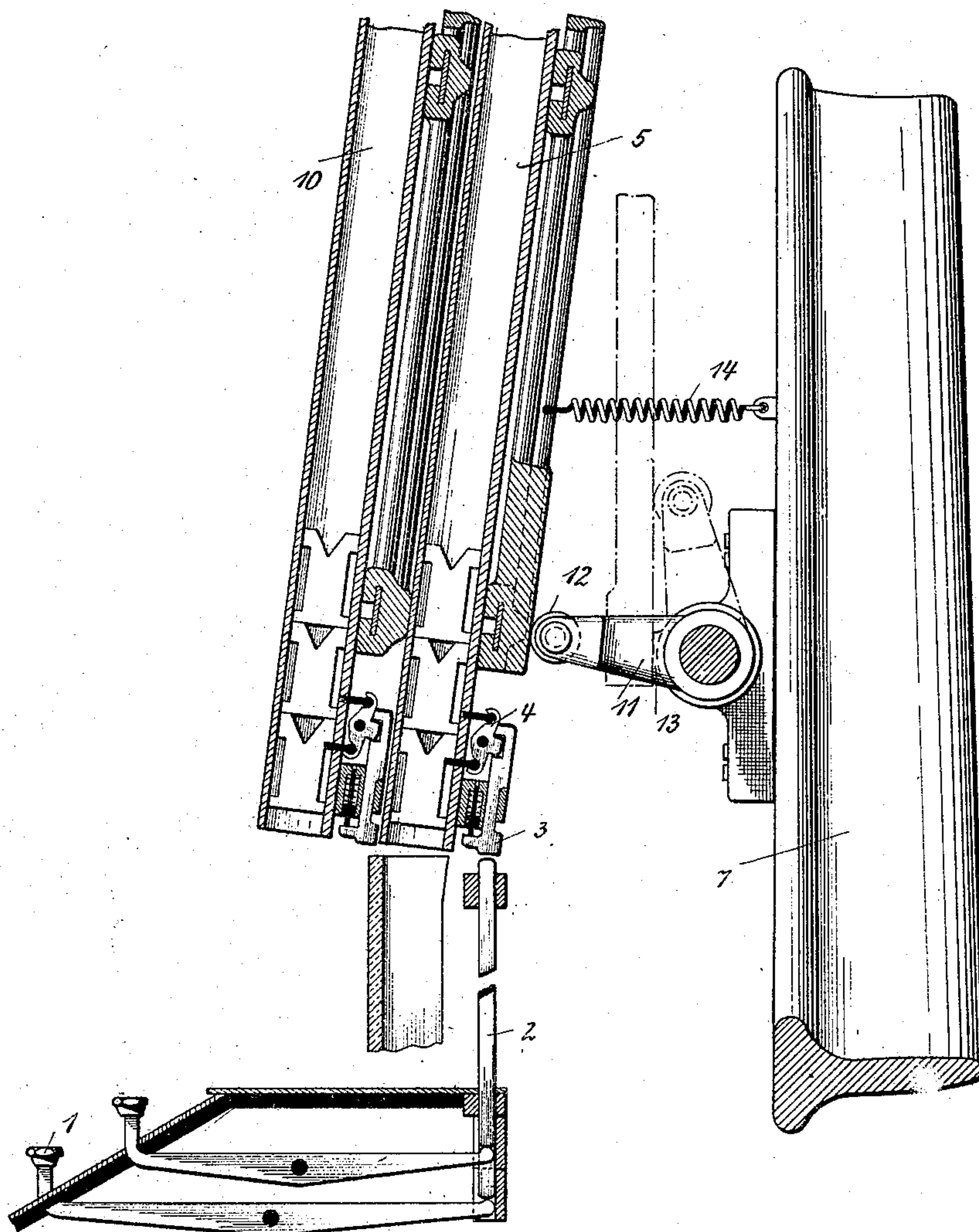


H. DEGENER.
TYPE SETTING AND LINE CASTING MACHINE.
APPLICATION FILED MAR. 11, 1909.

982,172.

Patented Jan. 17, 1911.
6 SHEETS—SHEET 1.

fig. 1.



Witnesses
James H. Hays
Wm. E. Eves

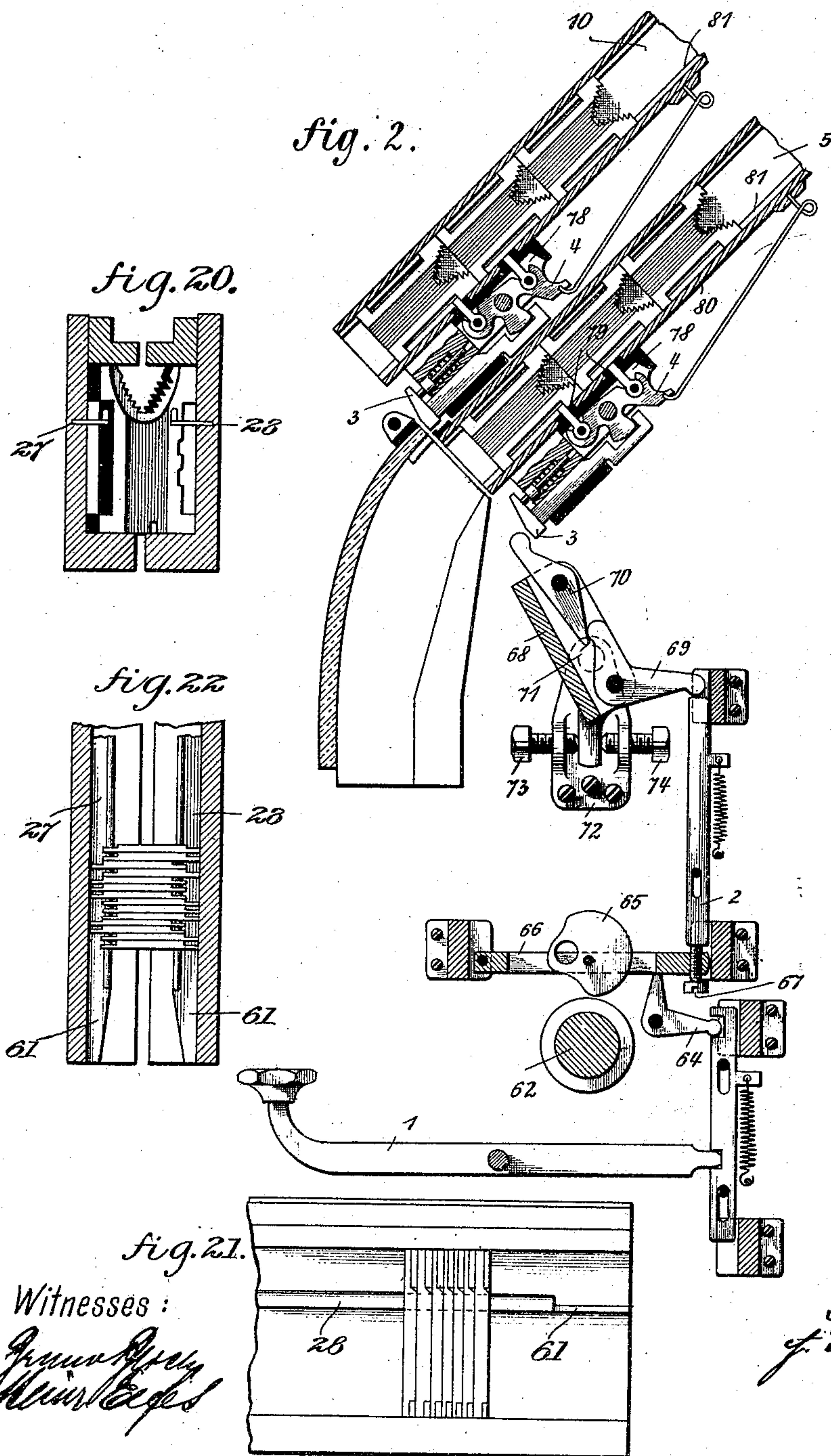
Inventor:
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6 SHEETS—SHEET 2.



Witnesses:
James H. [unclear]
John [unclear]

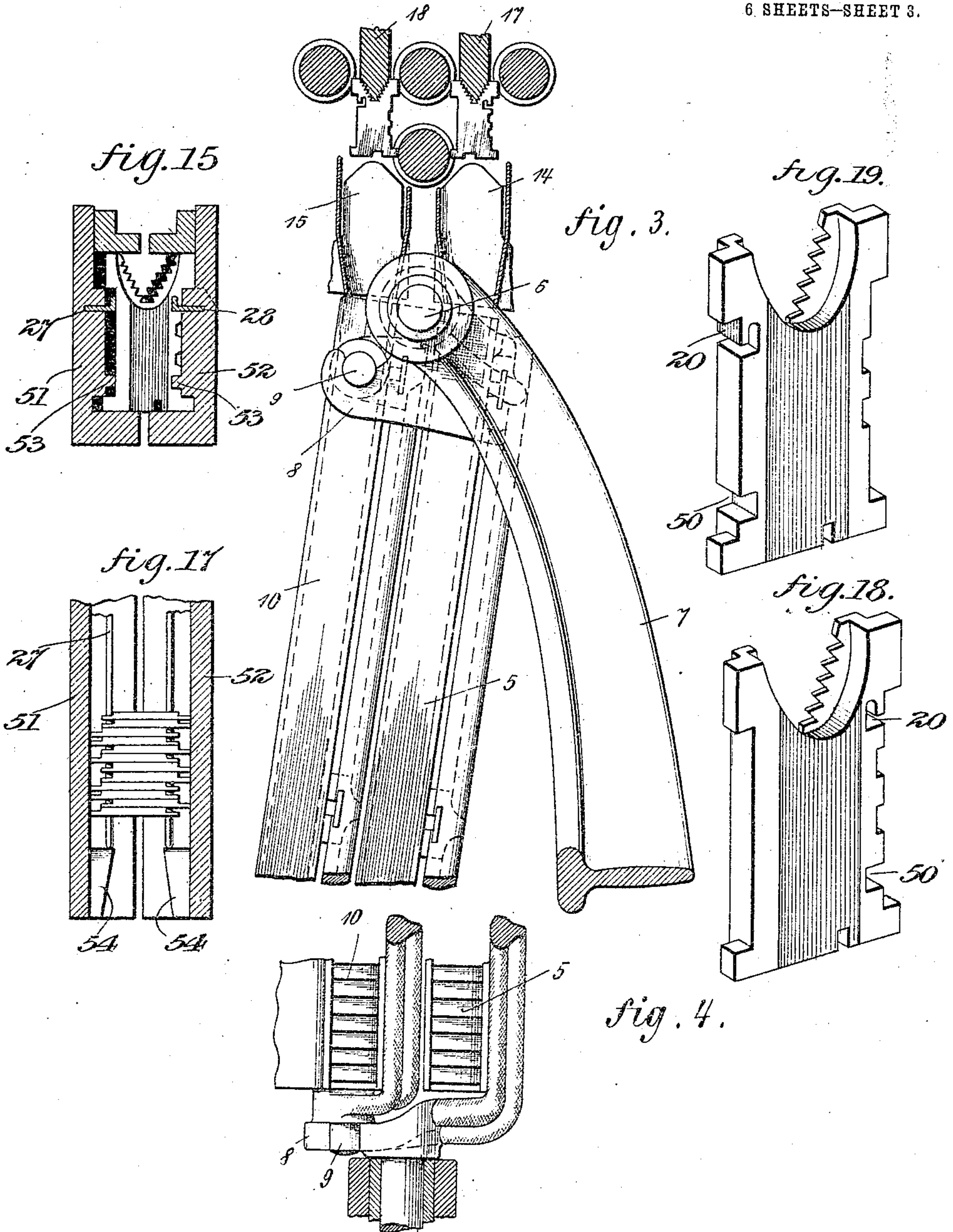
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982,172.

Patented Jan. 17, 1911.

6 SHEETS—SHEET 3.



Witnesses:
James H. [unclear]
Wm. C. [unclear]

Inventor:
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 APPLICATION FILED MAR. 11, 1909.

982,172.

Patented Jan. 17, 1911.

6 SHEETS—SHEET 4.

fig. 5.

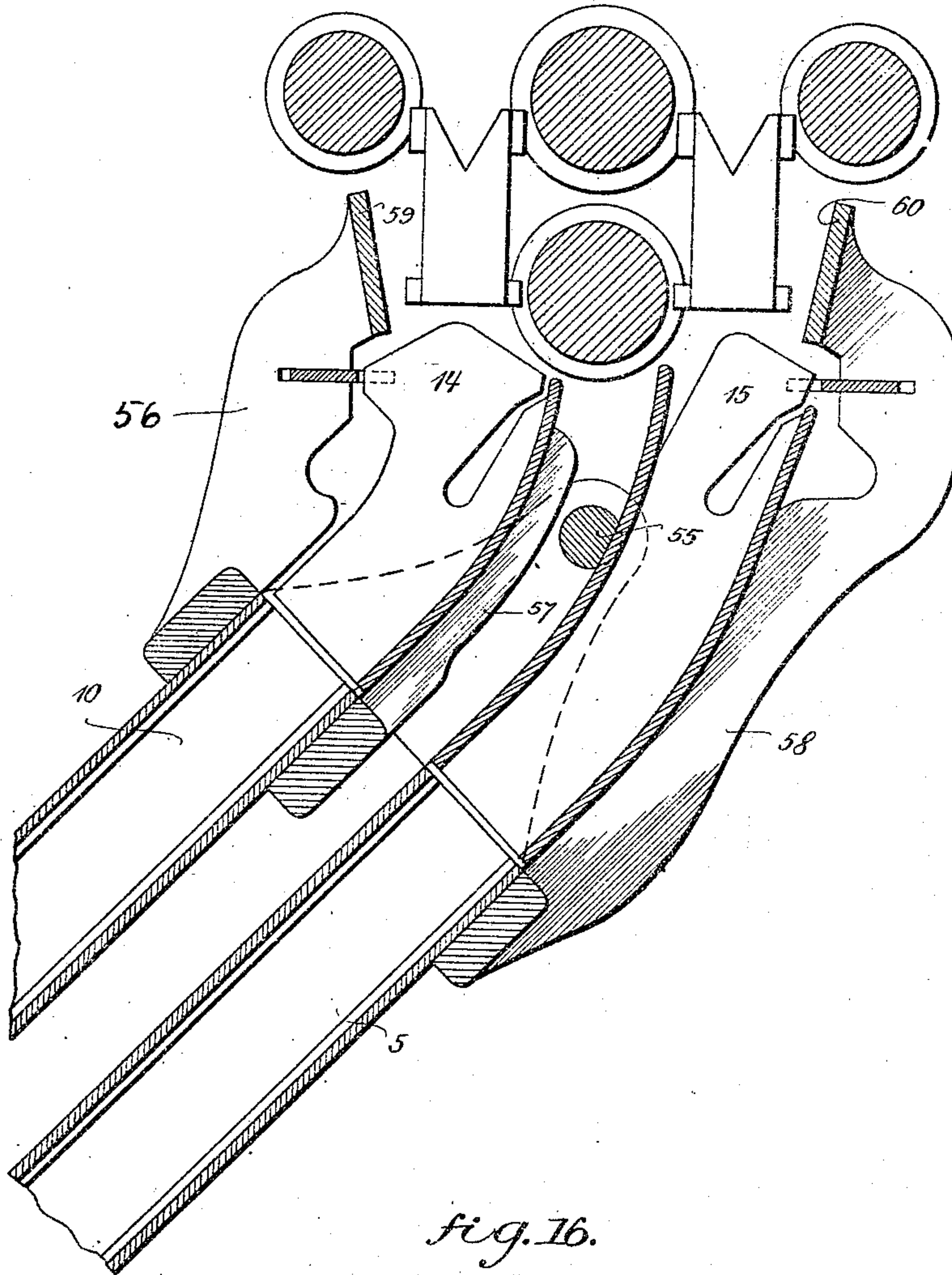
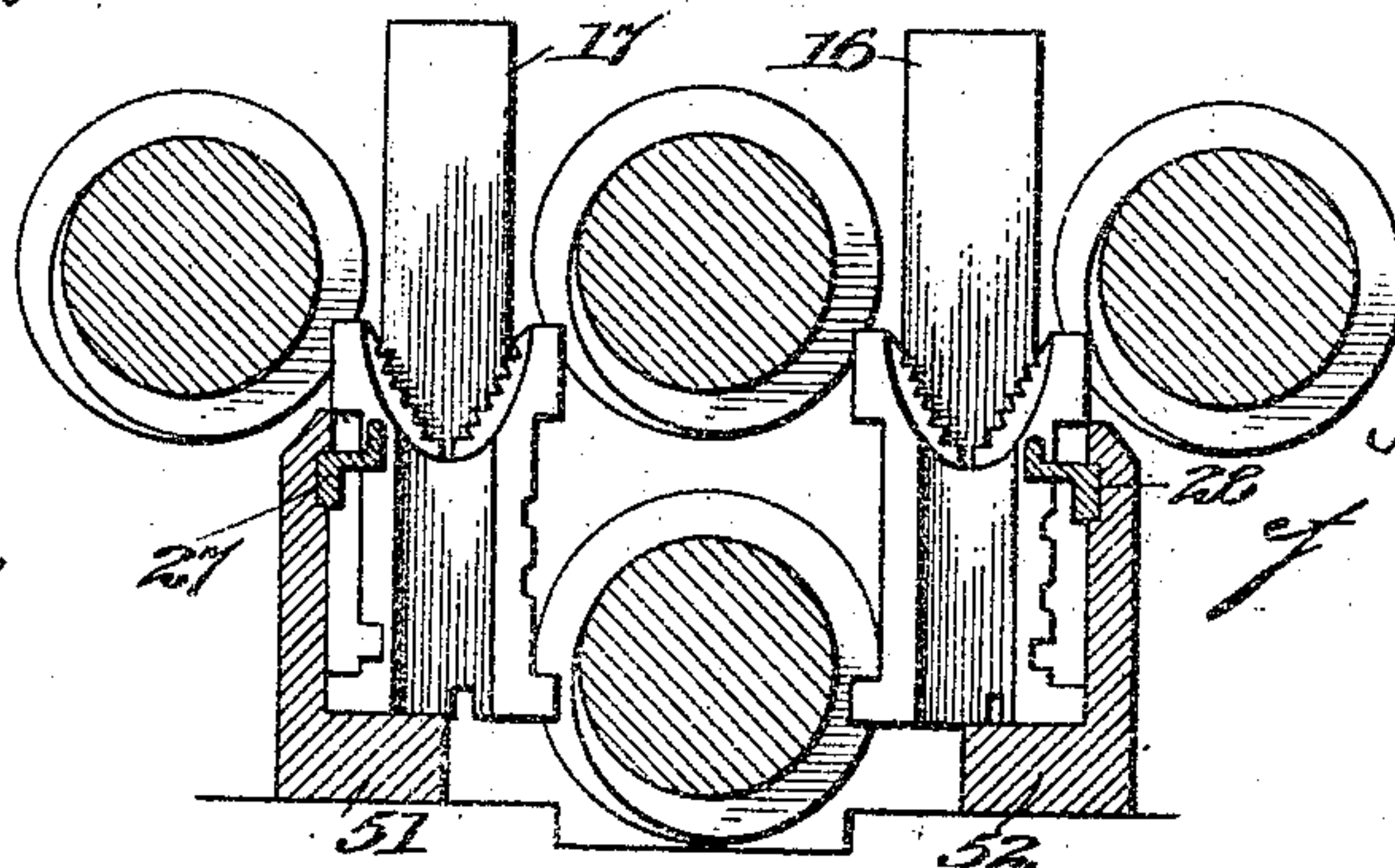


fig. 16.



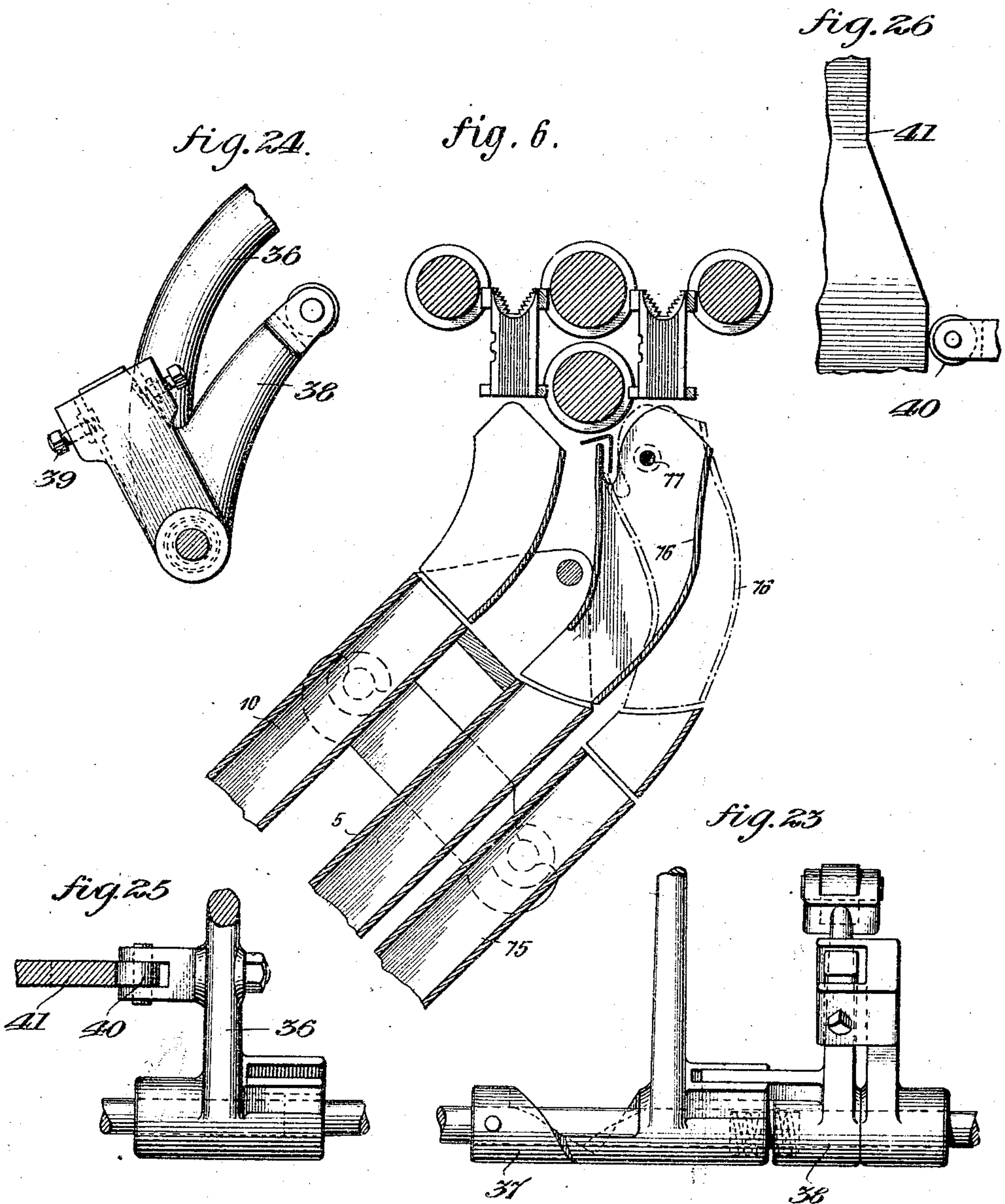
Witnesses:
James H. [unclear]
Wm. [unclear]

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982,172.

Patented Jan. 17, 1911.
6 SHEETS-SHEET 5.



Witnesses :
James H. [unclear]
Wm. [unclear]

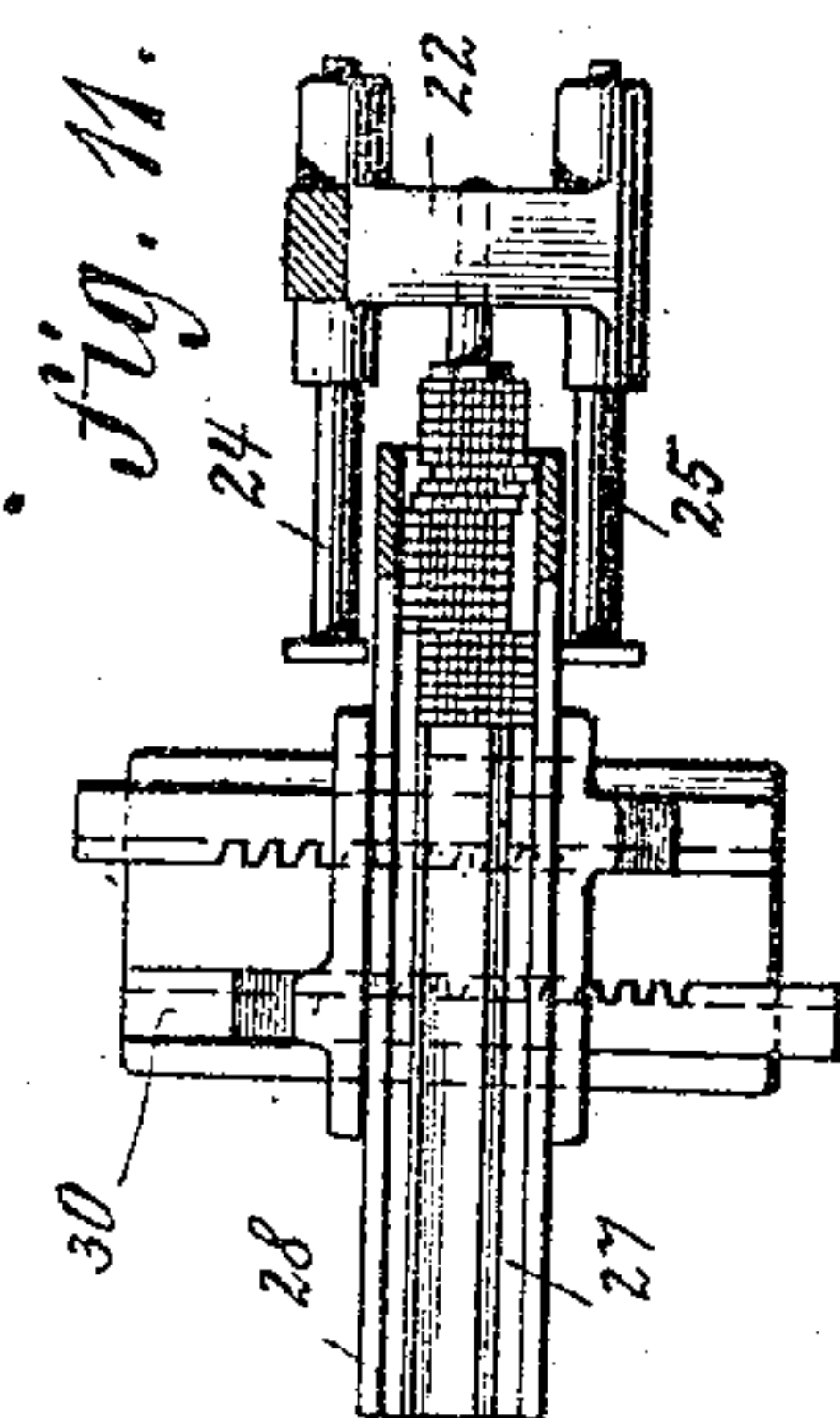
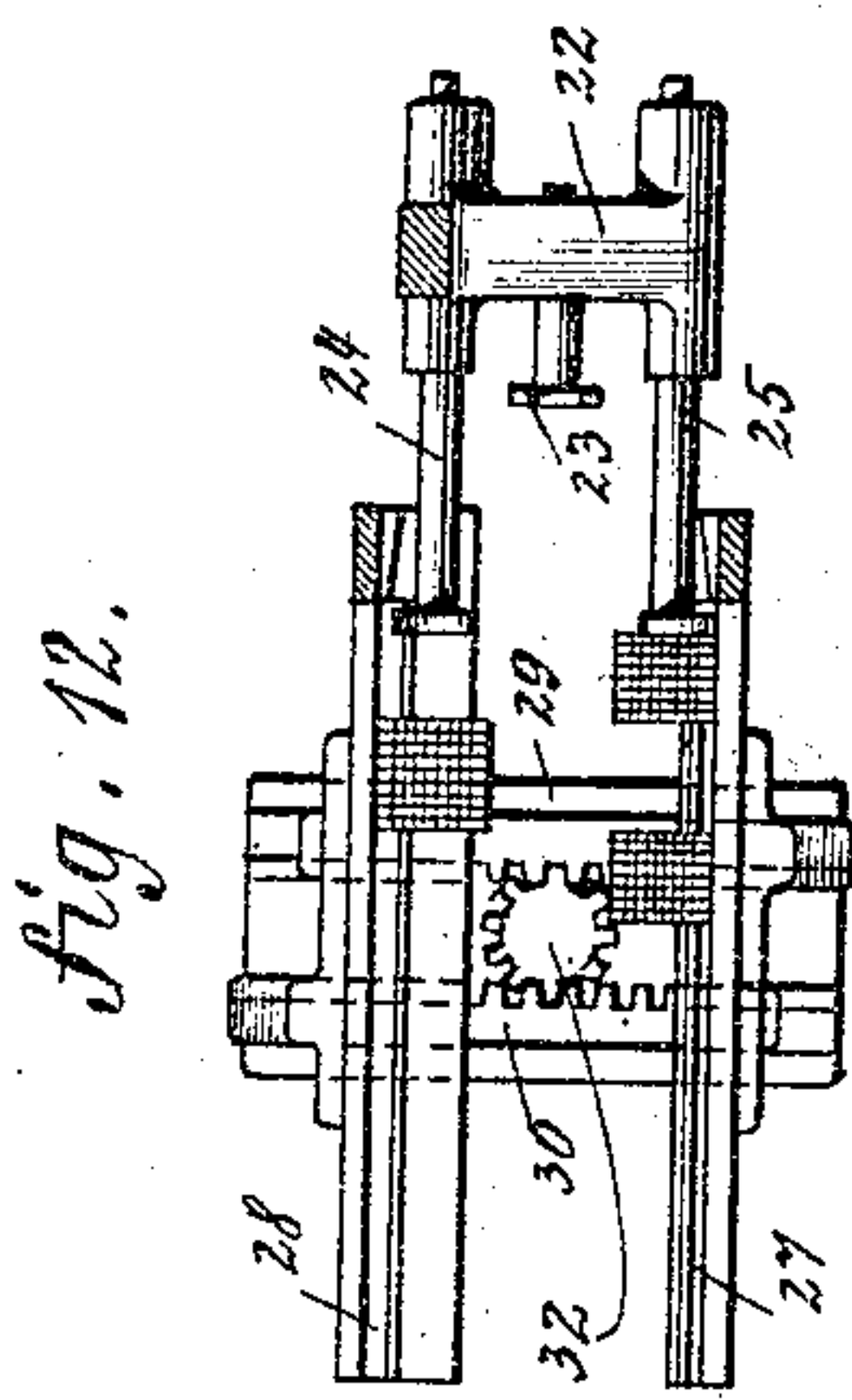
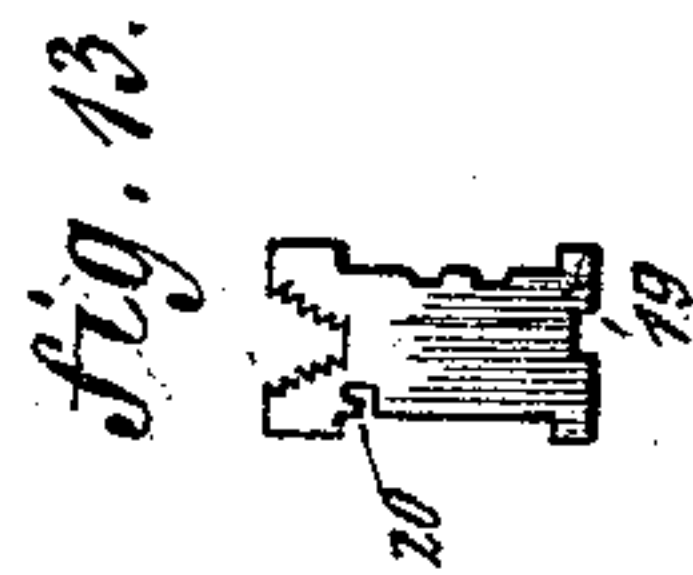
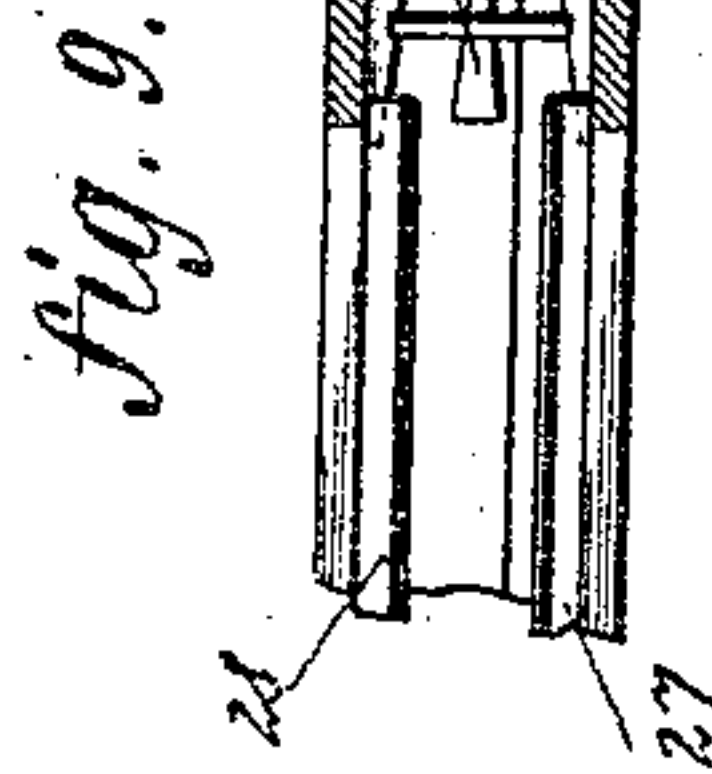
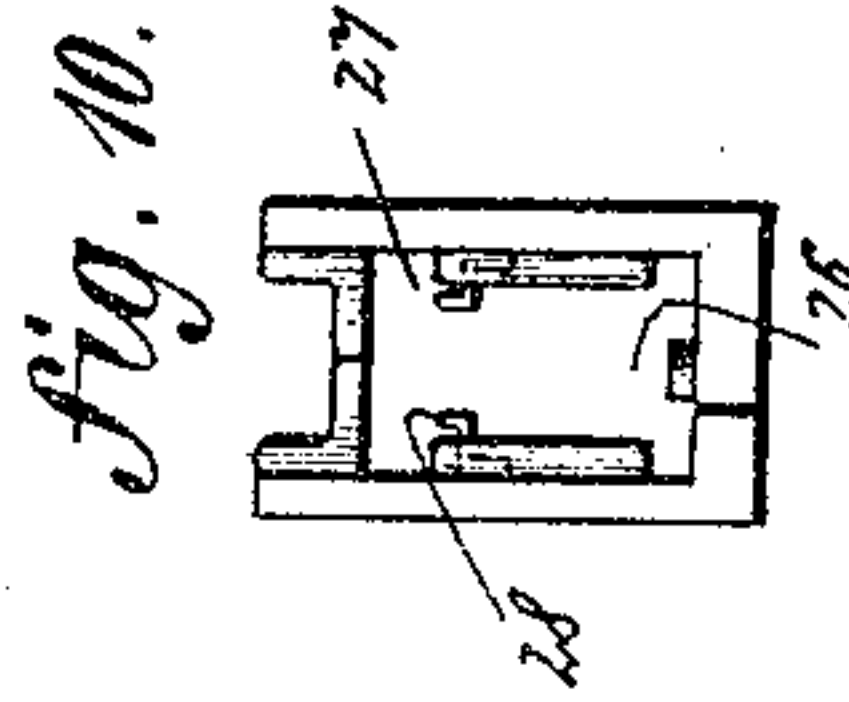
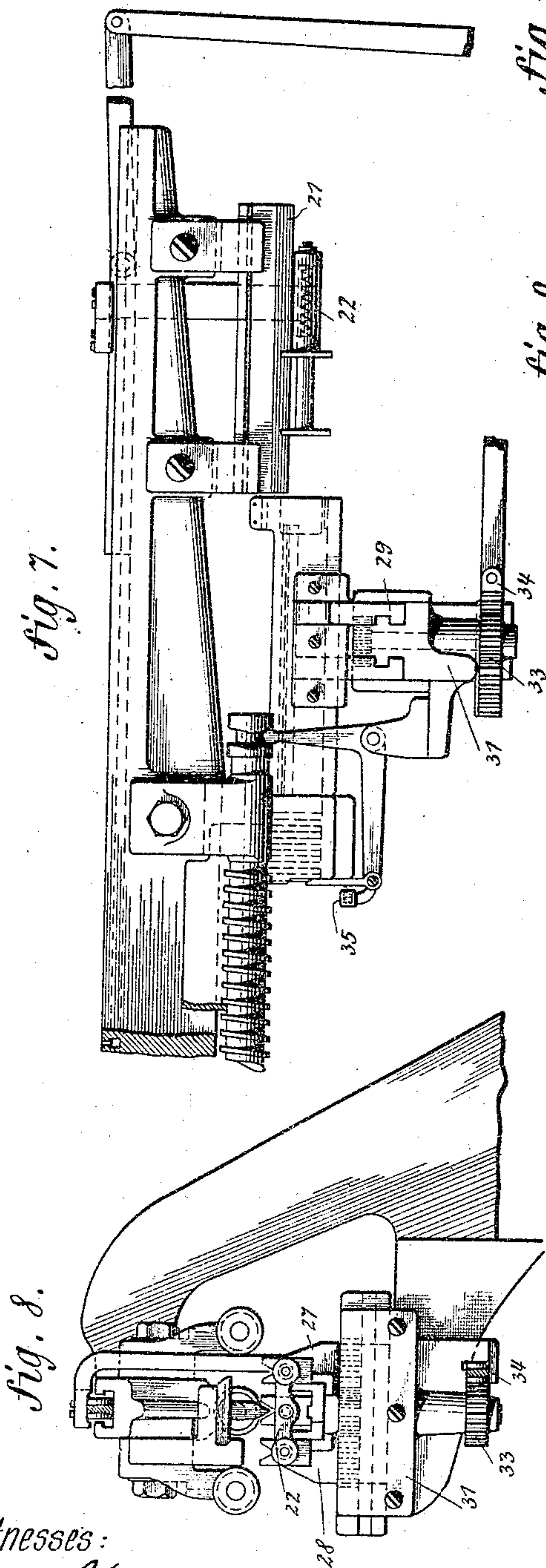
Inventor :
H. Degener

H. DEGENER.
TYPE SETTING AND LINE CASTING MACHINE.
APPLICATION FILED MAR. 11, 1909.

982,172.

Patented Jan. 17, 1911.

6 SHEETS—SHEET 6.



Witnesses:

James H. [Signature]
Wm. [Signature]

Inventor:

H. Degener

UNITED STATES PATENT OFFICE.

HEINRICH DEGENER, OF BERLIN, GERMANY.

TYPE-SETTING AND LINE-CASTING MACHINE.

982,172.

Specification of Letters Patent.

Patented Jan. 17, 1911.

Application filed March 11, 1909. Serial No. 482,845.

To all whom it may concern:

Be it known that I, HEINRICH DEGENER, of 26 Hollmannstrasse, Berlin, German Empire, manager, having invented certain new and useful Improvements in or Relating to Type-Setting and Line-Casting Machines, do hereby declare that the following is an exact specification of the same.

This invention relates to a line setting and casting machine in which several sets of matrices arranged in separate magazines can be simultaneously used, in such a manner, that only one magazine is each time connected to the keyboard, and both the changing of the magazines, in passing from one kind of type to another when setting mixed matter, and the exchanging of the single magazines, take place without difficulty. At the same time, there is provided a device for separating the matrices composed into a line from the various magazines and bringing them back into the corresponding magazines, the connection of the magazines with the distributing device being such that whichever magazine be used, the matrices falling down from the distributing bar always get into the proper magazine conduits.

The accompanying drawings illustrate, by way of example, a well known general construction of a machine.

Figure 1 shows the connection between the magazine and the key-board; Fig. 2 shows another construction of the connection between the magazines and the key-board, Fig. 3 shows the suspension of the magazine and the arrangement of the distributing bars; Fig. 4 is a partial plan of Fig. 3 and shows the relative securing of the magazines; Fig. 5 shows another construction of the magazine suspension in side elevation; Fig. 6 shows an arrangement of the magazines when more than two kinds of type are used; Fig. 7 shows the distributing mechanism; Fig. 8 shows the same in side elevation; Fig. 9 shows the device for arranging the matrices in the proper order; Fig. 10 is a side elevation of the same, Figs. 11 and 12 show the mechanism for separating and driving in, namely Fig. 11 shows it in the closed position and Fig. 12 in the extended position, Figs. 13 and 14 are matrices of each set. Figs. 15-19 show another construction of the separating mechanism, namely, Fig. 15 is a cross-section through the sorting box, Fig. 16 the

plan of the same, Fig. 17 the matrices pushed onto the sorting bars, Figs. 18 and 19 show each a perspective view of the two kinds of matrices. Figs. 20-22 show a third construction of the matrix separating mechanism, in which, Fig. 20 is a cross-section through the sorting box, Fig. 21 side elevation of one half of the same, and Fig. 22 the corresponding plan. Fig. 23 represents the arm for raising the matrices on to the distributing device; Fig. 24 is a side elevation of the same, and Figs. 25 and 26 show another construction of the same device.

The keyboard is, generally speaking, constructed in the usual way. The depressing keys 1 (Figs. 1 and 2) operate immediately (Fig. 1) or by means of a continuously rotating spindle (Fig. 2) the releasing bars 2 which are brought back again to their normal position by gravity or by springs not shown in the drawing. The releasing bars 2 are only connected to the key-board but not with the releasing device of the magazines, so that the latter are enabled to alter their position relatively to the key-board as hereinafter described.

According to the construction shown in Fig. 2 the tie rod 63 is first moved upward and carries with it the bell crank lever 64 until the free branch of the same can engage with a recess of the lever 66 carrying the eccentric 65. The eccentric then falls on the rotating spindle 63 and is driven by the latter and thus raises the releasing rod 2. The lever 66 engages by means of a set screw 67, with the releasing lever 2 in order to enable the latter to be accurately adjusted. The manner in which the magazines are mounted is hereinafter described, but to understand the difference of the engagement of the releasing bars 2 with the magazines according to Figs. 1 and 2, here it must be said that in Fig. 1 the position of the magazines is almost vertical, while in Fig. 2 the magazines are in an oblique position. Therefore in the construction according to Fig. 2 a direct release of the releasing slides 3 by the bars 2 is impossible, and for that reason there are arranged, as shown in Fig. 2, two more double levers 69 and 70 mounted in the brackets 68 and transmitting the movement of the bars 2 to the slide 3. In order to make an adjustment possible in this case as well for the purpose to control the engage-

ment of the levers 70 with the slides 3, the bracket 68 is rotatably mounted about the pin 71 of the bearing 72 and is held in its position by the two set screws 73, 74. For the purpose of an accurate adjustment, it can be rotated by adjusting the said screws about the pin 71.

All the escapements 4 belonging to a magazine are mounted together with the respective pins projecting through the magazine rear wall for holding the matrices, in a common "comb" 78 which is provided at the places where the pins pass through, with ledges 79. The strength of these ledges corresponds to the strength of the magazine rear wall 80.

For the purpose of using two different sets of matrices I use two magazines lying over each other, as shown in Figs. 1 to 4. The manner of securing the magazines to the frame is shown in Figs. 3 and 4. The rear magazine 5 oscillates about the bolt 6 in the bracket 7 which forms a portion of the machine frame. The frame of the magazine 5 is formed at the sides into hooked-shaped blades 8 into which the front magazine 10 is suspended by means of pins 9. The magazines are pivoted together about the bolt 6, and are moved in one direction by means of the lever 11 (Fig. 1) which is also mounted in the bracket 7. If the lever 11 is turned in the position shown in Fig. 1 by dotted lines it allows the magazines to assume the dotted line position as in Fig. 1. According as the magazines are in their front position shown in Fig. 1 in full lines, or in the rear position as shown by dotted lines, the rear magazine engages with the roller 12 or with the projection 13 of the lever 11, while the return movement is assisted by the spring 14'. If therefore it is desired to pass from the use of one magazine to another, it is merely necessary to move the lever 11. The pivot point about which the two magazines oscillate is so high and placed into such position that the position of the upper end of the magazine channels relatively to the matrix entrances 14 and 15 through which the matrices fall into the magazine conduits, is changed by the oscillation only to such a small extent that in both positions, for both magazines, the matrices can slide down in a reliable manner, without it being necessary to adjust the matrix entrances 14 and 15 themselves.

If the magazine is in a very oblique position, the space produced between the matrix entrances and the magazine conduit, could possibly in certain circumstances become such that it would lead to disturbances in the working. This disadvantage can however be obviated by connecting the matrix entrances to the magazine, so as to form one whole, and so that it oscillates or swings together with the said magazine, as shown

in Fig. 5. As the upper end of the matrix entrances is always vertical, the shifting of the same relatively to the distributing bar is only very small and may be neglected. The two magazines 5 and 10 in said Fig. 5 swing about the pins 55. The matrix entrances 14 and 15 have the shape of an arc of a circle, in such manner that the upper portion of the same is approximately in the vertical position, while the bottom portion has the same direction as the magazine (see Fig. 5). The matrix entrances are connected to the magazines by means of connecting pieces 56, 57 and 58 arranged above or below the magazines in such manner that in case of a rotation of the magazines about the point 55, the said matrix entrances are forced to participate in the rotation. The upper portion of the connecting pieces 56 and 58 is formed into a cross partition 59 or 60 extending throughout the whole length of the magazine, so that the matrices falling into the matrix entrances are supported by the same and guided in a reliable manner.

Owing to the method of suspending the magazines, it is also possible to use more than two magazines of matrices without it being necessary to alter the distributing bar or the releasing mechanism, and this will be more particularly necessary when the ordinary type contained in one magazine is to be alternately marked with two distinctive signs. As shown in Fig. 6, on one of the magazines, for instance on the rear magazine, can be mounted another magazine 75 which will swing together with the two other magazines, so that, according to the position of the swinging magazines, one of the three matrix releasing devices on the magazines is connected to the keyboard. The distributing apparatus can remain exactly the same as if two magazines exist, only in this case the matrix entrance 76 of that magazine to which the third magazine is connected must also be capable of swinging. In the position shown in full lines in the drawing, the matrices coming down from the distributing bar fall into the magazine 5. By rotating the hopper 76 about the pivot point 77, it can, however, be brought into the chain dotted position, in which case the matrices must slide down into the additional magazine 75.

After the matrices have been cast into a line in well known manner, they are also raised in well known manner on to the distributing apparatus.

In accordance with the matrix entrances which are in duplicate, the distributing bars 17 and 18, Fig. 3, and the screws which advance the matrices on the distributing bars, must also be constructed in duplicate. In order, however, to enable the matrices which were first mixed up in the line, to be brought on to the two bars 17 and 18, it is

necessary to provide a separate sorting device which effects the separation of the two fonts of matrices. As will be seen from Figs. 13 and 14, the matrices are provided on the bottom edge with a recess 19 which is arranged in a different position for the two fonts. The two fonts of matrices are moreover, provided with angular recesses 20, namely in one font the said recesses are on the face, and in the other font on the opposite side.

The matrices are first guided in the well known manner from the bar 21, Fig. 7, which is raised by the second elevator arm, next to the line, and on which bar the matrices are pushed over, to the distributing apparatus where they are driven in by the driving device 22 into the sorting apparatus. The driving apparatus is provided with three drivers 23, 24, 25 (Figs. 11 and 12) but only the central driver 23 drives the matrices from the bar 21. The sorting device chiefly comprises, as will be seen from Figs. 9 and 10, a box arranged between the said bar 21 raised by the second elevator and the screws which advance the matrices, as clearly shown in Fig. 7, at the beginning of which is arranged a triangular blade 26 with the point directed toward the arriving matrix line. The point of the said blade engages with the groove 19 of the matrices, and owing to the different positions of the said recess, drives the two kinds of matrices, some to the right and some to the left, namely the matrices are pushed to the side to such an extent that the angular recesses 20 of the matrices engage with the two needles 27 and 28, so that the separation of the two kinds is effected. As the driving device 22 must advance forward during the said sorting movement to a very considerable extent the two outer drivers 24 and 25 of the same, are mounted on springs, so that they should yield on striking said sorting box. After having executed the sorting movement, the driver is again moved back until the drivers 24 and 25 come out of reach of the matrices pushed into the sorting box, whereupon the two needles are moved laterally apart. To that end, they are secured to the guide pieces 29 and 30 and movably mounted on the bracket 31 secured to the frame. The guide pieces are provided at the sides facing each other, with teeth, and between them is mounted a toothed wheel 32 engaging with the two sets of teeth, in such a manner that the rotation of the said toothed wheel drives the two guides, and with them the two needles, apart in the lateral direction. The driving of the said toothed wheel 32 can be effected, as shown for instance in Figs. 7 and 8, by means of a second toothed wheel 33 mounted on the same spindle and of a tooth rack 34 which can be driven from the power shaft

of the machine in a manner not shown in the drawing. After the two needles have been moved apart, the driving device executes a second movement and forces then with its two drivers 24 and 25 the matrices on both the distributing bars 17 and 18. As proposed in connection with known constructions, the matrices must be lifted singly to the distributing bars. This can be effected according to this invention in exactly the same way as in former constructions *i. e.* by means of the lifting lever 35.

Figs. 15-19 show another means for sorting the matrices. According to this means the matrices are provided with recesses 50 (see Figs. 18 and 19) below the recesses 20 by means of which the matrices engage with the bars receiving them. In one kind of matrices the two recesses are on the face of the type and in the second on the back. For the purpose of sorting, the matrices are pushed into a box consisting of two parts 51 and 52 which are opened laterally in any suitable way for instance as shown in Figs. 11 and 12. Each of these parts is provided with a projection or sorting bar 53, provided with a sharpened portion or point 54 facing the pushing-in point. The width of the box between each lateral wall and the front edge of the projection 53 corresponds, in the closed position of the box, to the width of one matrix. On the matrices being pushed into the box, the oblique or cam portions 54 or the projection 53, engage with the grooves 50 of the matrices and push those matrices which have no groove on that side, to the other side. The two kinds of matrices are thus pushed laterally apart to the extent corresponding to the height of the projection 53. In being further pushed into the box, the sorted kinds of matrices engage with their recess 20 with the receiving bars 27, 28, this being now possible, owing to the lateral movement of the matrices. It is, however, also possible to leave out the bottom recesses 50 on the matrices and to push them apart by means of the upper grooves 20. This construction is shown in Figs. 20-22. The receiving bars 27, 28 are provided in this case in the beginning with outward oblique portions or bevels 61—the front beading being omitted—the said oblique portions taking the place of the sharpened portions 54 of the preceding construction. As the grooves 20 of the two kinds of matrices are arranged on different sides, the pushing apart and therefore the sorting of the matrices will take place on the matrices being pushed into the box, owing to the engagement of the bar portions 61 with the said grooves. The sorting of the matrices is completed as soon as the matrices have reached the portion of the receiving bars 27 28 provided with a beading. They are then at once pushed on

the said bars and after that has been done, the pulling apart of the two portions of the box can be effected in the ordinary manner, for instance as shown in Figs. 7 and 8. The matrices are thereupon pushed on the sorting bars 17 and 18 and distributed in the well known manner.

If it is desired to arrange the sorting device as described above on an old machine, I mount the so-called second elevator in a laterally movable manner, as shown in Figs. 23 and 24 for the purpose to have space enough to arrange the sorting box. To this end the hub of the said arm 36 can be of a helical shape, and another helical part 37 could be mounted on its spindle, so that on the part 36 being turned, a lateral movement is simultaneously brought about. The lever would be operated in that case by means of a separate lever 38 which could engage with it by means of a feather and groove, that is to say, movable in the lateral direction, but not rotatable relatively to each other. In order to control the end positions, separate set screws 39 arranged on the said lever 38 could be provided for the lever in question. Instead of making the hub of the helical shape as illustrated in Fig. 23, also as another feature a roller 40 could be placed at a slightly higher point of the lever 38 and would slide, as shown in Figs. 25 and 26, on a curved rim 41 secured to the machine frame, so that the lever would be shifted in that way. In this construction the driving could also be effected in the same manner.

The working of the machine is effected in the usual manner by the compositor. According to the magazine from which the matrices are to be taken, the switch lever 11 is brought into one or the other position. It must be pointed out that the matrices used could be either single letter matrices, so that the two magazines would contain ordinary type, and display face, but the matrices of each font could also contain two or more kinds of type, and the two magazines could be arranged, for instance, for different type bodies, or one for Gothic type and the second for "antique" type or in any other desired manner.

After the line has been set and cast, it is first taken in the well known manner by the elevator and brought to the distributing point. The elevator arm, as already described, then executes a movement to the right, in order to bring the matrices in front of the sorting device. The matrices are then first separated from each other by one of the three methods described, and then pushed on the needles by means of the angle-shaped recess 20 with which they are provided. The driving device then executes a return movement, the needles are moved apart by means of the toothed wheel 32, and

the matrices are pushed, by a further movement of the driving device on to the distributing bars, namely each kind on the corresponding bar, so that the matrices again get back into the corresponding magazine.

In the same way as in the construction shown in the drawings, where two magazines are connected together, three or more magazines could be arranged together. The construction as regards details would then be a corresponding one.

Having thus particularly described and ascertained the nature of my invention and in what manner the same is to be performed, what I desire to secure by Letters Patent of the United States is:

1. In a matrix setting and line casting machine in combination several magazines arranged one above the other an escapement for each magazine, a horizontal pivot arranged near to the upper magazine ends about which the magazines commonly swing, a single keyboard releasing mechanism for all magazines, distributing bars one for each magazine the magazines being mounted to swing in such a manner, that in the different positions one of the escapement-sets engage with the keyboard releasing mechanism, while the upper magazine ends are constantly capable of receiving the matrices falling from the distributing bars relatively.

2. In a matrix setting and line casting machine in combination several magazines, several fonts of matrices, the matrices of each font being arranged in a separate magazine and being provided with recesses, a sorting mechanism dividing the matrix line into different fonts and a distributing mechanism consisting of receiving needles one for each font of matrices engaging with the matrix recesses and distributing bars one for each font of matrices, said sorting mechanism separating the matrices so that the recesses of the matrices are enabled to engage with the receiving needles bringing them onto the distributing bars.

3. In a matrix setting and line casting machine in combination several magazines, several fonts of matrices, the matrices of each font being arranged in a separate magazine and being provided with recesses, a sorting mechanism dividing the matrix line into different fonts and a distributing mechanism consisting of receiving needles one for each font of matrices engaging with the matrix recesses and distributing bars one for each font of matrices, said sorting mechanism pushing the different fonts of matrices sideward from each other to such an extent that the recesses of the matrices are enabled to engage with the receiving needles bringing them onto the distributing bars.

4. In a matrix setting and line casting machine in combination several magazines, several fonts of matrices, the matrices of

each font being arranged in a separate magazine and being provided with recesses, a sorting mechanism dividing the matrix line into different fonts and a distributing mechanism consisting of receiving needles one for each font of matrices engaging with the matrix recesses and distributing bars one for each font of matrices, said sorting mechanism consisting of a switch like device separating the matrices so that the recesses of the matrices are enabled to engage with the receiving needles bringing them onto the distributing bars.

5. In a matrix setting and line casting machine in combination several magazines, several fonts of matrices the matrices of each font being arranged in a separate magazine and being provided with recesses, a sorting mechanism dividing the matrix line into different fonts and a distributing mechanism receiving needles one for each font of matrices engaging with the matrix recesses and distributing bars one for each font of matrices, said sorting mechanism containing a triangular blade with a point directed forward to the incoming matrix line separating the matrices so that the recesses of the matrices are enabled to engage with the receiving needles bringing them onto the distributing bars.

6. In a matrix setting and line casting machine in combination several magazines, several fonts of matrices, the matrices of each font being arranged in a separate magazine and being provided with two sets of recesses, a sorting mechanism dividing the matrix line into different fonts and a distributing mechanism receiving needles one for each font of matrices engaging with the matrix recesses and distributing bars one for each font of matrices, said sorting mechanism containing a triangular blade with a point directed forward to the incoming matrix line and engaging with recesses of the matrices arranged at different points and thereby separating the matrices.

7. In a matrix setting and line casting machine in combination several magazines, several fonts of matrices, the matrices of each font being arranged in a separate magazine and being provided with two sets of recesses, a sorting mechanism dividing the matrix line into different fonts and a distributing mechanism receiving needles one for each font of matrices engaging with the matrix recesses and distributing bars one for each font of matrices, said sorting mechanism containing a triangular blade with a point directed forward to the incoming matrix line and engaging with recesses at the foot of the matrices arranged at different points and thereby separating the matrices.

8. In a matrix setting and line casting machine in combination several magazines, several fonts of matrices, the matrices of each

font being arranged in a separate magazine and being provided with recesses, a sorting mechanism dividing the matrix line into different fonts and a distributing mechanism containing receiving needles, one for each font of matrices, means for pulling the receiving needles apart, a driving device and means for actuating it, said driver firstly pushing the matrices through the sorting mechanism on the receiving needles and then executing a return movement in order to push secondly the matrices from the receiving needles, meantime pulled apart, onto the distributing bars, substantially as described.

9. In a matrix setting and line casting machine in combination several magazines, several fonts of matrices, the matrices of each font being arranged in a separate magazine and being provided with recesses, a sorting mechanism dividing the matrix line into different fonts and a distributing mechanism containing receiving needles, one for each font of matrices, means for pulling the receiving needles apart, a driving device consisting of three drivers arranged side by side and means for actuating said drivers in such a manner that the middle driver pushes the matrices onto the receiving needles, while the two outermost of them push the matrices from the receiving needles onto the distributing bars, substantially as described.

10. In a matrix setting and line casting machine in combination several magazines, several fonts of matrices, the matrices of each font being arranged in a separate magazine and being provided with recesses, a sorting mechanism dividing the matrix line into different fonts and a distributing mechanism containing receiving needles, one for each font of matrices, means for pulling the receiving needles apart, a driving device consisting of three drivers arranged side by side and means for actuating said drivers, the outermost drivers being arranged on springs so that they yield at the first movement of the driving device, substantially as described.

11. In a matrix setting and line casting machine in combination several magazines, several fonts of matrices, the matrices of each font being arranged in a separate magazine and being provided with recesses, a sorting mechanism dividing the matrix line into different fonts and a distributing mechanism containing receiving needles, one for each font of matrices, an elevator arm lifting the matrices out of the cast line and bringing them in front of the sorting device and means for giving the elevator arm a swinging as well as a lateral movement.

12. In a matrix setting and line casting machine in combination several magazines, several fonts of matrices, the matrices of each font being arranged in a separate mag-

azine and being provided with recesses, a
sorting mechanism dividing the matrix line
into different fonts and a distributing mech-
anism containing receiving needles, one for
5 each font of matrices, and an elevator arm
lifting the matrices out of the cast line and
bringing them in front of the sorting device
and means for actuating the elevator arm in

such a manner that it executes a swinging
and at the same time a lateral movement. 10

In witness whereof I have hereunder set
my hand in presence of two witnesses.

HEINRICH DEGENER.

Witnesses:

WOLDEMAR HAUPT,
HENRY HASPER.