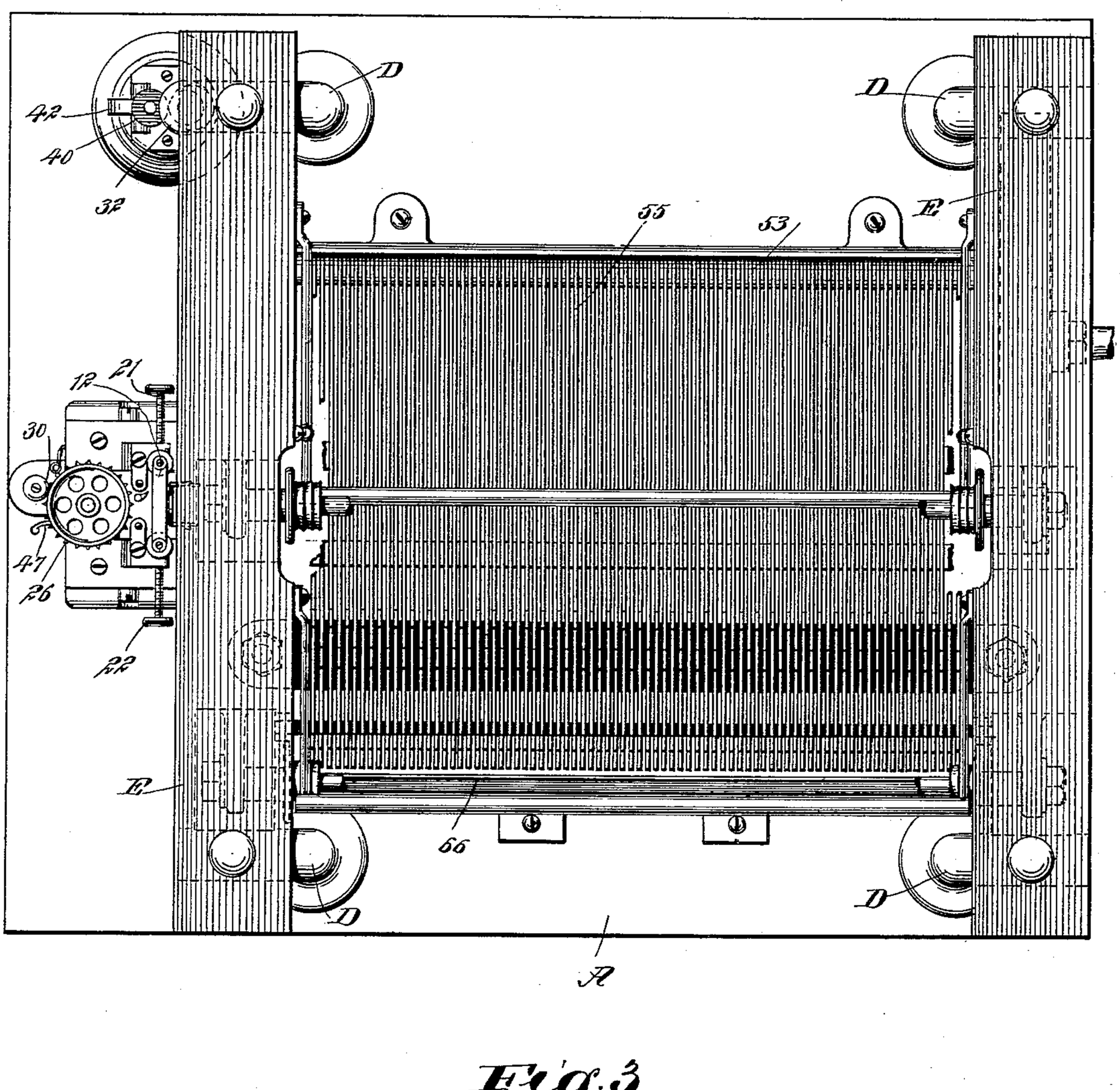

Fig. 3

WITNESSES:

John A. Berglund
C. R. Ferguson

INVENTOR
Donald Murray
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ATTORNEYS.

No. 638,591. Patented Dec. 5, 1899.

D. MURRAY.

ACTUATING MECHANISM FOR KEY OPERATED MACHINES.

(Application filed May 4, 1899.)

(No Model.) 16 Sheets—Sheet 4.

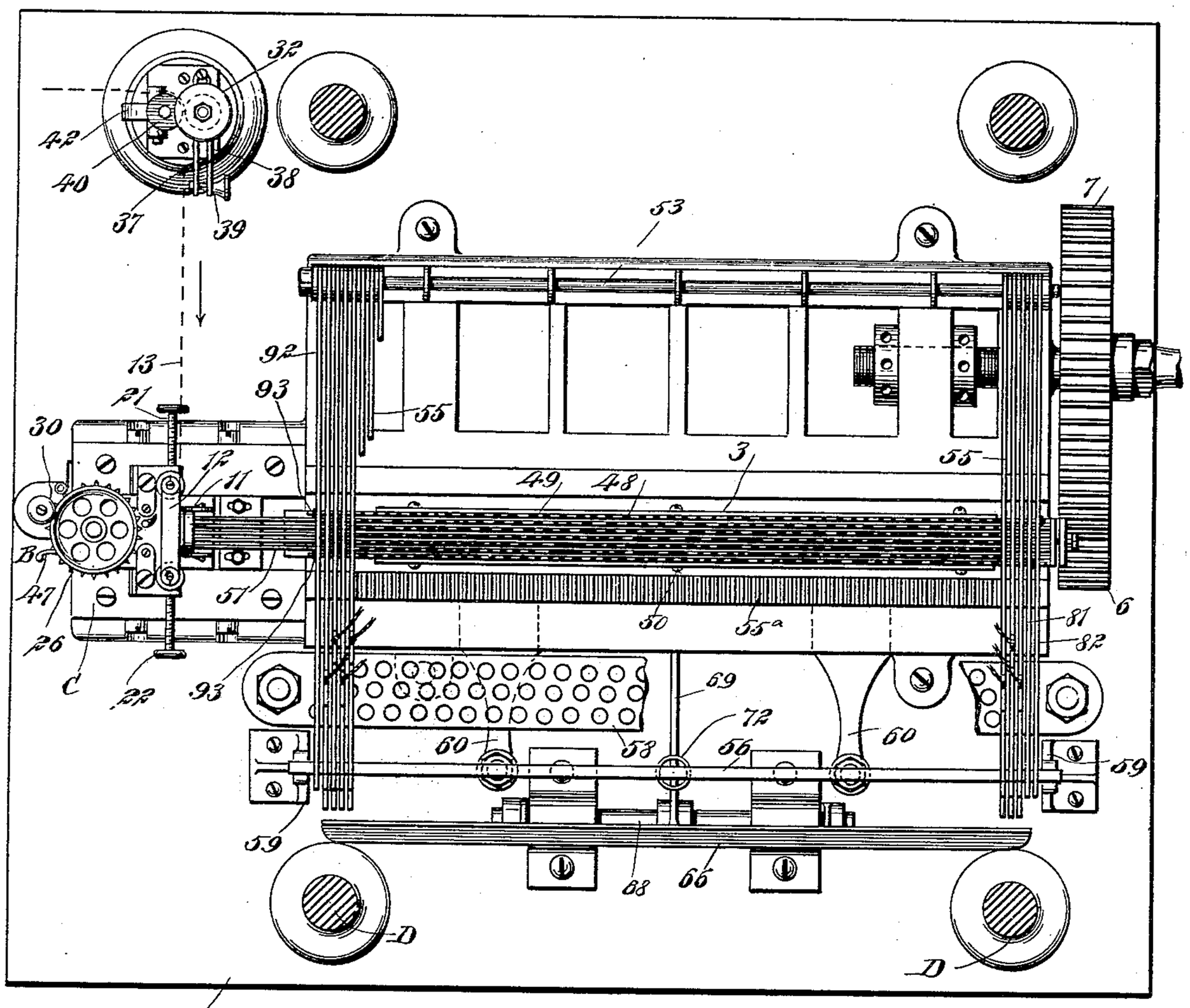

Fig. 4

WITNESSES:

John A. Thompson

C. R. Ingersoll

INVENTOR

Donald Murray

BY Munn & Co

ATTORNEYS.

No. 638,591. Patented Dec. 5, 1899.

D. MURRAY.

ACTUATING MECHANISM FOR KEY OPERATED MACHINES.

(No Model.) (Application filed May 4, 1899.) 16 Sheets—Sheet 5.

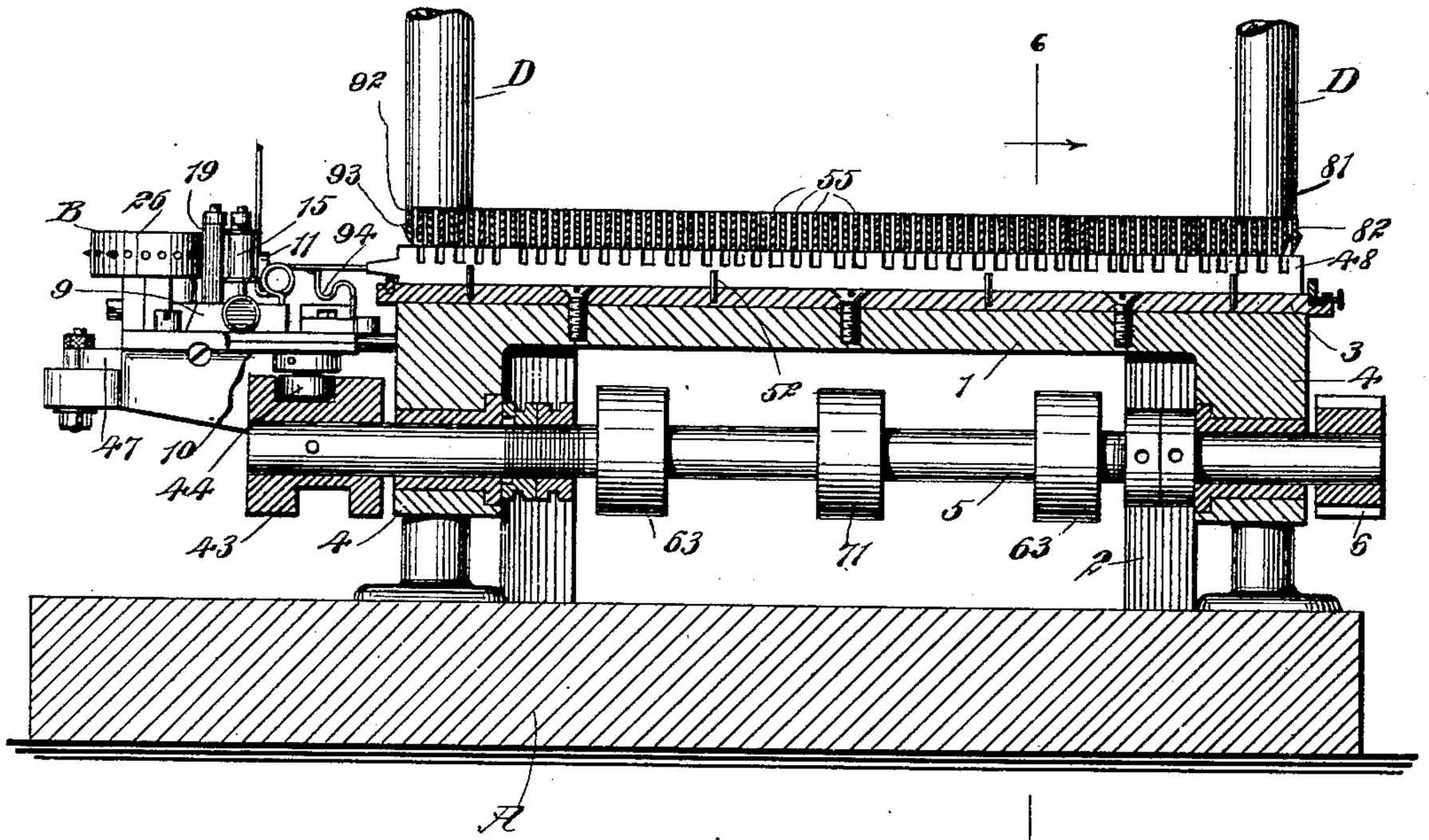

Fig. 5

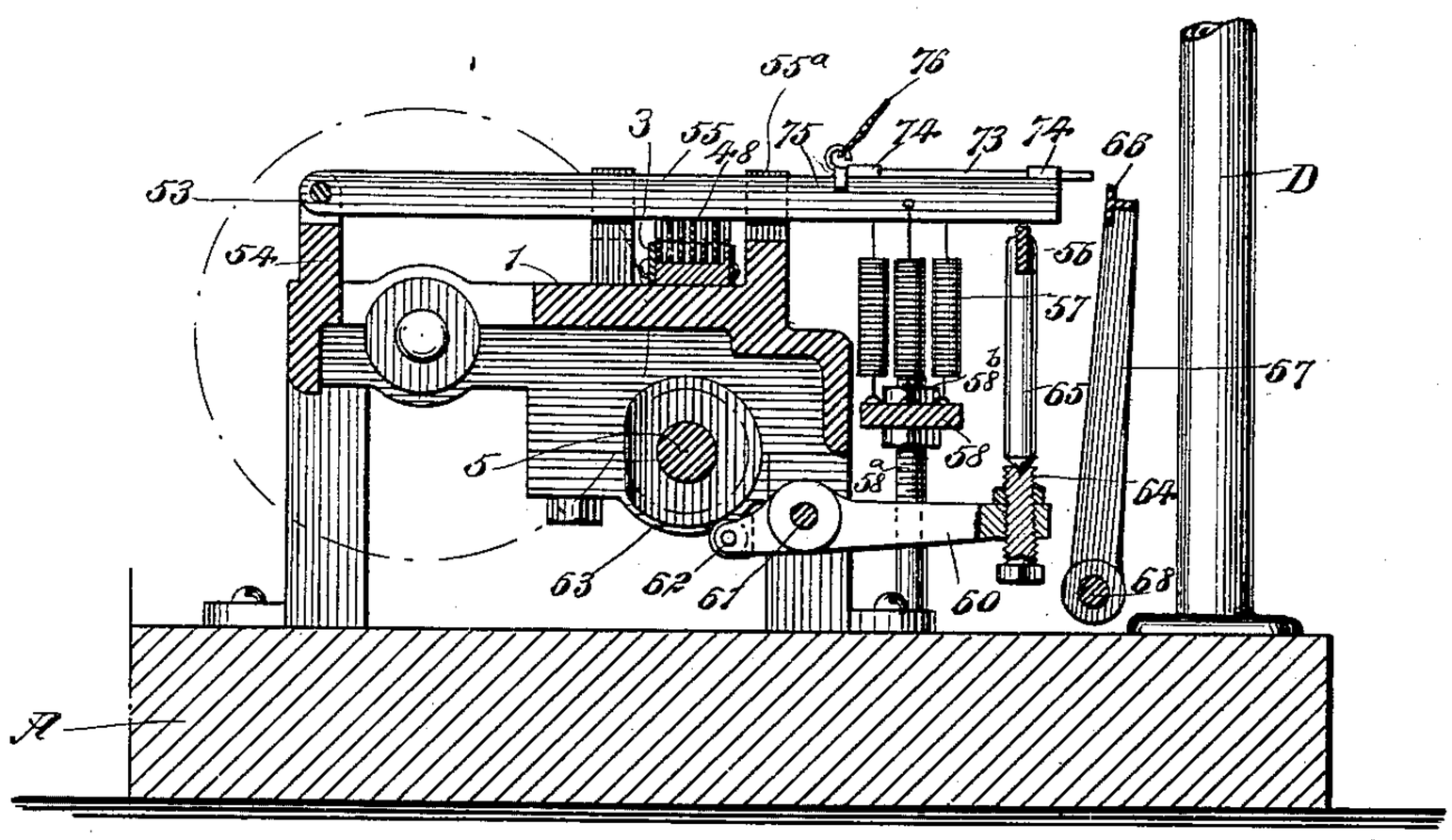

Fig. 6

WITNESSES:

John A. Creighton

C. R. Ferguson

INVENTOR

Donald Murray

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ATTORNEYS.

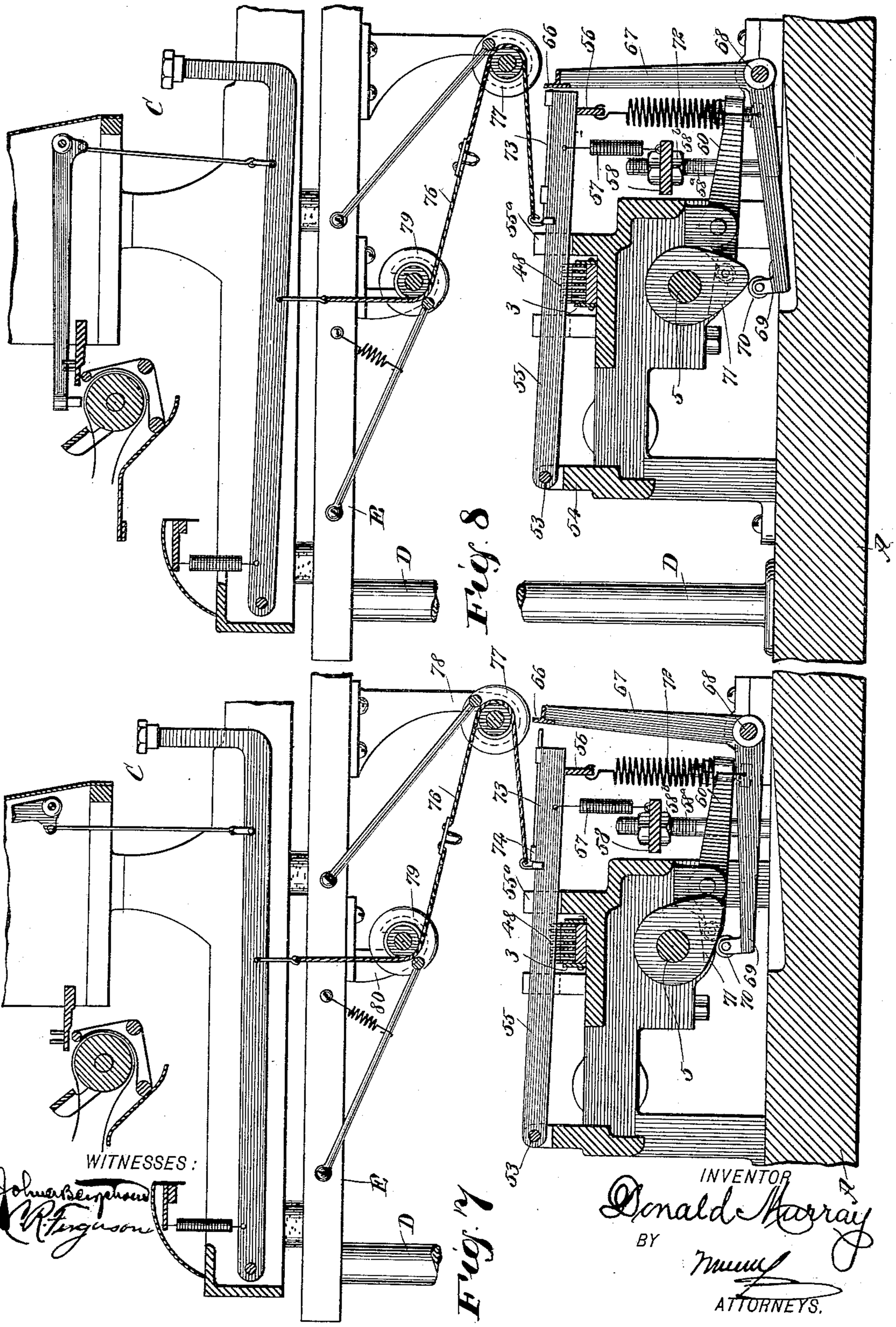
No. 638,591. Patented Dec. 5, 1899.

D. MURRAY.

ACTUATING MECHANISM FOR KEY OPERATED MACHINES.

(No Model.) (Application filed May 4, 1899.)

16 Sheets—Sheet 6.



WITNESSES:

John A. Seymour
R. Ferguson

INVENTOR
Donald Murray
BY
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No. 638,591. Patented Dec. 5, 1899.

D. MURRAY.

ACTUATING MECHANISM FOR KEY OPERATED MACHINES.

(Application filed May 4, 1899.)

(No Model.) 16 Sheets—Sheet 7.

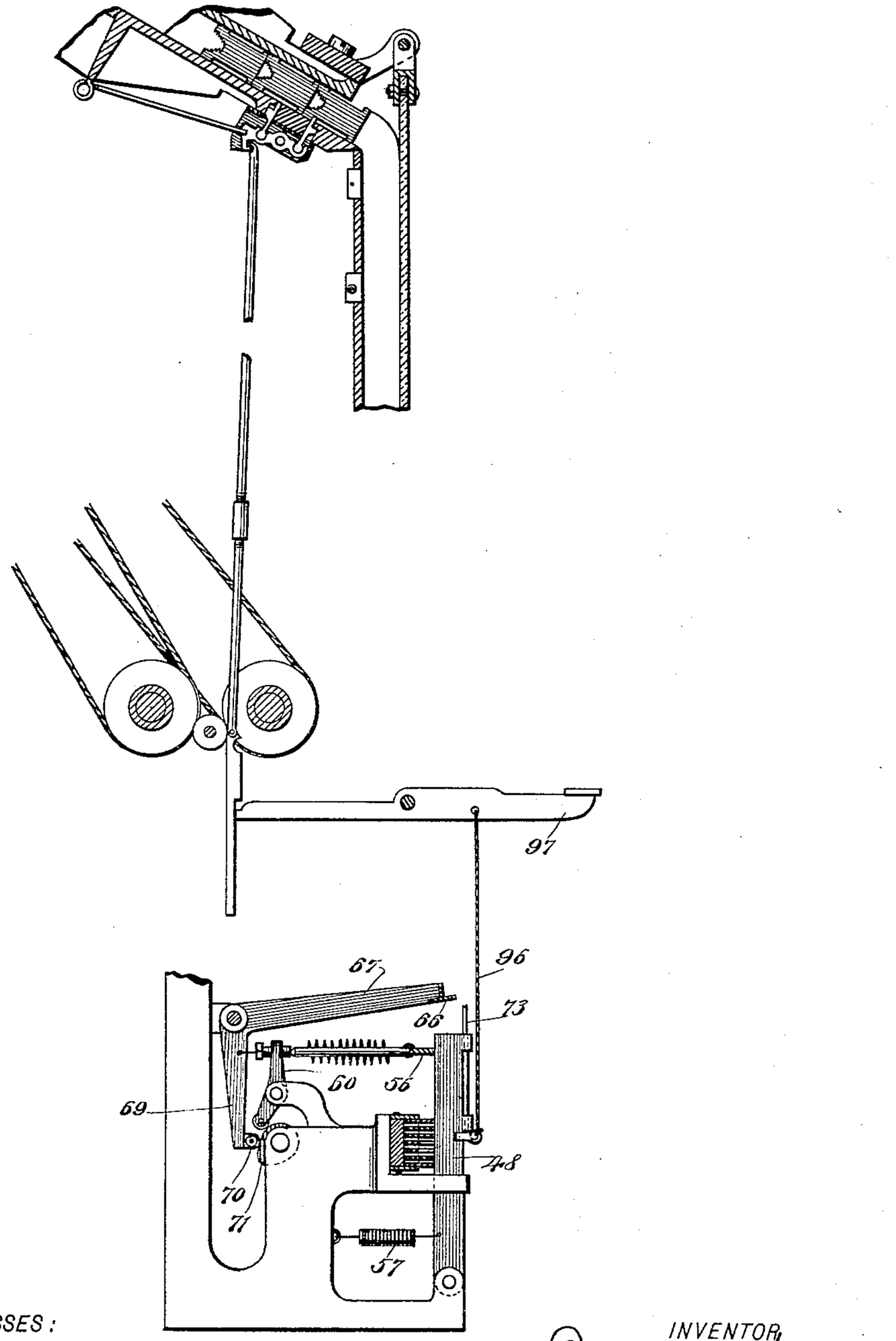

Fig. 9.

WITNESSES:

John A. Berglund
C. R. Ferguson

INVENTOR
Donald Murray
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Munn & Co
ATTORNEYS.

No. 638,591. Patented Dec. 5, 1899.

D. MURRAY.

ACTUATING MECHANISM FOR KEY OPERATED MACHINES.

(Application filed May 4, 1899.)

(No Model.) 16 Sheets—Sheet 8.

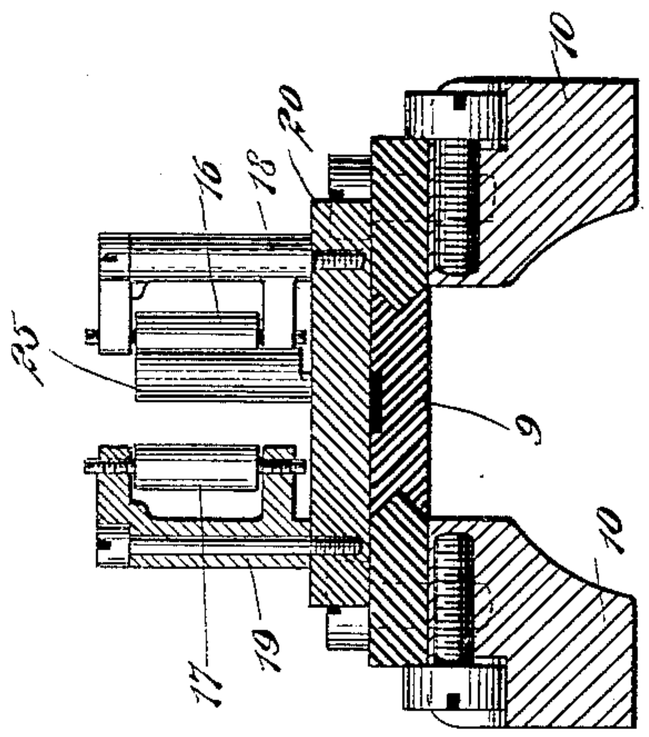

Fig. 11

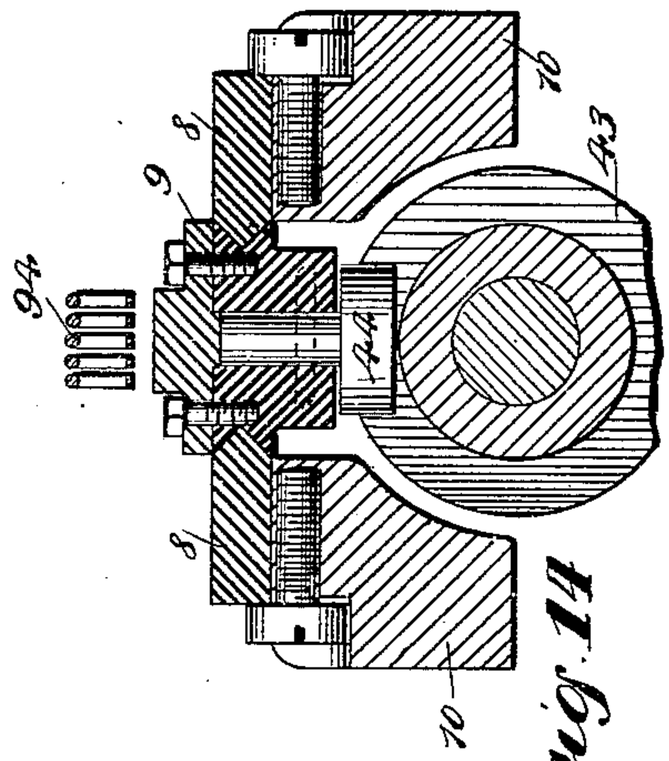

Fig. 14

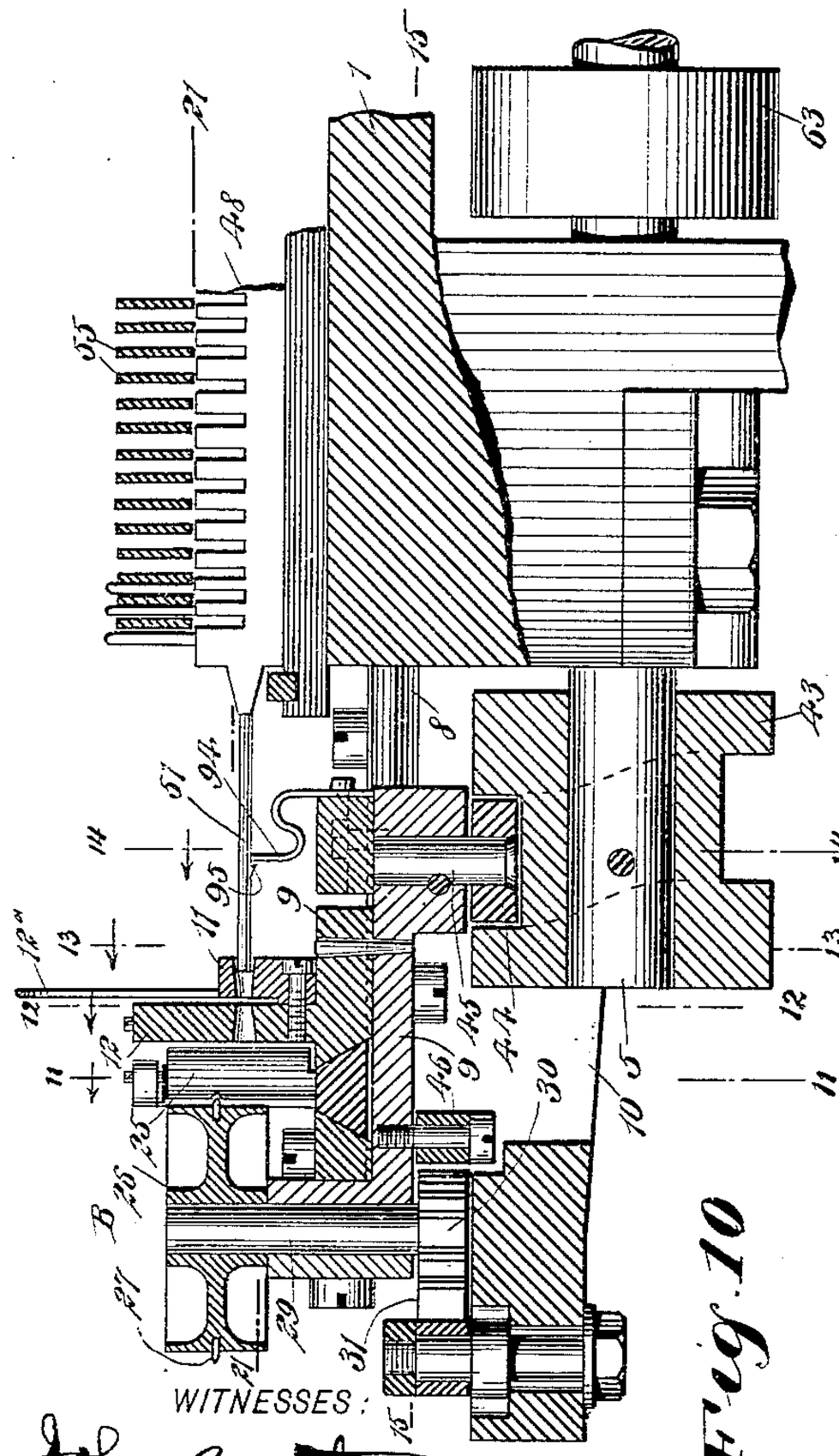

Fig. 10

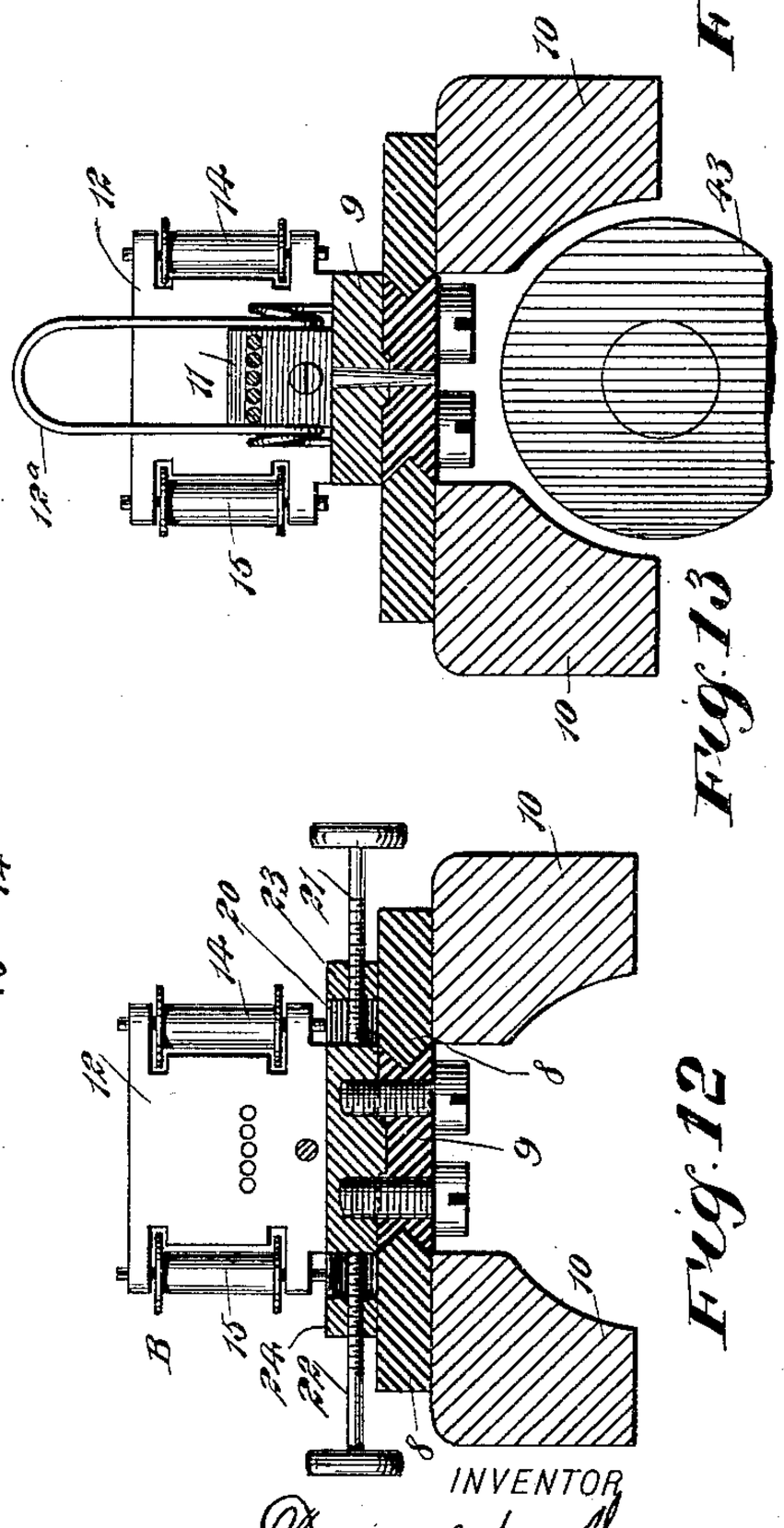

Fig. 13

Fig. 12

WITNESSES:

John A. Benjamin

C. R. Ferguson

INVENTOR

Donald Murray

BY

Munn & Co

ATTORNEYS.

No. 638,591. Patented Dec. 5, 1899.

D. MURRAY.

ACTUATING MECHANISM FOR KEY OPERATED MACHINES.

(Application filed May 4, 1899.)

(No Model.) 16 Sheets—Sheet 9.

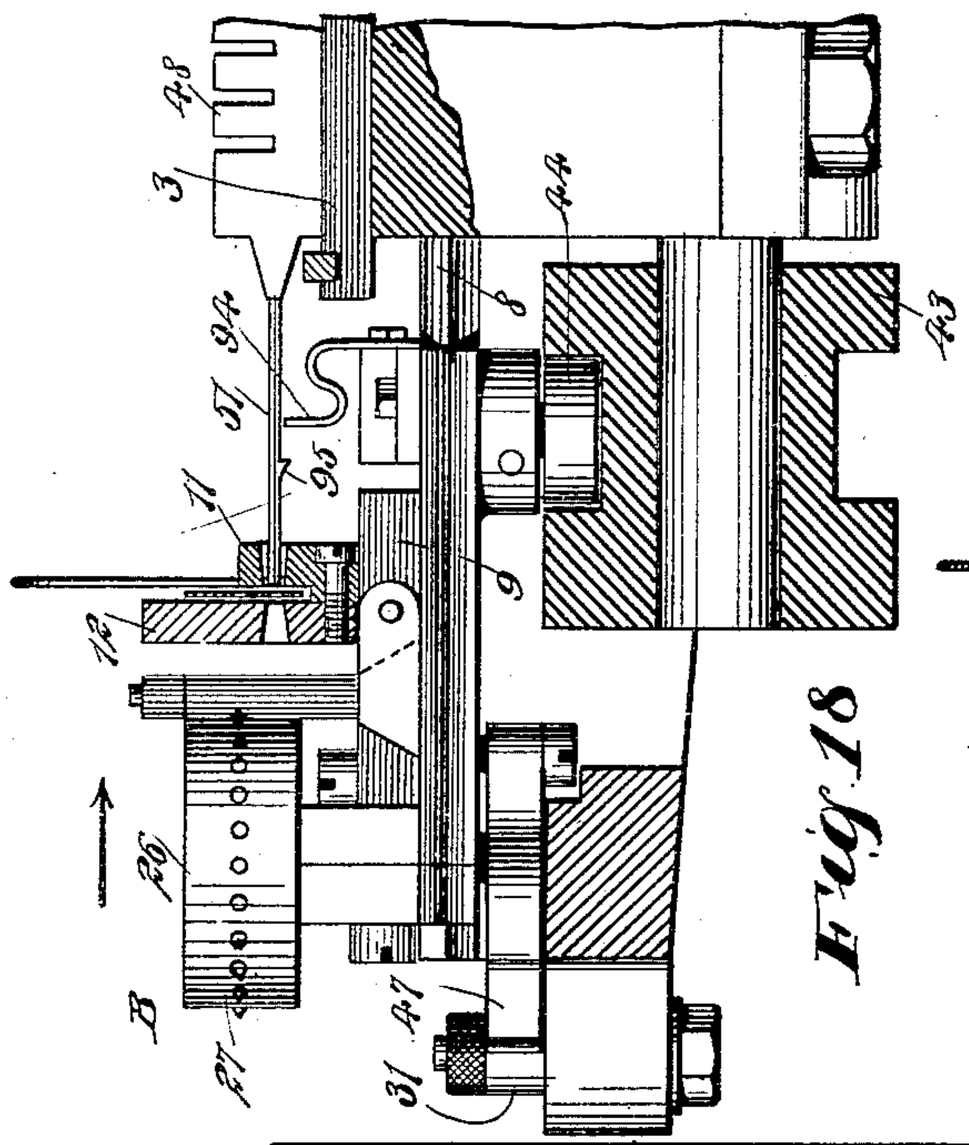

Fig. 18

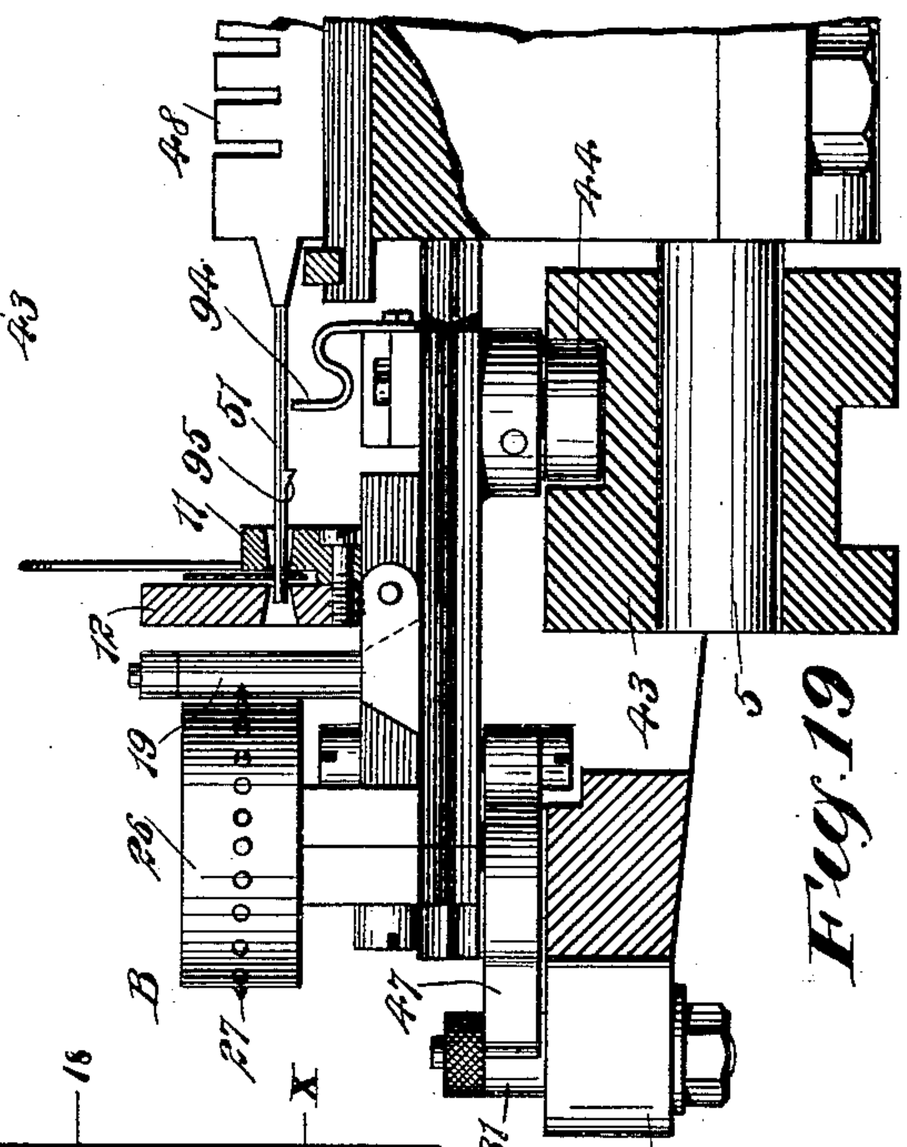

Fig. 19

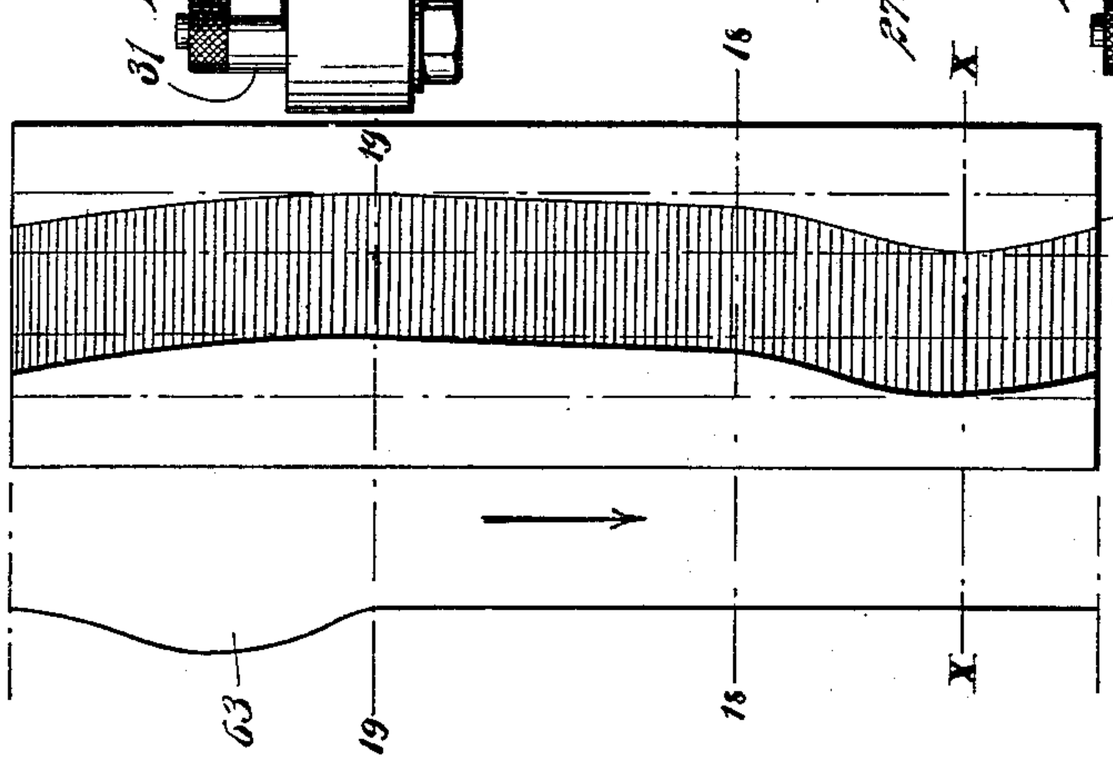

Fig. 17

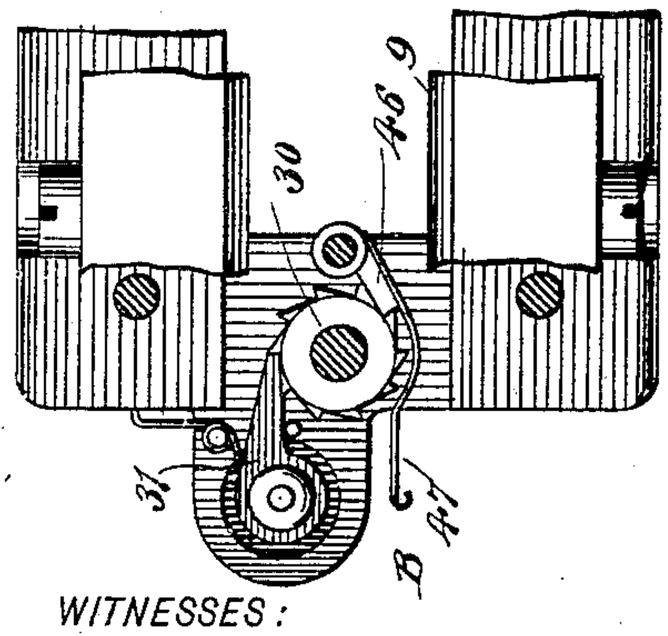

Fig. 15

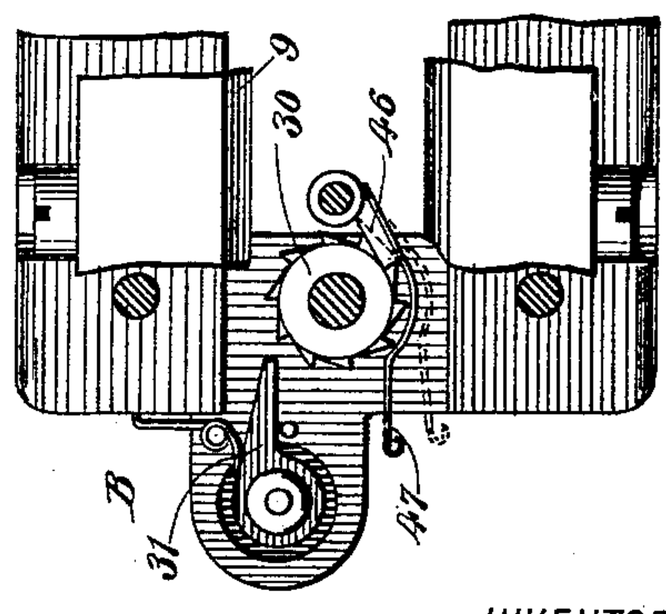

Fig. 16

WITNESSES:

John A. Bergstrom

C. R. Ferguson

INVENTOR,

Donald Murray

BY Munn & Co

ATTORNEYS.

No. 638,591. Patented Dec. 5, 1899.

D. MURRAY.

ACTUATING MECHANISM FOR KEY OPERATED MACHINES.

(Application filed May 4, 1899.)

(No Model.) 16 Sheets—Sheet 10.

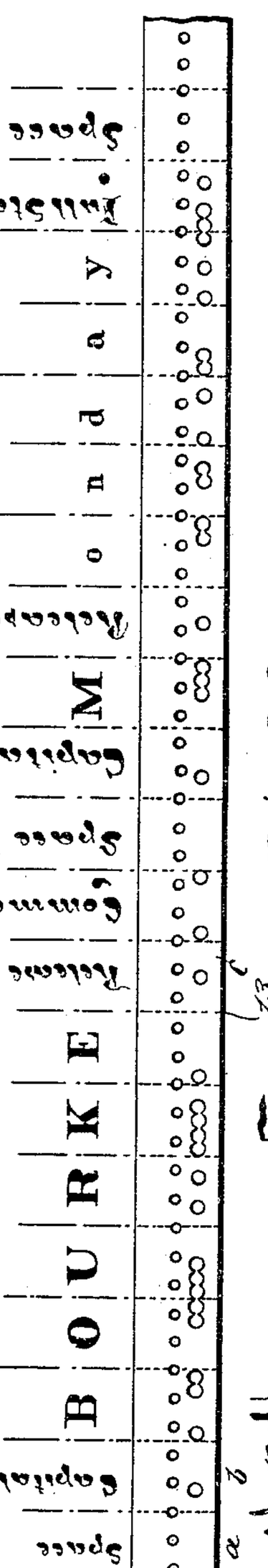

Fig. 20

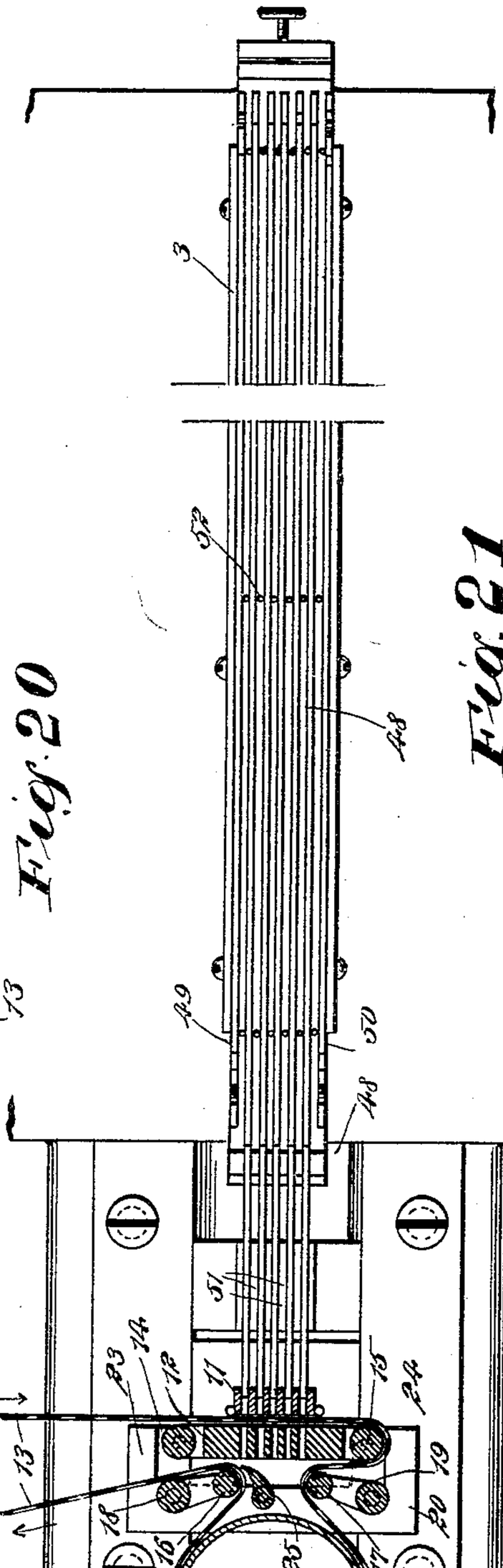

Fig. 21

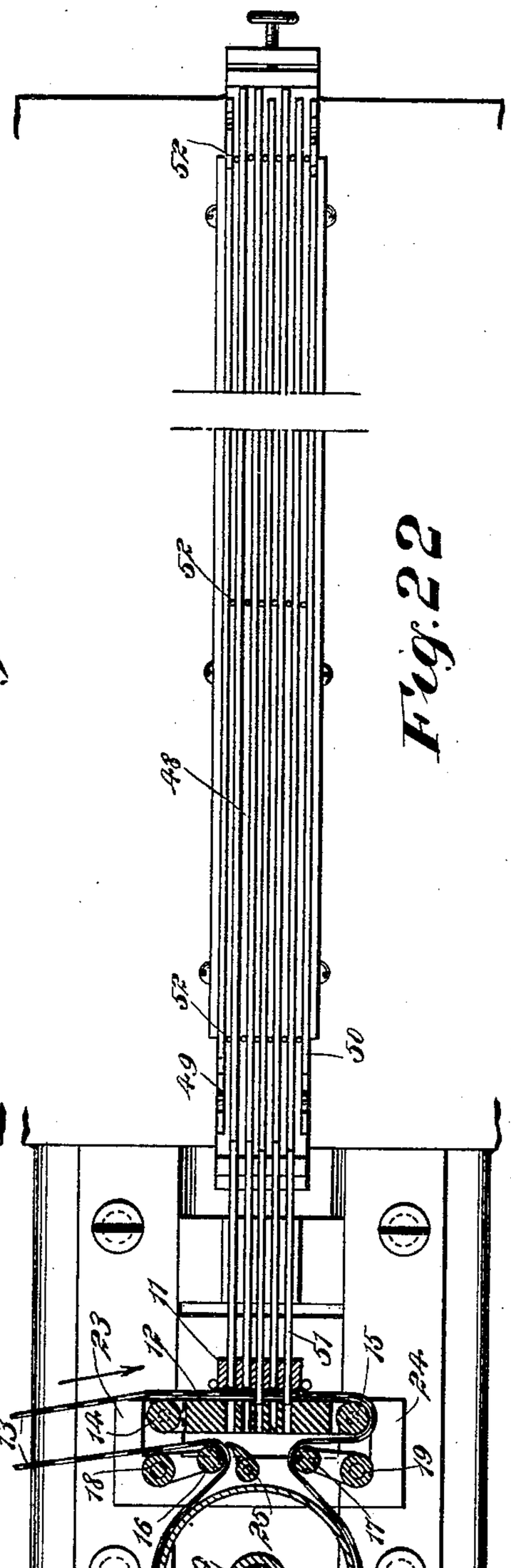

Fig. 22

WITNESSES:

John A. Berglund
C. R. Ferguson

INVENTOR
Donald Murray

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ATTORNEYS.

No. 638,591. Patented Dec. 5, 1899.

D. MURRAY.

ACTUATING MECHANISM FOR KEY OPERATED MACHINES.

(Application filed May 4, 1899.)

(No Model.) 16 Sheets—Sheet 11.

BOURKE , Monday.

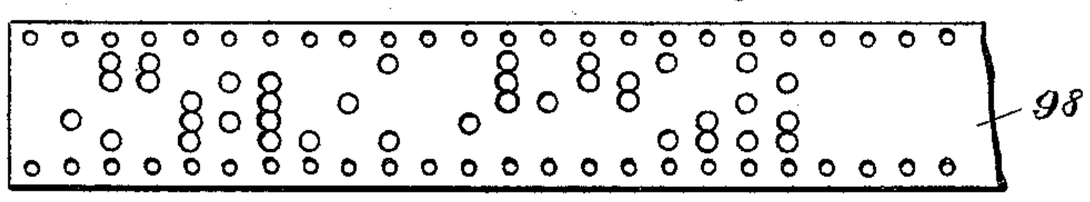
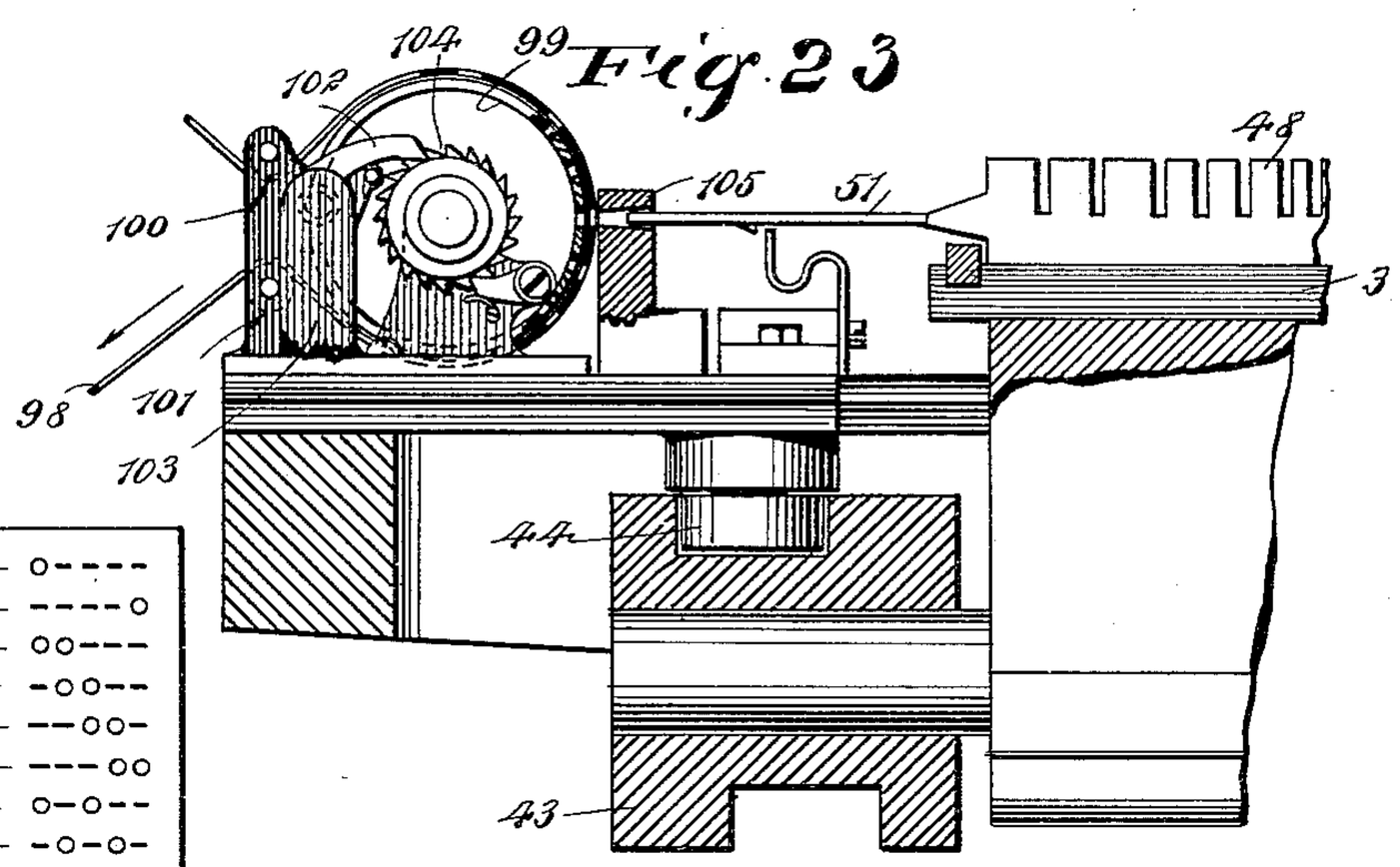


Fig. 23



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a	oo---
i	-oo--
n	--oo-
o	---oo
s	o-o--
r	-o-o-
h	--o-o
d	o--o-
l	-o--o
u	ooo--
c	-ooo-
m	--ooo
f	o-oo-
w	oo--o
y	o-o-o
p	-oo-o
b	o--oo
g	-o-oo
v	-oooo
k	oooo-
q	ooo-o
j	oo-oo
x	o-ooo
z	ooooo
,	o---o
.	oo-o-
Space Key	-----
Capital Key	-o---
Figure Key	---o-
Release Key	--o--

Fig. 24

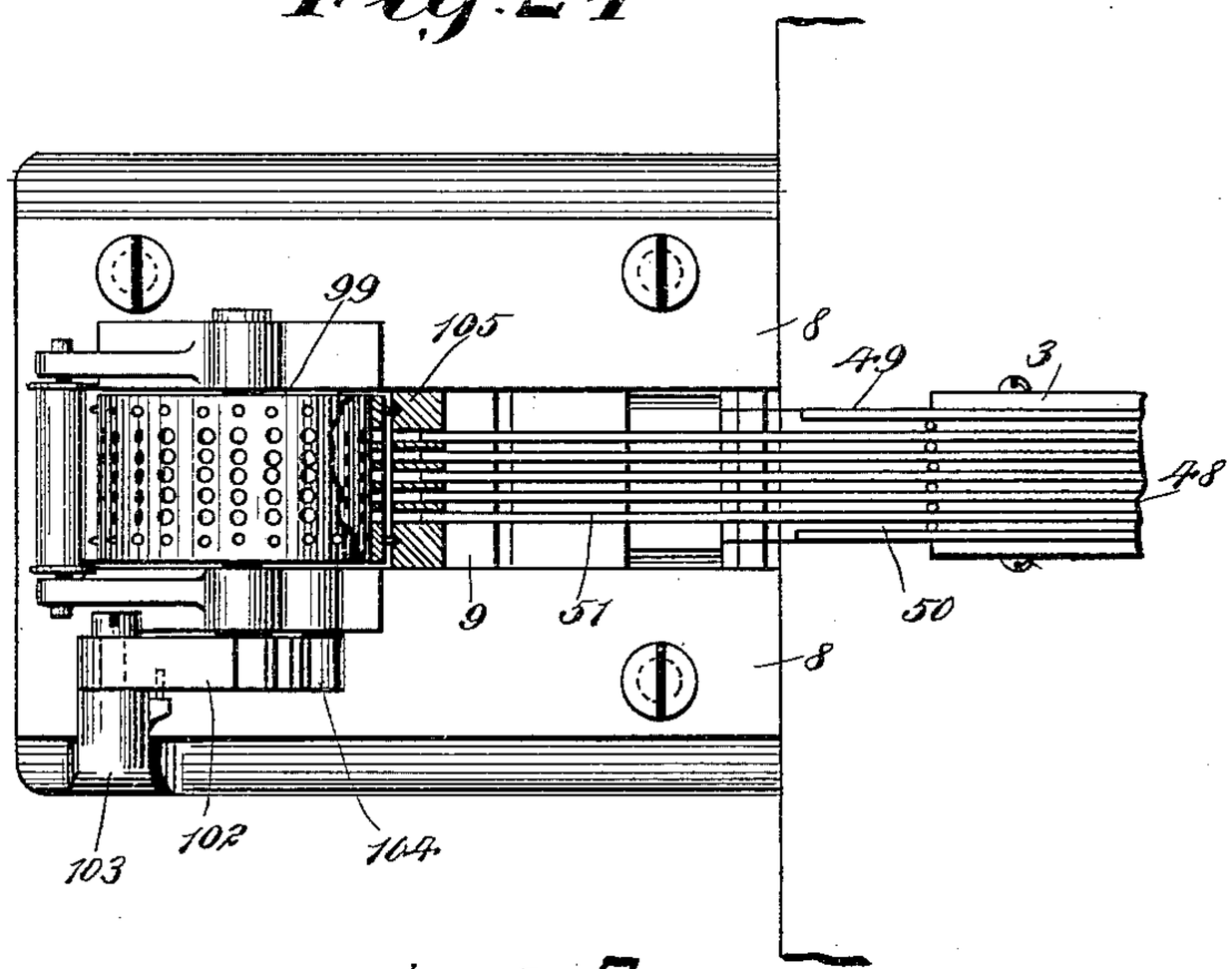

Fig. 23a

Fig. 25

WITNESSES:

John A. Berglund

C. R. Ferguson

INVENTOR

Donald Murray

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Munn & Co

ATTORNEYS.

No. 638,591. Patented Dec. 5, 1899.

D. MURRAY.

ACTUATING MECHANISM FOR KEY OPERATED MACHINES.

(Application filed May 4, 1899.)

(No Model.) 16 Sheets—Sheet 12.

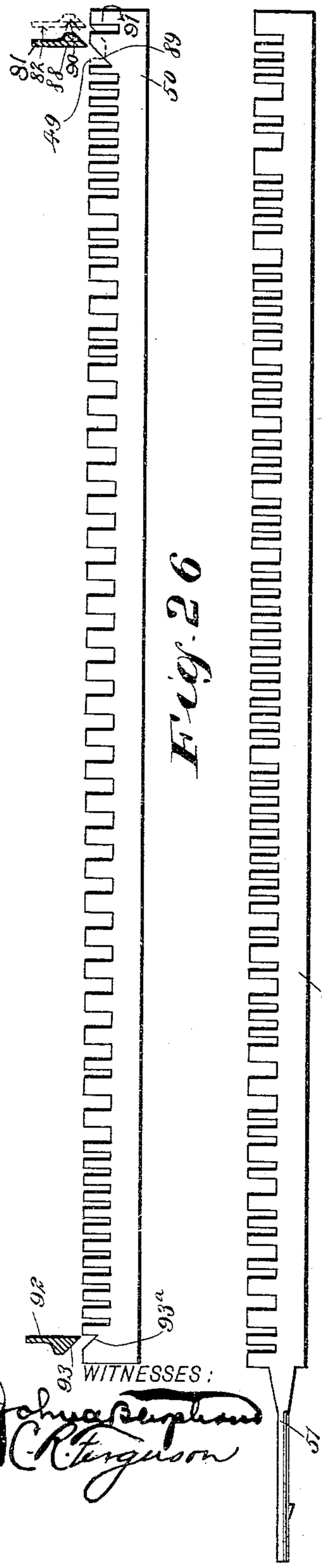

Fig. 26

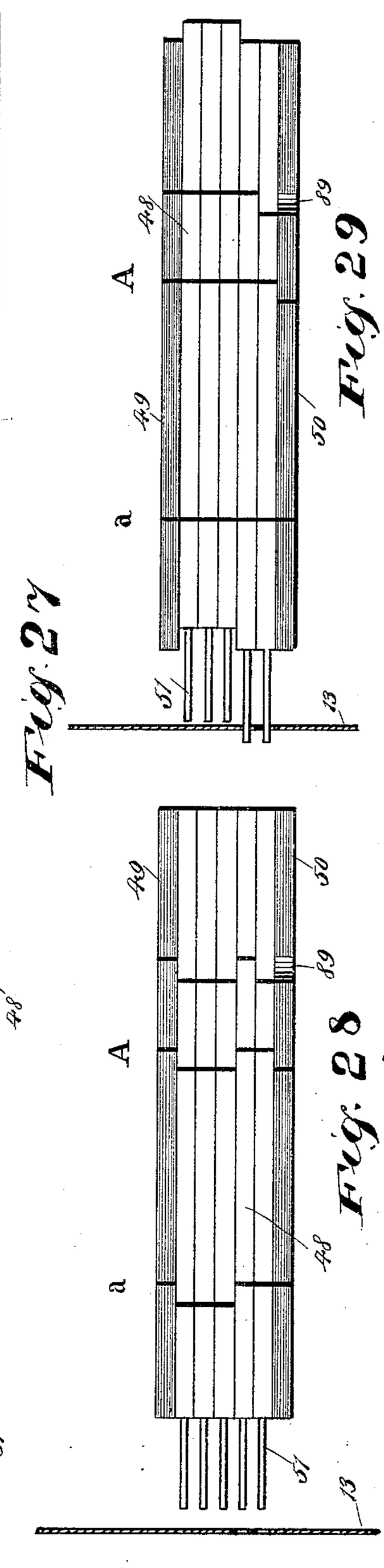

Fig. 27

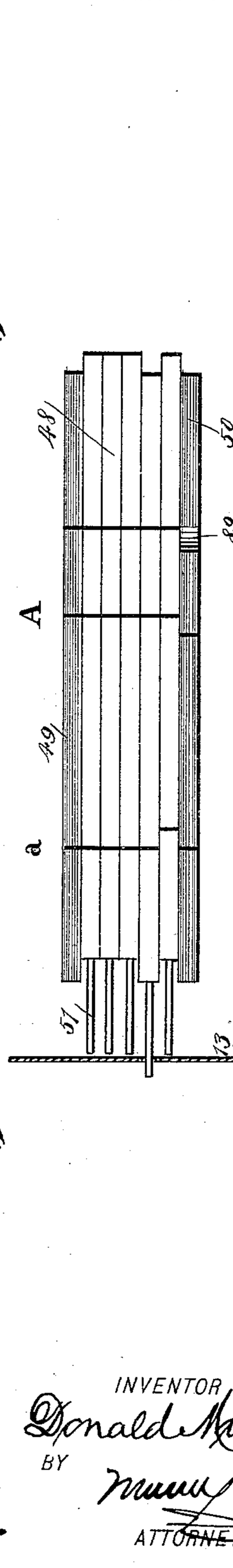

Fig. 29

Fig. 28

Fig. 30

WITNESSES:

John A. Stephens

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ATTORNEYS.

No. 638,591. Patented Dec. 5, 1899.

D. MURRAY.

ACTUATING MECHANISM FOR KEY OPERATED MACHINES.

(Application filed May 4, 1899.)

(No Model.) 16 Sheets—Sheet 13.

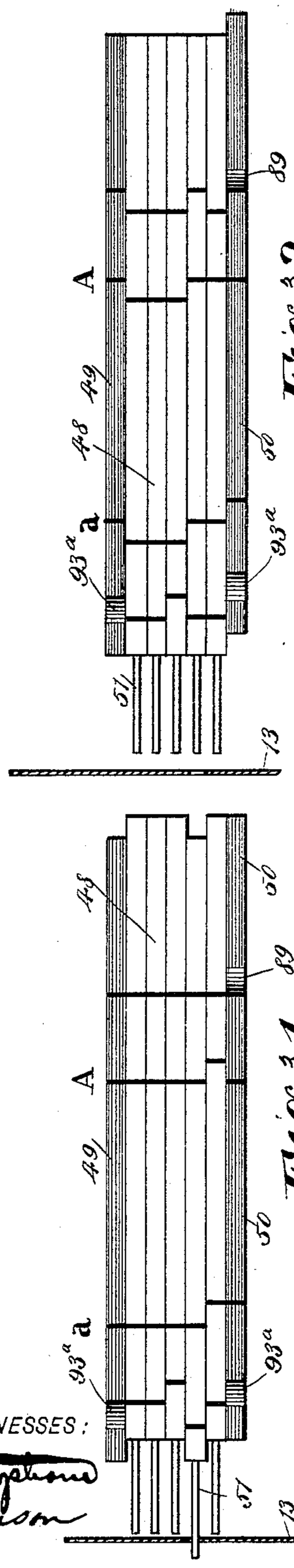

Fig. 32

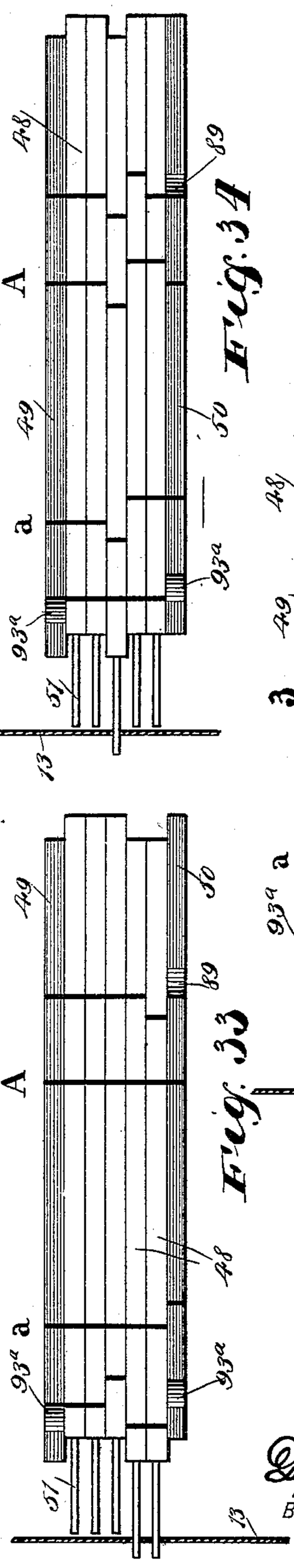

Fig. 34

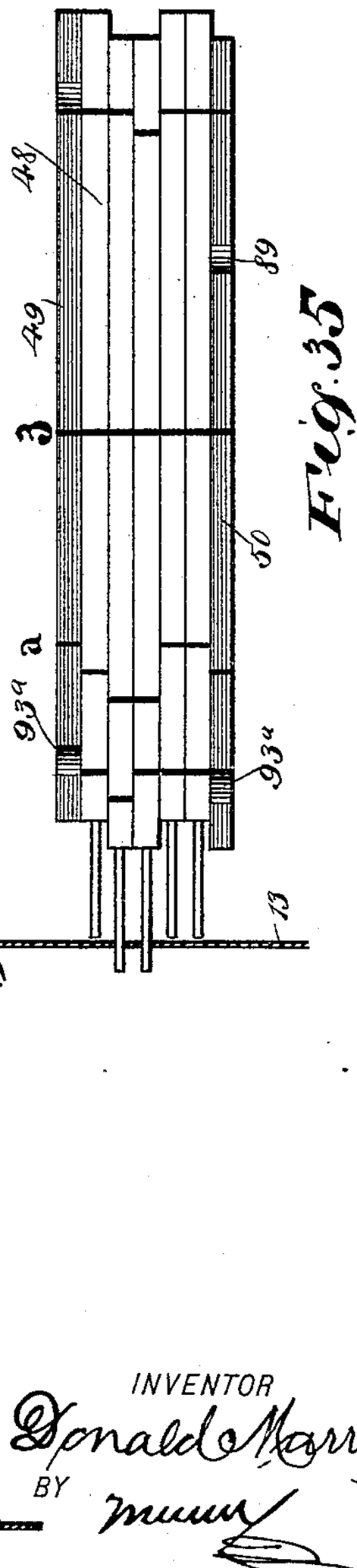

Fig. 35

Fig. 31

Fig. 33

WITNESSES:

John A. Brophy
C. R. Ferguson

INVENTOR
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No. 638,591. Patented Dec. 5, 1899.

D. MURRAY.

ACTUATING MECHANISM FOR KEY OPERATED MACHINES.

(Application filed May 4, 1899.)

(No Model.) 16 Sheets—Sheet 14.

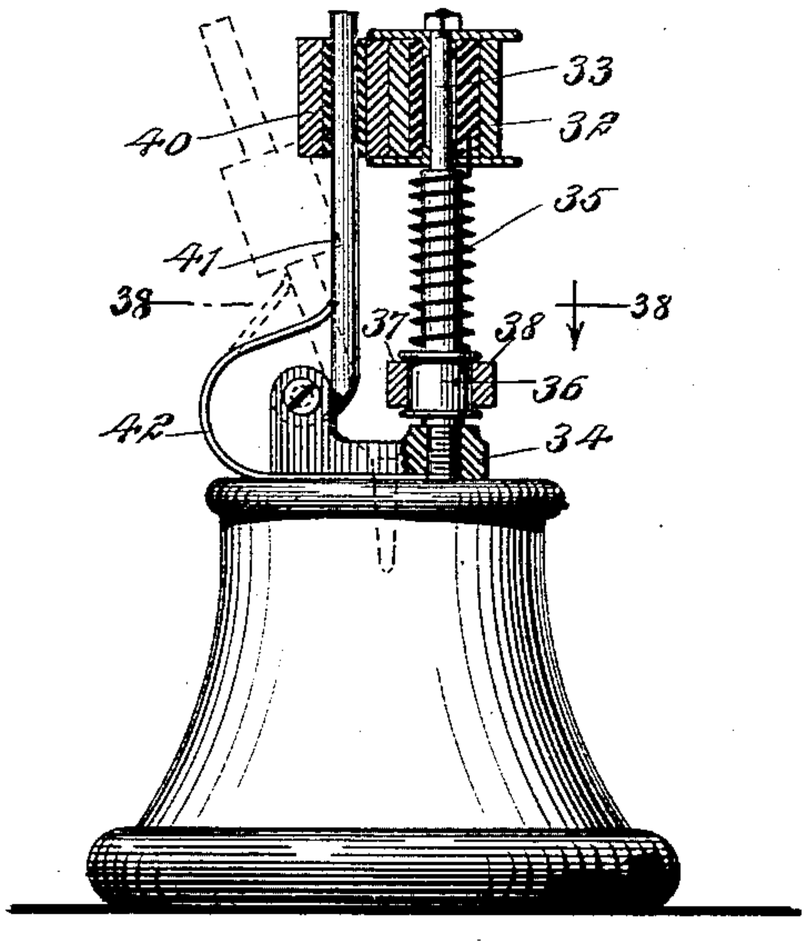

Fig. 36

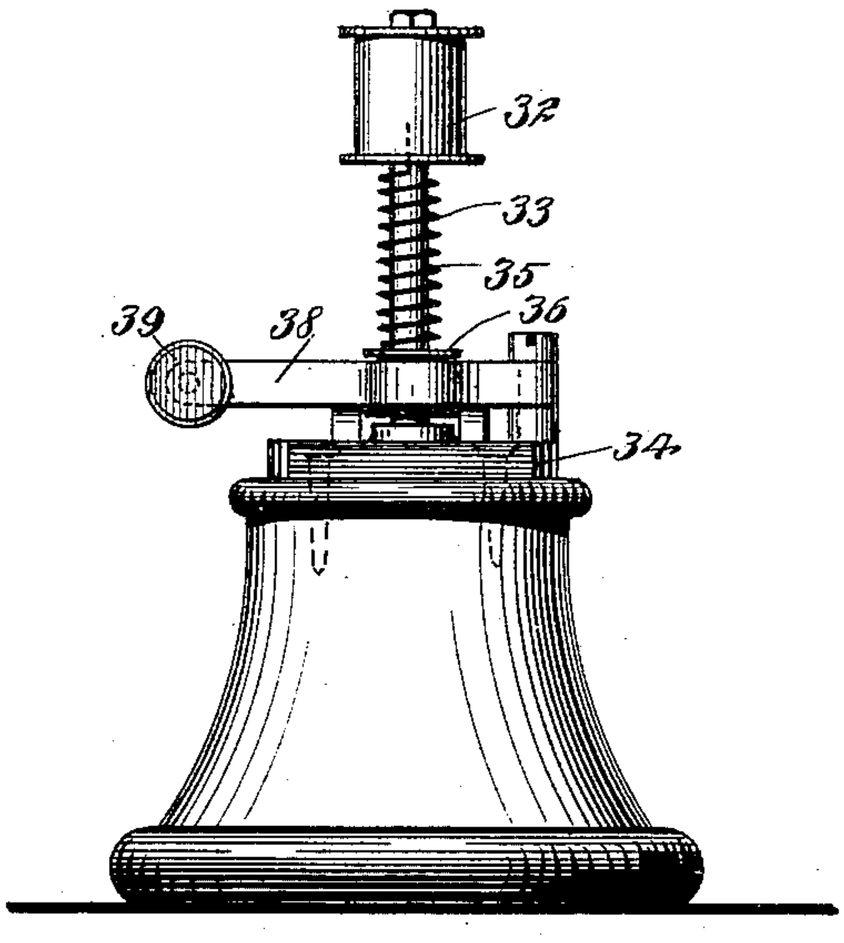

Fig. 37

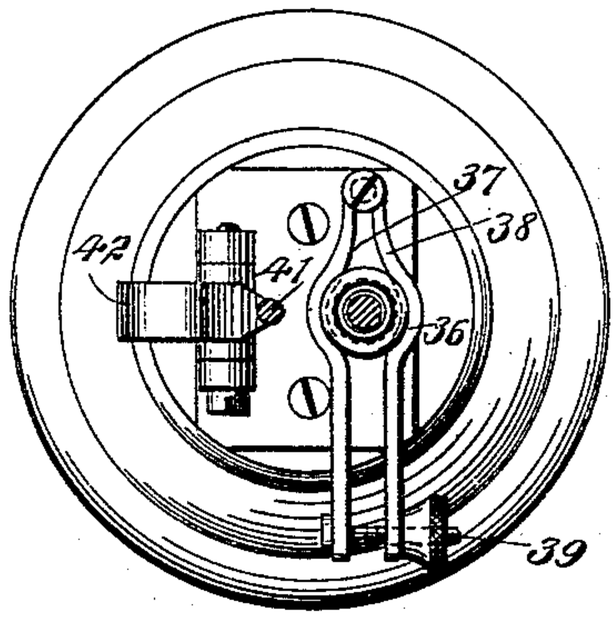

Fig. 38

WITNESSES:

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C. R. Ferguson

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Donald Murray
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Munn & Co
ATTORNEYS.

No. 638,591. Patented Dec. 5, 1899.

D. MURRAY.

ACTUATING MECHANISM FOR KEY OPERATED MACHINES.

(Application filed May 4, 1899.)

(No Model.) 16 Sheets—Sheet 15.

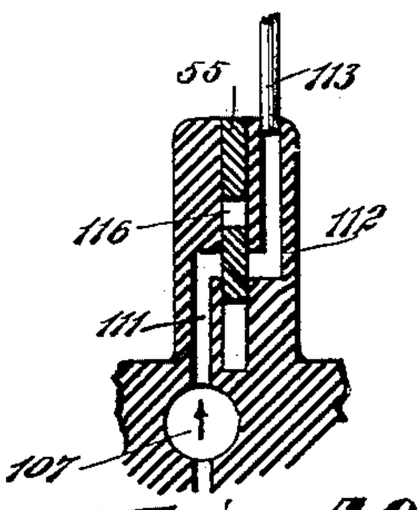

Fig. 40

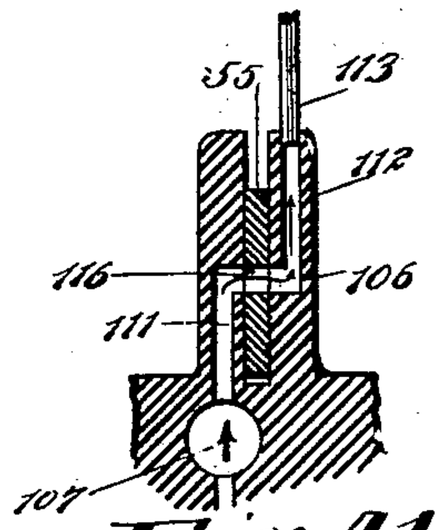

Fig. 41

Fig. 39

WITNESSES:

John A. Brophy
C. R. Ferguson

INVENTOR

Donald Murray

BY

Munn & Co

ATTORNEYS.

No. 638,591. Patented Dec. 5, 1899.

D. MURRAY.

ACTUATING MECHANISM FOR KEY OPERATED MACHINES.

(Application filed May 4, 1899.)

(No Model.) 16 Sheets—Sheet 16.

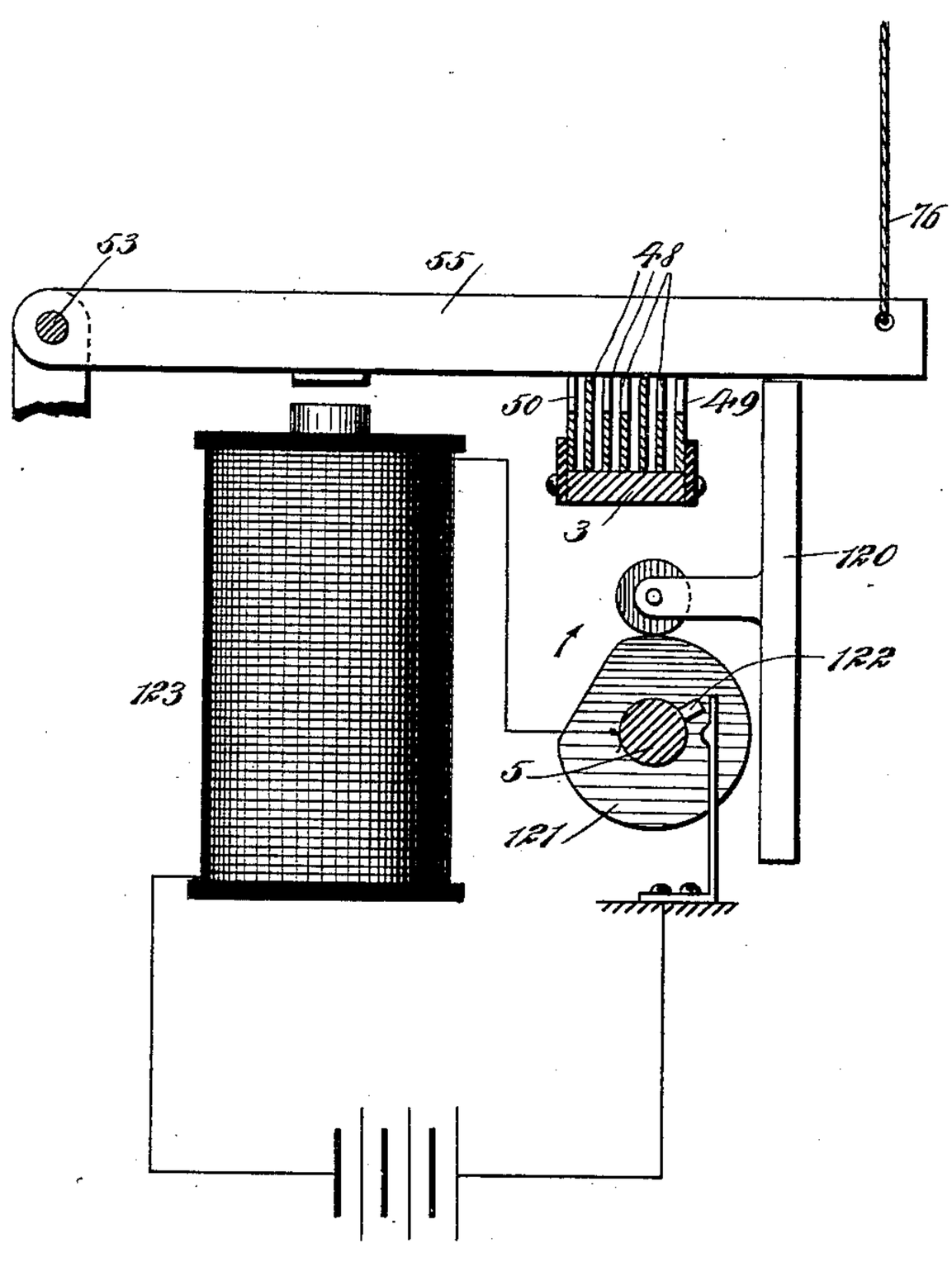

Fig. 42

WITNESSES:

John A. Berglund
C. R. Ferguson

INVENTOR

Donald Murray

BY Munn & Co.

ATTORNEYS.

UNITED STATES PATENT OFFICE.

DONALD MURRAY, OF SYDNEY, NEW SOUTH WALES.

ACTUATING MECHANISM FOR KEY-OPERATED MACHINES.

SPECIFICATION forming part of Letters Patent No. 638,591, dated December 5, 1899.

Application filed May 4, 1899. Serial No. 715,521. (No model.)

To all whom it may concern:

Be it known that I, DONALD MURRAY, of Sydney, New South Wales, have invented a new and Improved Actuating Mechanism for Key-Operated Machines, of which the following is a full, clear, and exact description.

This invention relates to improvements in actuating mechanism for keyboard-operated machines of the class used for the dissemination of intelligence, embracing linotype, type-setting machines, type-writing machines, and the like.

The object of the invention is to provide a new and improved device for operating such machines automatically and in such a manner that accurate work is produced without danger of derangement of the organism of such machines, at the same time leaving such machines at all times in condition for being operated by hand in the way now generally practiced.

A further object of the invention is to furnish syndicates, press associations, news agencies, and other centers of intelligence with simple means for convenient, quick, and immediate distribution to their customers and subscribers, so as to enable the latter to expeditiously and automatically convert, by the use of the type-machine, the intelligence received into type matter for printing serial stories, special articles, and telegraphic, cable, or other news without the assistance of any skilled labor whatever.

The invention consists of novel features and parts and combinations of the same, as will be fully described hereinafter and then pointed out in the claims.

A practical embodiment of my invention is represented in the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is an end elevation of a device embodying my invention and shown in connection with a type-writing machine to be actuated by the improvement. Fig. 2 is a front elevation of the same. Fig. 3 is a top plan of the same with the type-writing machine removed. Fig. 4 is a sectional plan view of the same on the line 4 4 in Fig. 2. Fig. 5 is a sectional front elevation of the same on the line 5 5 in Fig. 1. Fig. 6 is a transverse section of the same on the line 6 6 in Fig. 5. Fig. 7 is a cross-section of the improvement as applied to a type-writing machine, the section being taken on the line 7 7 in Fig. 2 and showing a striking device employed as just beginning to operate. Fig. 8 is a similar section showing the striker as operated. Fig. 9 shows a method of attaching the invention to a linotype-machine. Fig. 10 is an enlarged sectional front elevation of a portion of the device to clearly illustrate the reciprocating carriage and the tape-feeding mechanism employed. Fig. 11 is a transverse section of the same on the line 11 11 in Fig. 10. Fig. 12 is a like section of the same on the line 12 12 in Fig. 10. Fig. 13 is a similar section of the same on the line 13 13 in Fig. 10. Fig. 14 is a like section of the same on the line 14 14 in Fig. 10. Fig. 15 is a sectional plan view of part of the tape-feeding mechanism in position, the section being on the line 15 15 in Fig. 10. Fig. 16 is a similar view, but showing the parts in another position. Fig. 17 is a diagrammatic view of certain cams employed. Fig. 18 is a sectional front elevation showing the carriage and the feeding and controlling devices in one position. Fig. 19 is a similar view of the same, but showing the parts in another position. Fig. 20 shows a form of controlling-tape employed. Fig. 21 is an enlarged sectional plan view on the line 21 21 in Fig. 10 of the tape-feed, the carriage, and combs in normal position. Fig. 22 is a similar view of the same, but showing the parts in an actuating position. Fig. 23 shows a modified form of tape or web that may be employed under certain conditions. Fig. 23[a] shows a table with the groups of elements representing the letters of the alphabet, punctuation-signs, and special keys used for forming the message on the tape or web. Fig. 24 is a sectional front elevation of a modified form of the mechanism adapted to be controlled by the tape shown in Fig. 23. Fig. 25 is a top view thereof with parts in section. Fig. 26 is a side view of the comb for the capital-key. Fig. 27 is a side view of one of the regular combs. Figs. 28, 29, 30, 31, 32, 33, 34, and 35 are plan views of the combs in various positions relatively to the tape, the latter being in section. Fig. 36 is a partial section and partial elevation of a tension device

employed. Fig. 37 is an elevation of the same at right angles to Fig. 36. Fig. 38 is a section on the line 38 38 in Fig. 36. Fig. 39 shows a modification in which certain parts are operated by pneumatic means. Fig. 40 is a section showing a valve for governing the pneumatic device, the said valve being in its closing position. Fig. 41 is a similar section, but showing the valve in position to permit the actuating of a type-writer or similar key; and Fig. 42 is a transverse section of a modified form of the improvement, showing an electromagnet arranged for operating certain parts.

Various attempts have heretofore been made to directly actuate the operating mechanism of type-machines of the class described by the use of a continuously-traveling tape or web having perforations representing the message or reading matter to be converted into type matter, the tape being for this purpose provided with perforations representing groups of single elements, of which each group represents a letter or character of the message. Now type-machines of this class are in themselves formed of a very complex mechanism, and in order to automatically and directly actuate this mechanism by the continuously-moving tape or web containing the elements of the message to be translated into type matter required the addition of such complex mechanism that the attempts heretofore made encountered almost insurmountable practical difficulties, and consequently reliable mechanism for accurate work could not be produced. In order to overcome these difficulties, I do not disturb the mechanism of the type-machine in question, but translate the elements on the tape into corresponding mechanical contrivances forming part of my machine, and each such mechanical contrivance in turn actuates a corresponding mechanical contrivance of the type-machine to produce accurate work.

In my machine the mechanical contrivance referred to may be in the form of levers 55, and I prefer hereinafter to call such contrivances "unitary parts," as each part represents a letter, numeral, punctuation-sign, logotype, or other unitary character or sign in contradistinction to the individual elements on the tape and of which elements it requires a number grouped together in a peculiar manner (see Fig. 23) to indicate or represent a letter, numeral, punctuation-sign, &c., of the message. For great accuracy in the result it is essential that the tape or web is not fed continuously, but intermittently, and is not used direct on the type-machine, but is employed to intermittently actuate the separate machine, which in turn by the unitary parts actuates the type-machine without interfering with the keyboard of such machine, so that this keyboard can be worked by hand whenever desired.

The improved machine is mounted on a suitable base A, carrying standards 2 for supporting a table or bed-plate 1, on which are mounted to slide longitudinally assembling members, preferably in the form of combs 48, five in number, and controlled by a web or tape 13, fed intermittently by a feed mechanism B, located on a reciprocating carriage 9 for moving the tape to and from the combs 48 and actuating the same according to the message on the tape, as hereinafter more fully described, said combs controlling the unitary parts 55, which in turn are connected with the corresponding parts of a type-setting, linotype, or other machine. As shown in Figs. 1, 2, and 3, my improvement is applied to a type-writing machine C, set on a skeleton frame E, supported on posts D, carried by the base A.

The message on the tape is formed by groups of elements, of which each group represents a letter, numeral, punctuation-mark, or other character, sign-space, &c., (see Fig. 23[a],) so that when a group of elements assembles the corresponding combs the corresponding unitary part has actuated such part repsenting the group of elements on the tape active at the time. The groups of elements are preferably arranged as shown in said Fig. 23[a], which illustrates the entire alphabet, some punctuation-signs, a group of elements for a space-key, a capital-key, one for a figure or numeral key, and one for a release-key. Each group of elements, as shown, contains five elements represented either by apertures or dashes or a combination of both. By having the elements in each group of a like number each letter or character or sign occupies the same space on the tape or web, and the intermittent feed given to the web or tape by the feed mechanism B corresponds to the length of the space occupied by a single group, so that the combs corresponding to the group active at the time are actuated for actuating the corresponding unitary part 55. Owing to the uniformity of the feed of the tape and the equal spaces occupied by the group of elements it is possible for the groups of elements to be placed one alongside the other without intervening spaces and without the slightest danger of actuating wrong combs.

The combs 48 are provided at the ends adjacent to the carriage 9 with pins or fingers 51, adapted to be engaged by a group of elementary apertures and dashes on the tape as the latter is moved bodily with the carriage to the right. When this takes place, the combs, with pins registering with apertures or perforations, are engaged by the latter and remain dormant, while the pins in register with the dashes are engaged by the solid parts of the tape and are shifted by the latter to the right to assemble such combs and bring their slots in register with each other for the corresponding unitary part 55 to drop in such registering slots. Thus, for instance, when the group of elements representing the letter "e" (see Fig. 23[a]) and consisting of an aperture and four succeeding dashes engages the combs 48 four of the combs are shifted and

only one comb remains dormant as its pin or finger 51 passes through the solitary aperture in said group, while the four other combs are engaged by the solid portions of the web at the dashes following the aperture. In practice it is not necessary to show the dashes on the tape, and they may be omitted.

On the bed-plate 1 is a slideway 3, and from the said bed-plate depend hangers 4, in which is journaled a shaft 5, which may be rotated by any suitable means. I have here shown it as provided with a pinion 6 for engaging with a driving-gear 7, which is provided with a crank, so that it may be operated manually; but said shaft 5 may be driven from other suitable machinery by gearing or belt-and-pulley connections. Extended from one end of the bed-plate 1 is a guideway 8 for the reciprocating carriage 9 to slide on, said guideway consisting of plates secured to brackets 10, projected from the bed-plate 1. The inner edges of these bed-plates engage in grooves on each side of the carriage, so that while the carriage may reciprocate back and forth it is restrained from any other movement.

Mounted on the carriage 9 are perforated plates 11 and 12, between which the web or tape 13 is designed to pass, the perforations in the plates 11 and 12 being designed to act as guides for the passage through the tape-perforations of the fingers 51, extending from the controlling-combs 48, as previously mentioned. The plate 12 also acts as a support for the tape, while its solid portions, represented by dashes, are thrust against the corresponding fingers 51 of the said combs 48.

On the ends of the plates 12 are vertically-disposed rollers 14 and 15, and rearward of said plate 12 are guide-rollers 16 and 17. (See Figs. 10, 11, 12, 13, 14, 21, and 22.) These guide-rollers 16 and 17 are mounted, respectively, in brackets 18 and 19, held on a bar 20, adapted for adjustment transversely of the carriage, and for this purpose I employ set-screws 21 and 22, engaging tapped apertures formed in arms 23 24, extending from said bar 20, and the inner ends of these set-screws (see Fig. 12) impinge against the sides of the carriage. Obviously by manipulating these screws the rollers 16 17, and therefore the tape, may be adjusted. The object of providing for this adjustment of the guide-rollers 16 17 transversely of the carriage is to permit of minute adjustment of the tape or web, and which adjustment may be necessary to cause the elementary perforations to properly aline with the fingers of the combs 48; but this adjustment once made rarely or never needs changing. A spring-guide 12^a is held on the carriage, straddles the plate 11, and serves to hold the tape or web against the face of the plate to prevent accidental shifting of the tape during the time the tape is active for shifting the combs.

Adjacent to the roller 16 and mounted on the sliding bar 20 is a curved shield-plate 25, (see Figs. 21 and 22,) designed to prevent buckling of the web or tape as it passes along under the influence of the feeding mechanism. In other words, while the tape or web is being fed by the feeder or star-wheel 26 it will strike against the concave side of the shield-plate 25 and will be directed to a basket or other suitable receptacle without danger of its folding or returning upon the star-wheel. This star-wheel or feeder 26 has on its periphery a series of pins 27, (see Figs. 10, 18, and 19,) adapted to engage in perforations 28, formed in the tape 13, as shown in Fig. 20. The star-wheel 26 is mounted on a vertical shaft 29, adapted to rotate in the carriage 9, and on the lower end of said shaft 29 is a ratchet-wheel 30, designed to be engaged by a spring-pressed pawl 31, (see Figs. 15 and 16,) mounted on the bracket 10.

Reciprocating motion is imparted to the carriage 9 (see Figs. 5, 10, 18, and 19) by means of a cam-pulley 43, mounted on the driving-shaft 5, said cam-pulley having a peripheral groove engaged by a roller 44, loosely mounted on a stud 45, depending from said carriage. As the cam-pulley 43 moves the carriage 9 toward the bed-plate of the machine the ratchet-wheel 30 will of course be disengaged from the pawl 31; but upon the reverse movement of the carriage a tooth of the said ratchet-wheel will engage with said pawl 31, so that the star-wheel 26 will be rotated a sufficient distance to move the tape or web through one space. The star-wheel is held from backward rotation while the carriage is moving forward by means of a spring-pressed dog 46, mounted on the carriage and engaging with the ratchet-wheel. (See Figs. 15 and 16.) If it be desired to rotate the star-wheel backward for any purpose, the dog 46 may be disengaged from the ratchet-wheel by pushing outward upon the finger-piece 47, as indicated in dotted lines in Fig. 16.

The combs 48 are movable longitudinally on the slideway 3 and are held separately in a vertical position by means of pins 52, extended upward from the bottom of the slideway 3 and between adjacent combs, as is plainly indicated in Figs. 5, 21, and 22. Some or all of the combs 48 are shifted at a time to the right by the action of the tape moved bodily with the feed mechanism, and in order to insure a return movement of the combs to the left during part of the return stroke of the carriage I provide the under side of each finger 51 with a lug 95, adapted to be engaged by a spring arm or finger 94, mounted on a block adjustably secured to the carriage 9, so that when the latter is on the return or outward movement the arms or fingers 94 engage the lugs 95 of the previously-shifted combs to return the latter to their normal position. (Shown in Figs. 10 and 21.)

The several combs 48 are provided in their top edges with slots variously placed, (see Fig. 27,) and the slots are designed to govern the unitary parts in the form of levers 55, mounted to swing independently of each other

on a rod 53, secured in standards 54 on the bed-plate 1, said unitary parts or levers 55 being mounted to swing in fixed guideways 55[a] to restrain the parts from sidewise motion. The number of unitary parts or levers 55 will correspond to the number of unitary parts contained in the machine to which my device is applied, and said unitary parts 55 are designed to have connection by means of cords or other devices with the several keys of such type-machine. The unitary parts or levers 55 extend transversely of the combs 48 and are supported at their ends normally above the several combs by means of a supporting-bar 56, and they are held yieldingly against said supporting-bar and are adapted to swing downward at the proper time by means of springs 57, connected at one end to the levers 55 and at the other end to a cross-bar 58, supported on a threaded standard 58[a], so that the tension of the springs 57 may be adjusted by nuts 58[b]. (See Figs. 6, 7, and 8.) The ends of the supporting-bar 56 are movable in slots formed in standards 59, and said bar is moved upward by means of posts 65, mounted on the outer ends of two levers 60, rocking on shafts 61, and said levers 60 are provided at their inner ends with rollers 62, engaging with cams 63, attached to the shaft 5. (See Fig. 5.) As a means of adjusting the bar 56 vertically I provide step-bearings 64, adjustable through the levers 60, and these bearings are preferably made in the form of screw-bolts, which in their upper ends have depressions for receiving the lower pointed ends of the posts 65, depending from the bar 56.

Forward of the supporting-bar 56 and also forward of the unitary parts or levers 55 is a striking-bar 66, mounted on the upper ends of arms 67, projecting upward from a rock-shaft 68. On the latter is arranged an inwardly-extending arm 69, carrying at its free end a roller 70, engaging the peripheral surface of a cam 71, mounted on the shaft 5 between the cams 62 and 63. A spring 72, connected at one end to the supporting-bar 56 and at the other end to the arm 69, serves two purposes—one to depress the bar 56 and the other to hold the roller 70 in contact with the cam 71.

Mounted to slide on each key-lever 55 is a tappet-rod 73, (see Figs. 7 and 8,) movable through guideways 74 on the unitary part or lever 55, and the outer end of said tappet-rod extends normally forward of the end of the lever to which it is attached. A stop 75 on the inner end of the tappet-rod engages against each side of the lever 55, and said stops not only prevent the tappet-rods from rotating in their bearings, but also by coming in contact with the inner bearing 74 prevent the tappet-rods from moving too far in an outward direction. From the inner end of the tappet-rods 73 extend cords or other suitable connections 76 around idler-pulleys 77, mounted on a rod supported in hangers 78, said cords then extending around idler-pulleys 79, supported in hangers 80, and from these idler-pulleys 79 the cords extend to connect with the keys of the type-machine to be operated. Provision is made for adjusting the length of the cords by turnbuckles or other well-known mechanical means.

Alongside the combs 48 and similarly mounted are arranged a figure-comb 49 and a capital-comb 50, having slots or notches in their top edges, but without fingers 51. (See Figs. 4, 5, 21, 22, 26, 28, 29, and 30.) The figure-comb 49 and the capital-comb 50 are adapted to be actuated by levers 82 and 81, respectively, located at one side of the unitary parts or levers 55 (see Fig. 4) and likewise fulcrumed on the rod 53. The lever 81 (see Fig. 26) has a wedge-like cam 88 on one side to engage with the inclined surface 89, formed on the capital-comb 50, and a similar cam 90 is formed on the lever 82 to engage with an inclined surface 91 on the figure-comb 49, so that when either of these levers swings downward the corresponding comb will be moved into an operative position.

At the opposite side of the series of unitary parts or levers 55 and likewise fulcrumed on the rod 53 is arranged a release-lever 92, (see Figs. 4 and 26,) having cam-surfaces 93 adapted to engage with the inclined surfaces 93[a] on both the combs 49 and 50, so that when the lever 92 swings downward it will return either or both of these combs to their normal position—that is, the lever 92 will be brought into operation when it is desired to change from capitals or figures back to lower case at the time the corresponding group of elements (see Fig. 23[a]) is active on the tape and shifts the corresponding combs 48 to such position as to allow the lever 92 to swing downward the same as a unitary part or lever 55. The three levers 81, 82, and 92 are supported at their free ends on the supporting-bar 56 in a similar manner to the levers 55, and they each have spring connections with the bar 58, the three springs supplying the power to shift the combs 49 or 50 in the manner described.

The tape 13 is fed from a roll supported in any suitable manner, and preferably it will pass through a tension device (see Figs. 3, 4, 36, 37, and 38) before it reaches the star-wheel 26, so as to keep said web or tape under proper stress. The tension device is provided with a roller 32, supported on a stem 33, extending from a base 34, attached to the main base A, and said roller 32 is prevented from revolving freely on the stem 33 by a spring 35, which surrounds the stem and engages at one end with the roller 32 and at the other end with a sleeve 36, mounted loosely on the stem 33. The tension of the spring 35 may be adjusted by means of clamping-jaws 37 and 38, which engage the periphery of the sleeve 36, and said jaws 37 38 are connected at one end to the base 34, and at the opposite ends they are connected to each other by an

adjusting-bolt 39. By the operator manipulating the nut on the bolt 39 the jaws 37 and 38 may be caused to bear with greater or less friction upon the sleeve 36, and the tension of the spring 35 will be regulated accordingly. The web or tape is held against the roller 32 by means of a presser-roller 40, mounted on a rod 41, having swinging connection with the base 34, and said roller 40 is yieldingly held toward the roller 32 by means of a spring 42, attached to one end of the base or to any other fixed device and bearing at its free end against the rod 41, as plainly indicated in Fig. 6.

The operation is as follows: When the several parts are in the position shown in Figs. 1, 2, 4, 5, 6, 10, and 21, then the several unitary parts or levers 55 are supported in their uppermost position, directly above the combs 48, 49, and 50, by the supporting-bar 56, the outer ends of the fingers 51 of the combs 48 being transversely in alinement with each other in the guide-plate 11. The web or tape 13 extends between the plates 11 and 12 and passes around the feed or star wheel 26, as shown in Fig. 21, the feed-carriage standing at this time in its outermost position at the extreme left, the friction-roller 44 being in the groove of the cam 43 at the line $x\,x$. (Shown in Fig. 17.) Now when a rotary motion is given to the shaft 5 the cam 43 causes the carriage 9 and the now active feed mechanism B, the tape portion directly engaged by said feed mechanism, and the guide-plates 11 and 12 to move to the right, so that the tape is brought to the free alined ends of the fingers 51, with the elements of a group on the tape in register with the said free outer ends of the fingers 51. Upon a further motion to the right of the carriage and the parts carried thereby the solid or dash elementary portions of the web or tape shift the corresponding fingers and their combs 48 to the left, while the fingers opposite the perforations or apertures on the tape pass through the latter and remain dormant—that is, their combs are not shifted to the right, but remain stationary. When the carriage is in its extreme right-hand position, the combs 48 are assembled in such a manner that one set of slots or notches of all the combs are in register with each other in a transverse direction directly under that unitary part or lever 55 which represents the group of elements on the tape active at the time on the fingers 51 of the combs. When this takes place, the cams 63 actuate the levers 60 to move the supporting-bar 56 downward and allow the unitary parts or levers 55 to rest on the top of the combs 48, 49, and 50, with the exception of that unitary part or lever 55 now in register with the registering slots of the combs, and which single lever now swings downward by its own weight, assisted by the spring 57, the lever following the retreating or downward movement of the supporting-bar 56. (See Fig. 7.) When this has taken place, the cam 71 actuates the striker-bar 66 to impart a sliding motion to the tappet-rod 73, (see Fig. 8,) whereby the unitary part or key of the type-machine is actuated to produce type or other matter corresponding to the letter, sign, character, or the like and represented by the active group of elements on the tape or web and in engagement at the time with the fingers 51, as above described. The next action is the return of the supporting-bar 56 and the striker-bar 66 by the action of the cams 63 and 71 on the levers 60 and arm 69, respectively, so that the down lever 55 is first swung upward out of the registering slots or notches of the combs and again into alinement with the other non-active levers or unitary parts 55 to finally swing all the levers 55 upward back to their former normal position—that is, directly above the top edges of the combs—to allow free longitudinal movement of the combs when shifted by the solid tape portions, as above described. Upon the return movement of the carriage the previously-shifted combs are moved back to their former positions by the spring-fingers 94, moving with the carriage and engaging lugs 95 on the fingers 51, as previously explained. The feed mechanism for the tape is actuated immediately after the tape leaves the outer ends of these fingers 51, engaging apertures in the tape and belonging to those combs which remain dormant for the time being, as described. As the described movement of the actuated parts depends mainly on the construction and arrangement of the cams 43, 63, and 71, it is deemed advisable to more fully describe their action, special reference being had to Fig. 17. The carriage 9 is in an outermost position at the time the roller 44 stands in the groove at the line $x\,x$, and when the cam is rotated and the friction-roller travels from the line $x\,x$ to the line 18 18 then the carriage moves rapidly inward to bring the tape 13 in contact with the outer ends of the fingers 51, and when the friction-roller travels in the cam-groove on the line 18 18 to the line 19 19 a distance about one-third of the circumference of the cam then a very slow feed to the right is given to the carriage and its tape to shift the corresponding dash-combs to the right and assemble the combs, as described. This slow gradual feed prevents the fingers in contact with the solid portions of the web or tape from piercing, tearing, or otherwise injuring the tape or web, as might be the case if a fast motion is given to the carriage during the period of shifting the combs. During this time—that is, while the roller 44 travels from the line $x\,x$ to the line 19 19—the friction-rollers 62 and 70 travel on the segmental cam-surfaces of the cams 63 and 71, respectively, and consequently the levers 60 and arms 69 remain dormant; but when the carriage begins its return stroke after the friction-roller leaves the line 19 19 then the drop in the cam causes the levers 60 to be actuated for dropping the supporting-bar 56 from under the combs and allowing a corresponding unitary part or le-

ver 55 to drop into the registering slots or notches of the combs 48. When this has taken place, the cam 71 actuates the striker 67 to act on the tappet-rod 73 and actuate the corresponding unitary part of the type-machine, as above explained. Both cams now allow the levers 60 for the supporting-bar 56 and the arms 69 and 67 for the striker 66 to return to their former positions, so that the supporting-bar 56 is again raised to swing the previously-dropped unitary part into alinement with the rest of the unitary parts and to then swing all of the latter just free of the combs, so as not to interfere with their sliding motion for assembling, as previously explained. During the action of the cams 63 and 71 and during the first part of the return movement of the carriage the tape is carried back out of contact with all the fingers. As soon as the tape is free from the fingers the star-wheel 26 is rotated by the action of the pawl 31, as previously explained, the feeding stopping at the time the carriage has completed its return stroke—that is, when the roller 44 is again at the line $x\,x$ of the cam. During the latter portion of the return movement of the carriage the fingers 94 engage the projecting lugs 95 and carry the combs previously actuated by the solid or dash parts of the tape back to their former positions to bring the outer ends of all the fingers again in alinement with each other to be ready for the next action.

From the foregoing general description of the operation of the machine it will be readily understood that according to the message on the tape one, two, or more, all or none of the combs is shifted at a time, as will appear by reference to the table shown in Fig. 23ª. Now to more clearly illustrate the detail working of the machine it is assumed that the tape portion shown in Fig. 20 is intermittently fed through the machine.

Referring particularly to Fig. 20, the first tape portion *a* is entirely unperforated and corresponds to the five dashes for the space-key, as shown in Fig. 23ª. Now when the carriage is moved toward the bed-plate and the tape portion *a* is pressed against the fingers all of the combs 48 will be simultaneously moved. The next portion *b* contains first a blank or dash, then a perforation, and then follow three more blanks or dashes. The sign within the portion *b* (which is designed to make the machine operate capital letters) will permit the finger 51 of the second comb 48 from the front of the series to enter the perforation, so that no motion will be imparted to the second comb when the carriage is moved toward the bed-plate; but the several other combs 48 will be moved to their limit and also in alinement with a slot in the capital-comb 50 and in the figure-comb 49. The next portion contains a sign which represents the small letter "b"—that is, has within the portion a perforation, then two blanks or dashes, and then two perforations. This small "b" sign will allow the operation of the capital "B," because the previous sign has thrown the capital-comb into operative position. When the portion of the tape having this sign is moved by the carriage toward the bed-plate and against the ends of the fingers 51, the first one and the last two of the combs 48 will remain stationary, because their fingers will pass through the perforations. The other two combs, however, will be moved to their limit. This puts the proper series of slots in alinement to allow a lever 55 to drop downward and actuate the capital "B" key of the typewriter or other machine, and this is carried on as long as the capital letters are required. Thus the word "BOURKE" is produced in type matter. When it is desired to change the machine to its normal condition of operating small letters, a release-sign (indicated in the portion *c* in Fig. 20) is provided. This sign adjusts the combs so that the release-lever 92 is permitted to drop and throw the capital-comb back to normal position.

In Figs. 27 to 35, inclusive, I have diagrammatically shown the position of the several combs to allow for the printing of the small letter "a," a capital "A," and a figure, and referring thereto Fig. 28 indicates the normal position of the several combs. Now as the sign for the small letter "a" reaches its position on the plate 12 and as the carriage is moved toward the bed-plate the combs will be distributed to the position indicated in Fig. 29—that is, the slots of the combs will be in alinement to permit a lever 55 to be drawn downward to operate the device for the small letter "a." Upon the return movement of the carriage the several combs 48 will be returned to their normal position. (Indicated in Fig. 28.) In order to set the combs in position to allow for the printing of capitals, the capital-sign will come into position to permit the adjustment of the combs and allow the lever 81 to move downward into the alined slots of the several combs 48 and the comb 49, and the downward movement of this lever 81 by engaging its cam-surface with the incline 89 will move the capital-comb 50 from the position indicated in Fig. 30 to the position indicated in Fig. 31. The next stage is the return of all the combs except the capital-comb to the position shown in Fig. 32. After this when the sign for the small letter "a" moves forward the fingers 51 of the first two combs 48 will pass through perforations, so that these two combs will remain idle. The other three combs, however, will be forced to the right to bring certain slots in alinement with a slot in the comb 50 and also in line with a slot in the comb 49. Then the proper lever 55 may be moved downward by its spring to operate a printing-type; but none of the other levers can be moved downward, because there are no alined slots to receive them. At this time the parts will be in the position indicated in Fig. 33. Then after the printing shall have taken place or

the proper type is released the parts will be returned to the position indicated in Fig. 32. Then as the release-signal reaches its position the proper slots will be put in alinement to allow the lever 92 to move downward, as shown in Fig. 34. This lever will return the comb 50 to its normal position, and then the several parts will be returned to the position indicated in Fig. 28 by means of the fingers 94. For operating figures when the proper sign reaches its position—say the sign for the figure "3"—the comb 49 will be moved by means of the lever 82 to the position indicated in Fig. 35, bringing the proper slots in alinement to allow of the drawing downward of the proper lever for operating the type carrying the figure "3."

In certain figures of the drawings heretofore described I have shown the machine in connection with a type-writer. In Fig. 9 I have shown the same machine as attached to a linotype-machine, and in this view the machine is turned so that the several levers 55 extend vertically instead of horizontally, and from the tappet-fingers 73 there are direct connections 96 with the key-levers 97 of the linotype-machine. In Fig. 23 I have shown the tape or web 98, which performs the same function as the tape first described; but in this tape 98 the signs are arranged transversely of the tape or web. By this means the same number of words or characters may be formed in a shorter space than can be formed on the tape first described, where the signs extend lengthwise of the tape; but this form of tape cannot be conveniently telegraphed like that in which the signs are disposed lengthwise of the tape. When this tape 98 is employed, the machine will be arranged as indicated in Figs. 24 and 25, in which it may be noted that the plate 12 is omitted, and as a substitute therefor I provide a star-wheel 99, having perforations through which the projections or fingers 51 may pass when the carriage is moved toward the bed-plate. The tape or web 98 passes around the star-wheel 99 and also engages against idlers 100 and 101. A pawl 102, mounted on a fixed support 103, is designed to engage with a ratchet-wheel 104 on the shaft of the wheel 99 to impart a rotary motion to said wheel upon the return movement of the carriage on which the wheel is mounted. Mounted on the carriage forward of the wheel 99 is a plate 105, provided with perforations for receiving and guiding the fingers 51 of the combs 48. The operation of this device is substantially the same as that first described.

In the modification shown in Fig. 39 the key-levers of the type-writer are operated by pneumatic agency under the control of the several levers 55. Each lever 55 is movable vertically in a slot formed in a block 106 on the forward portion of the bed-plate 1. Extended longitudinally in the block 106 is an opening 107, which forms an air-chamber which has communication through a pipe 108 with a pump 109, the piston of which is operated by an eccentric 110 on the shaft 5. At one side of the slot in each block 106 a port 111 is formed, the said port communicating with the air-chamber 107 and also having an outward opening which is normally closed by the lever 55, as indicated in Fig. 40. At the other side the block is provided with a port 112, from which a pipe 113 extends to a cylinder 114, in which a piston 115 operates, the said piston having connection with the key-lever of the type-writer. Of course there will be an operating-piston 115 for each of the key-levers. When the several levers 55 are in their upper or normal position, they serve as valves to close the outlets of the ports 111. When one of the levers is drawn downward, however, a hole 116 in said lever will place the ports 111 and 112 in communication, so that the blast of air from the pump 109 will be forced through the pipe 113, controlled by said downwardly-moved lever, and upon the upper side of the piston 115, causing the type-writer or other machine to be drawn downward to operate a type.

In the modification shown in Fig. 42 the unitary parts or levers 55 are held in their normal uppermost position above the combs 48 49 50 by a support 120, controlled by a cam 121 on the main shaft 5, having means 122 for closing an electric current to actuate an electromagnet 123, which is located under the unitary parts 55 and which latter are now armature-levers. The electromagnet is actuated after the combs are shifted by the tape and the support 120 has moved into a lowermost position, so that the unitary part 55 in alinement with the registering slots in the combs is now forced to swing downward by being attracted by the electromagnet. The unitary part 55 is directly connected by the cord 76 with the corresponding part of the type-machine, and the striker mechanism previously described is in this case dispensed with, as the force of the electromagnet is sufficient to actuate the unitary part or lever 55 and the type-machine. A tape of any width or material may be used; but preferably I employ ordinary telegraphic paper tape of the standard half-inch width. As perforations in place of writing characters are used, it is not necessary that the paper shall be white—in fact, ordinary brown paper may be used—and it is not material as to the thickness of the paper, as I have found by experiment that even tissue-paper will move the combs to their appropriate positions.

In the modification in which the signs are placed transversely of the tape (see Fig. 23) the tape may advantageously be made wider than the standard telegraphic tape, and in this construction it is well to provide two rows of perforations to receive similar rows of teeth on the star-wheel. This arrangement of feed-holes may also be employed in the tape shown in Fig. 20, with the signs ar-

ranged between the two lines of perforations and lengthwise of the tape. In Fig. 20, however, a single line of feeding-holes 28 is shown as arranged in the center of the tape with the signs at one side; but it is obvious that signs may be placed at both sides of the feeding-holes.

While five elements are shown as comprised in each group, it is evident that a greater number may be used. If five elements are used in each group, a capital and figure comb will be required in the machine. In the event of six elements being used in each group there will be sixty-four possible combinations of the elements, and hence only one, either a capital or a figure, comb will be required, and if each group is composed of seven elements one hundred and twenty-eight combinations are possible, and in such case it is manifest that no capital or figure comb will be required. This last arrangement is especially applicable to the modification shown in Fig. 23, which, it is obvious, cannot be readily telegraphed like the tape shown in Fig. 20, but may be preferable for matter not to be transmitted by telegraph or otherwise what may be termed "local" matter.

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

1. The combination, with the actuating mechanism of a type-writing, type-setting, type-casting or other machine for the dissemination of intelligence, of a tape representing a message and having perforated and non-perforated portions, and a machine connected with the said actuating mechanism for transmitting its motion to the said mechanism of the type-machine, the said machine being positively actuated by the non-perforated portions of the said tape.

2. The combination, with a tape having lengthwise and sidewise movement and having perforated and non-perforated portions representing a message, of a machine connected with the actuating mechanism of a type-writing, type-setting, type-casting or other machine for the dissemination of intelligence the said machine having assembling devices adapted to be engaged by the said non-perforated portions of the tape to bodily shift the assembling devices to be actuated for a particular letter, character, sign and the like of the message, the remaining assembling devices remaining dormant by being accommodated by the perforated portions.

3. The combination, with a tape having lengthwise and sidewise movement and having perforated and non-perforated portions representing a message, of a machine connected with the actuating mechanism of a type-writing, type-setting, type-casting or other machine for the dissemination of intelligence, the said machine having assembling devices to be engaged by the said non-perforated portions of the tape to bodily shift the assembling devices to be actuated for a particular letter, character, sign and the like of the message the remaining assembling devices remaining dormant by being accommodated by the perforated portions, and means for first moving the said web lengthwise to position for a particular letter, character, sign and the like of the message, and then moving it sidewise for actuating the assembling devices.

4. In combination, a machine for governing the actuating mechanism of a type-writing, type-setting, type-casting or similar contrivance, and an actuating and controlling device for said machine, the machine having a plurality of governing members movable relatively to each other to effect various operative assemblages of said members, the actuating and controlling device consisting of a tape having perforated and non-perforated portions, the non-perforated portions engaging sundry of the members and serving directly to effect an operative assemblage of the moved and unmoved members.

5. The combination with a machine for the dissemination of intelligence, of a tape or web containing elements representing alphabetic or other characters, and a machine positively actuated and controlled by said tape according to said elements and arranged to translate the elements of the tape into unitary parts representing letters of the alphabet and other characters, said unitary parts being directly connected with the corresponding unitary parts of the type-machine, substantially as shown and described.

6. The combination with a linotype or other machine for the dissemination of intelligence, of a tape or web having groups of elements, the elements in a group representing an alphabetic or other character, and said groups being arranged one alongside the other, an intermittent feed mechanism for said tape or web, to feed the latter successively the distance of a group of elements, means for moving the tape sidewise, and mechanism controlled by said tape or web and having unitary parts connected with the corresponding parts of the said type-machine, the unitary parts being controlled by said tape elements during the sidewise movements of the tape, substantially as shown and described.

7. The combination with a linotype or other machine for the dissemination of intelligence, of a tape or web having perforations arranged in a longitudinal line and each representing an element of an alphabetic or other character, the perforations being in groups, each group representing a letter or other character and the groups being located one alongside the other without intermediate spaces, a mechanism having an intermittent feed for the said tape and moving the latter sidewise and unitary parts connected with corresponding parts of the type-machine, and means for actuating a corresponding unitary part from the tape, according to the corresponding group of per-

forations during the sidewise movement of the tape; substantially as shown and described.

8. In a machine for use with a type-setting, type-casting or other machine for the dissemination of intelligence the combination with a tape or web having groups of elements, each group representing a letter or other character, of a mechanism for moving the tape lengthwise, a series of combs in engagement with the tape and controlled by said elements, and a series of unitary devices each controlled by one or a plurality of said combs, substantially as shown and described.

9. The combination with the actuating mechanism of a type-writing, type-setting, type-casting or other machine for the dissemination of intelligence, of a tape representing a message and having alternate lengthwise and sidewise movement and having perforated and non-perforated portions, and a machine connected with said actuating mechanism, for transmitting its motion to the said mechanism of the type-machine, the said machine being positively actuated by the non-perforated portions of the said tape during the sidewise movement thereof.

10. The combination with the actuating mechanism of a type-writing, type-setting, type-casting or other machine for the dissemination of intelligence, of a tape representing a message having perforated and non-perforated portions, a mechanism for intermittently feeding the tape lengthwise and moving it sidewise during the period of rest after a lengthwise movement, and a machine connected with said actuating mechanism, for transmitting its motion to the said mechanism of the type-machine, the said machine having assembling devices actuated by or during the sidewise movement of said tape, substantially as shown and described.

11. In an actuating mechanism for key-operated machines, a series of movable combs, devices controlled by said combs for controlling the action of a key-operated machine, and a movable web for causing an assembling of the combs and having lengthwise and sidewise movement, substantially as shown and described.

12. In an actuating mechanism for key-operated machines, a series of combs, devices controlled by said combs for controlling the action of a key-operated machine, a perforated web for assembling the combs, means for moving said web lengthwise, and means for moving the web sidewise toward or from the combs, substantially as shown and described.

13. In an actuating mechanism for key-operated machines, a series of combs, devices controlled by said combs for controlling the action of a key-operated machine, a perforated web, means for imparting an intermittent feeding motion to said web, and means for moving the web sidewise to assemble the combs, substantially as shown and described.

14. In an actuating mechanism for key-operated machines, a series of combs mounted to slide, devices controlled by said combs for controlling the action of a key-operated machine, a perforated comb-controlling web, a feeding device for the web to feed the latter lengthwise, means for imparting intermittent motion to the feeding device, a carriage on which the feeding device is mounted to move the web sidewise, and means for imparting reciprocating motion to the carriage, substantially as shown and described.

15. In an actuating mechanism for key-operated machines, a series of combs mounted to slide, devices controlled by said combs for controlling the action of a key-actuated machine, a carriage mounted to slide at one end of the combs, a feeding-wheel mounted on said carriage and having projections on its periphery, a perforated web having holes to receive the projections on the feeding-wheel, the latter feeding the web lengthwise and the web moving sidewise with said carriage, means for operating the carriage to cause the web to adjust the combs, a ratchet-wheel on the shaft of the feeding-wheel, and a dog for engaging with said ratchet-wheel to rotate the feeding-wheel, substantially as shown and described.

16. In an actuating mechanism for key-operated machines, a series of combs mounted to slide, levers extended across said combs and adapted to enter slots in the combs when the slots in the several combs are in alinement, tappets movable on said levers and adapted for connection with keys of a key-actuated machine, a striker for moving the tappets in one direction, means for operating the striker, a perforated web for assembling the combs, and means for moving said web, substantially as shown and described.

17. In a mechanism for operating key-actuated machines, a series of combs mounted to slide, a perforated web for assembling said combs, means for operating the web, levers extended across the combs and adapted to enter alined slots in the combs, a support-bar for holding the levers normally out of engagement with the combs, means for moving said bar, tappet-rods movable on the levers and having their forward ends extended beyond the ends of the lever, the said tappet-bars being adapted for connection with the keys of a key-operated machine, a striker-bar for moving the tappet-rods in one direction, and means for imparting a swinging motion to said striker-bar, substantially as shown and described.

18. In an actuating mechanism for key-operated machines, a bed-plate, a series of combs mounted to slide on said bed-plate, certain of said combs having fingers or projections at one end, devices controlled by the combs for controlling the action of a key-operated machine, a reciprocating carriage adapted to receive a web having perforations to receive certain of the fingers or projections and also being adapted to engage with certain other

fingers or projections to move the combs thereof, and means carried by the carriage for returning all of the combs to a normal position upon a backward movement of the carriage, substantially as shown and described.

19. In an actuating mechanism for key-operated machines, a bed-plate, a series of combs mounted to slide on said bed-plate, means controlled by said combs for controlling the action of a key-operated machine, certain of said combs having fingers or projections at one end, a carriage mounted to reciprocate at the end of the combs in the direction of the length of the combs, a feeding device on said carriage, a perforated web moved intermittently lengthwise by the said feeding device and sidewise by the said carriage for assembling the combs, lugs on the fingers or projections of the combs, and spring-arms on the carriage adapted to engage with said lugs to adjust the combs to a normal position, substantially as shown and described.

20. In an actuating mechanism for key-operated machines, a series of combs, devices controlled by said combs for controlling the action of a key-operated machine, a reciprocating carriage arranged at one end of the combs, means for causing the movements of the carriage, a web carried by said carriage and adapted to adjust the combs, levers extending across the series of combs and each being adapted for connection with a key of a key-actuated machine, means for drawing the levers into slots of the combs when said slots are in alinement, means for moving the several levers out of engagement with the combs, and perforated plates on the carriage between which the web or tape is designed to pass, substantially as shown and described.

21. In an actuating mechanism for key-operated machines, a series of combs mounted to slide, a carriage mounted on one end of the machine, a perforated web mounted to move across said carriage and to be carried by said carriage to assemble the combs, a driving-shaft, a cam on said shaft and having engagement with the carriage to move the same in two directions, levers extended across the combs, tappet-rods movable longitudinally on said levers, the said tappet-rods being adapted for connection with the keys of a key-actuated machine, a striker-bar for engaging with and operating said tappet-rods, a cam on the driving-shaft for imparting a striking motion to said striker-bar, and means controlled from the driving-shaft for elevating the levers and also for permitting downward movement of the levers, substantially as shown and described.

22. In an actuating mechanism for key-operated machines, a series of combs mounted to slide, means for causing adjustments of said combs, levers extended transversely of the combs, tappet-rods movable upon the levers and adapted for connection with the keys of a key-operated machine, a support-bar common to all the levers, means for raising and lowering said bar, a striker-bar for engaging with the tappet-rods, and means for operating said striker-bar, substantially as shown and described.

23. In an actuating mechanism for key-operated machines, a series of combs mounted to slide, devices controlled by said combs for controlling the action of a key-operated machine, a carriage mounted to reciprocate, means for imparting motion to the carriage, a tape or web feeding wheel on the carriage, means for imparting motion to said wheel, guides forward of the wheel and adjustable transversely of the carriage, and perforated plates on the carriage forward of said guides, substantially as shown and described.

24. In an actuating mechanism for key-operated machines, a series of combs mounted to slide, devices controlled by said combs for controlling the action of a key-operated machine, a carriage mounted to slide at one end of the combs, a web-carrying wheel mounted on said carriage, means for imparting intermittent rotary motion to the wheel, guide-rollers on the carriage forward of the wheel, the said guide-rollers being mounted on a bar adjustable transversely of the carriage, a curved shield-plate adjacent to one of the said rollers, and perforated plates on the carriage between which a perforated web for adjusting the combs is designed to pass, the said web being moved lengthwise by the feeding-wheel, substantially as shown and described.

25. In an actuating mechanism for key-operated machines, a series of combs, devices controlled by said combs for controlling the action of a key-operated machine, a carriage arranged to have reciprocating motion at one end of the combs, a star or feeder wheel mounted on the carriage, a ratchet-wheel on the shaft of said star or feeder wheel, a pawl mounted on a fixed support and adapted for engagement with said ratchet-wheel to rotate the star or feeder wheel, perforated plates on the carriage and between which a perforated web for assembling the combs is designed to pass and moved by the star or feeder wheel, rollers mounted on the ends of one of said plates, and guide-rollers on the carriage between the first-named rollers and the star or feeder wheel, substantially as shown and described.

26. In an actuating mechanism for key-operated machines, a series of combs mounted to slide, means controlled by said combs for controlling the action of a key-operated machine, a carriage movable at one end of the combs, a perforated web movable through said carriage lengthwise and moving sidewise with the carriage to adjust the combs, means for feeding said web through the carriage, a tension device for the web, and devices controlled by the combs for controlling the action of a key-operated machine, substantially as shown and described.

27. In an actuating mechanism for key-operated machines, a series of combs mounted

to slide, devices controlled by said combs for controlling the action of a key-operated machine, means for causing adjustments of the combs, a capital slide or comb at one side of the first-named series of combs, a figure slide or comb at the other side of the said series of first-named combs, a lever extended across the combs and having a cam for moving the capital-comb in one direction, a lever extended across the combs and having a cam for engaging with and moving the figure-comb in one direction, and another lever having cams for engaging with and moving the capital-comb and figure-comb to normal position, substantially as shown and described.

28. An actuating mechanism for key-operated machines provided with a series of combs, a tape for moving the said combs, a change-comb, and means controlled by the said series of combs to actuate the said change-comb for changing the combination from small letters to capitals or to numerals, substantially as shown and described.

29. In an actuating mechanism for key-operated machines, a series of combs mounted to slide, a carriage movable at one end by said combs, a web-feeding wheel mounted on said carriage and adapted to operate a web for causing adjustments of the combs, a ratchet-wheel on the shaft of said feeding-wheel, a pawl on a fixed support for engaging with said ratchet-wheel, a spring-pressed dog carried by the carriage and adapted for engagement with said ratchet-wheel, to prevent a backward movement of the feeding-wheel while the carriage is moving forward, and a finger-piece extended from said dog, substantially as shown and described.

30. In a machine of the character described, a tension device for a web-fed through the machine, said tension device comprising a roller, a stem on which said roller is mounted, a sleeve on the stem, a spring surrounding the stem and connected at one end with said sleeve and at the other end with the roller, a tension device engaging with said sleeve, a presser-roller, and means for holding said presser-roller yieldingly toward the first-named roller, substantially as shown and described.

31. An actuating mechanism for key-operated machines, provided with a series of combs, a tape for moving the said combs, a capital-comb, a numeral-comb, and means controlled by the said series of combs for actuating the said capital-comb or the numeral-comb, substantially as shown and described.

32. An actuating mechanism for key-operated machines, provided with a series of combs, a tape for moving the said combs, a capital-comb, a numeral-comb, and a release-lever controlled by the said series of combs, to return either or both the capital-comb and the numeral-comb back to a normal position to change the combination from capitals or numerals back to lower case, substantially as shown and described.

DONALD MURRAY.

Witnesses:
THEO. G. HOSTER,
EVERARD BOLTON MARSHALL.