

No. 765,059.

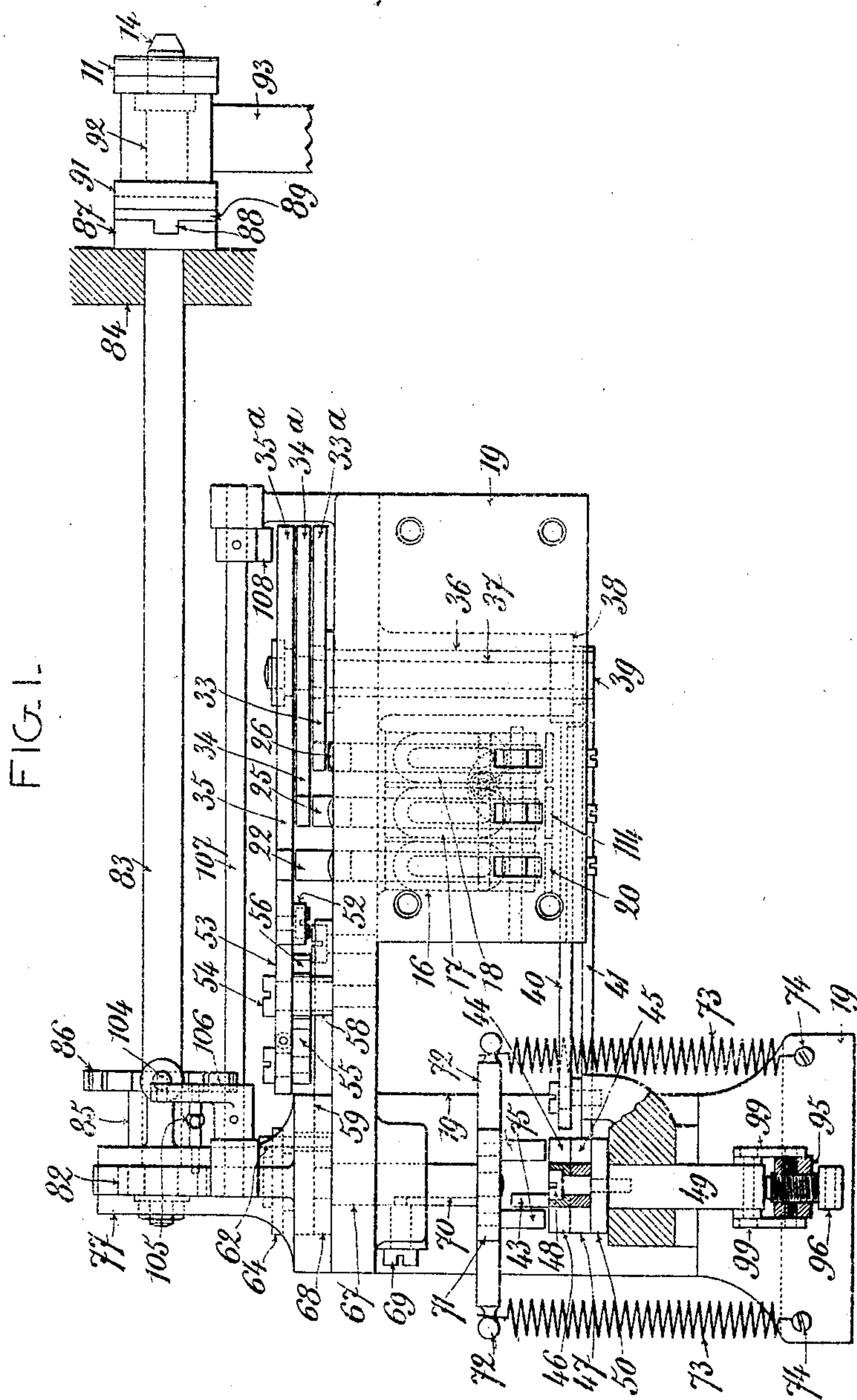
PATENTED JULY 12, 1904.

M. WEHRLIN.  
TYPE CASTING AND COMPOSING MACHINE.

APPLICATION FILED JUNE 6, 1903.

NO MODEL.

6 SHEETS—SHEET 1.



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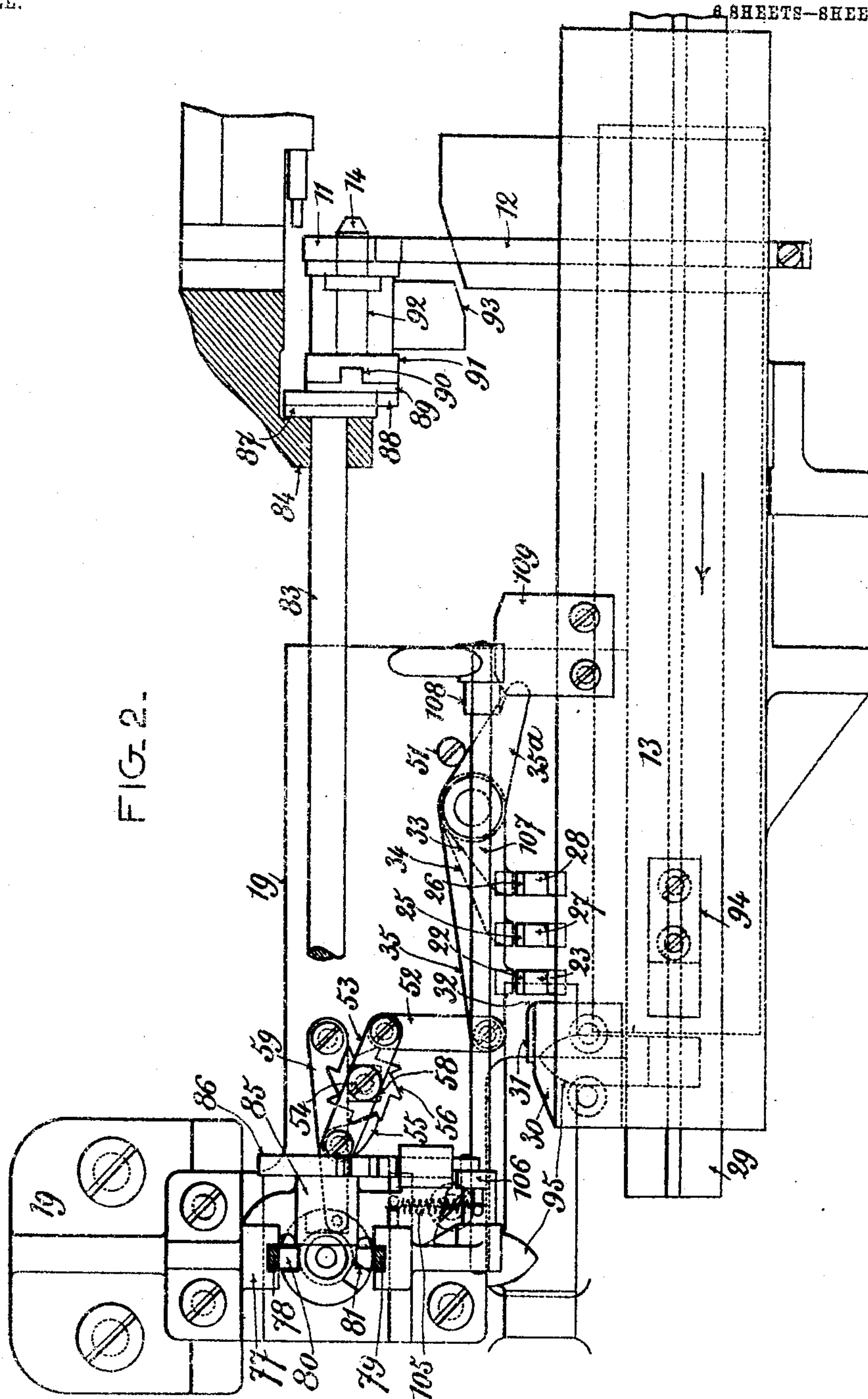
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M. WEHRLIN.  
TYPE CASTING AND COMPOSING MACHINE.

APPLICATION FILED JUNE 8, 1903.

NO MODEL.

8 SHEETS—SHEET 2.



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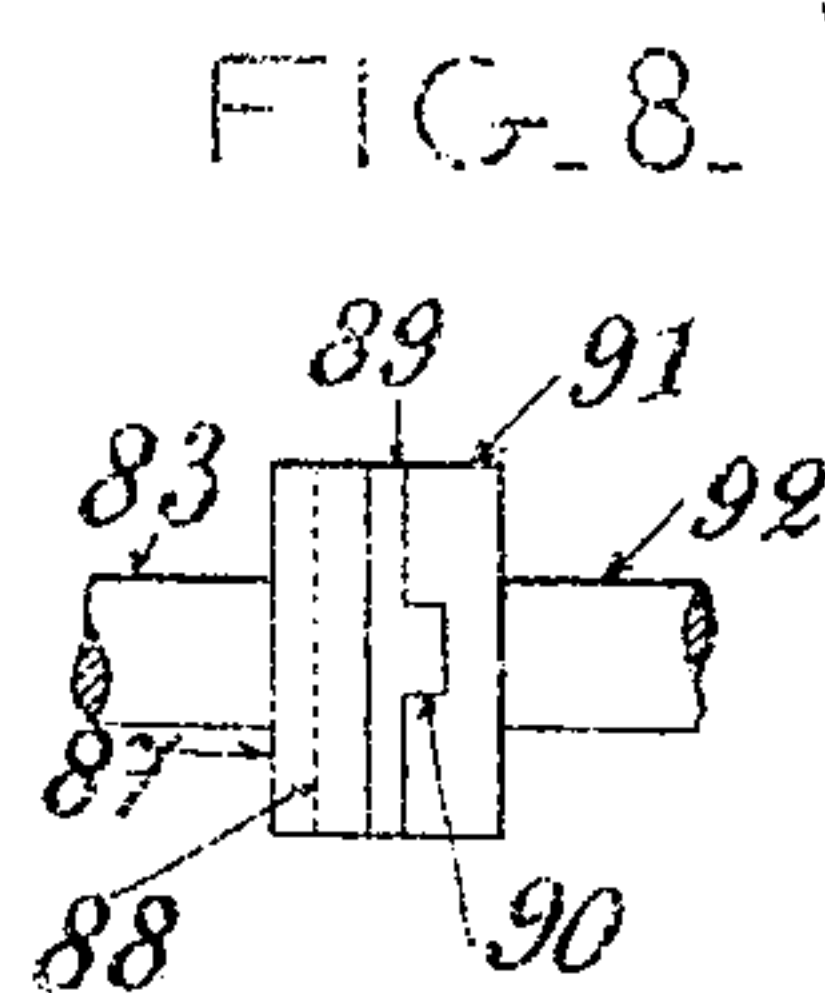
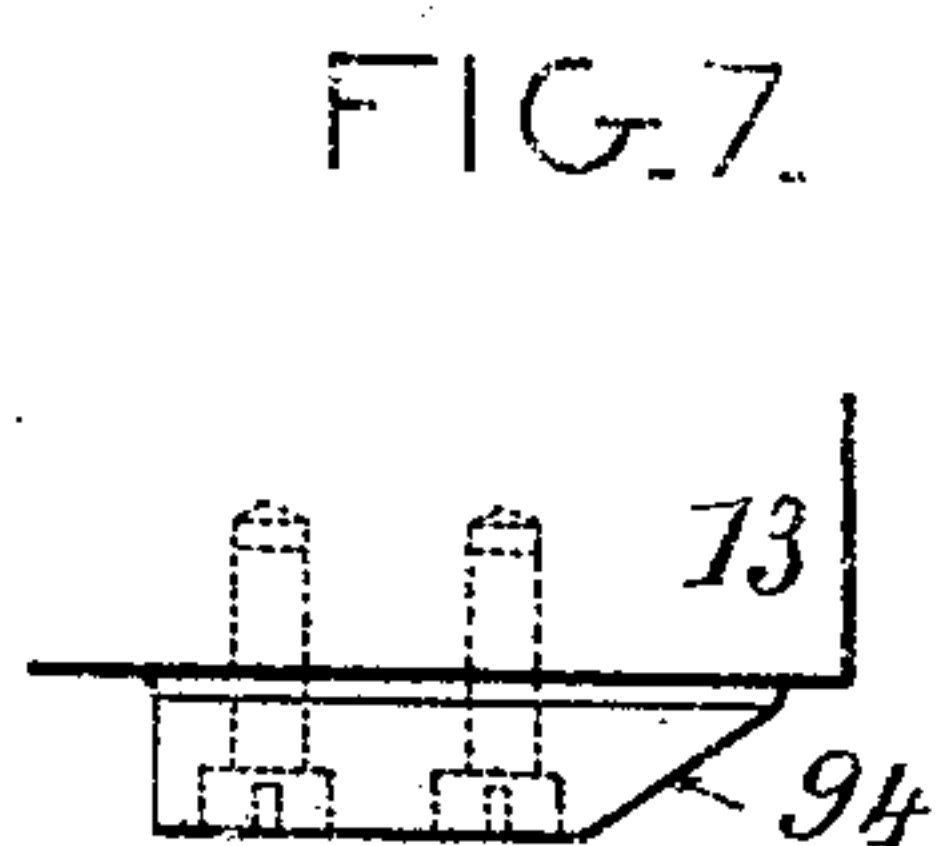
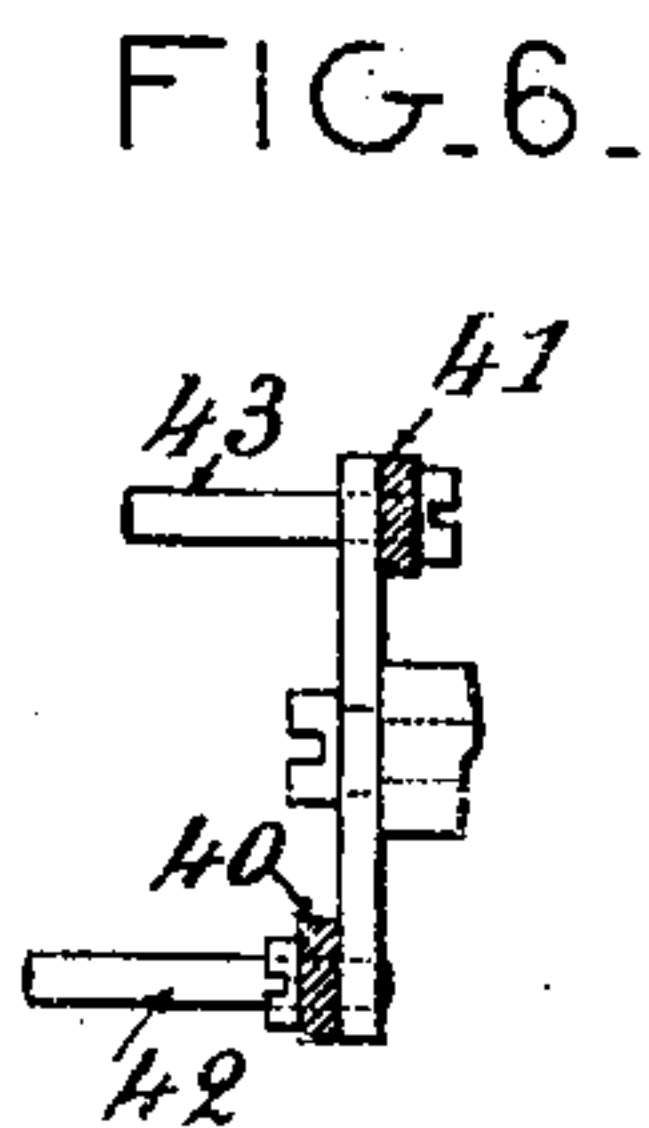
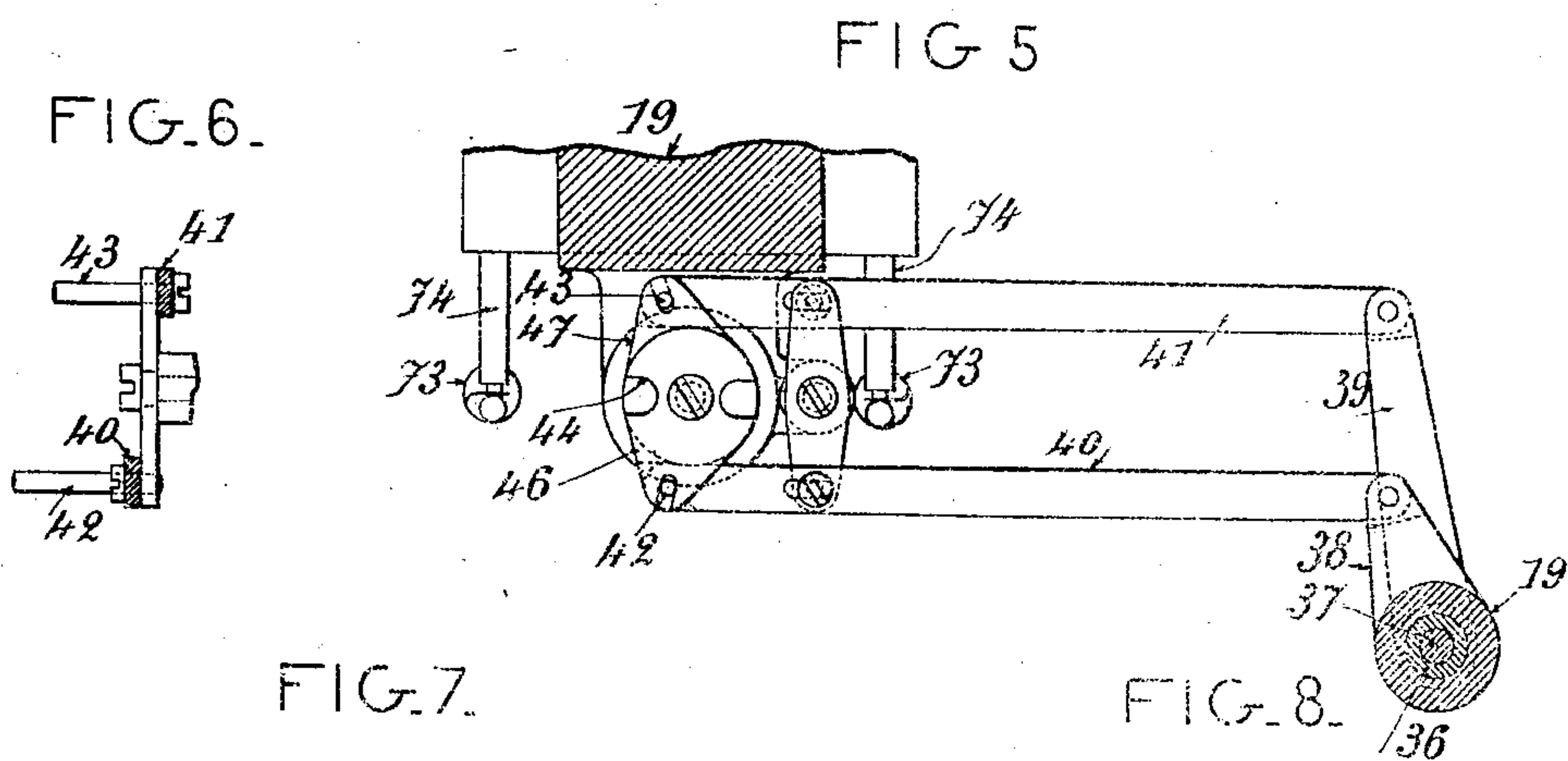
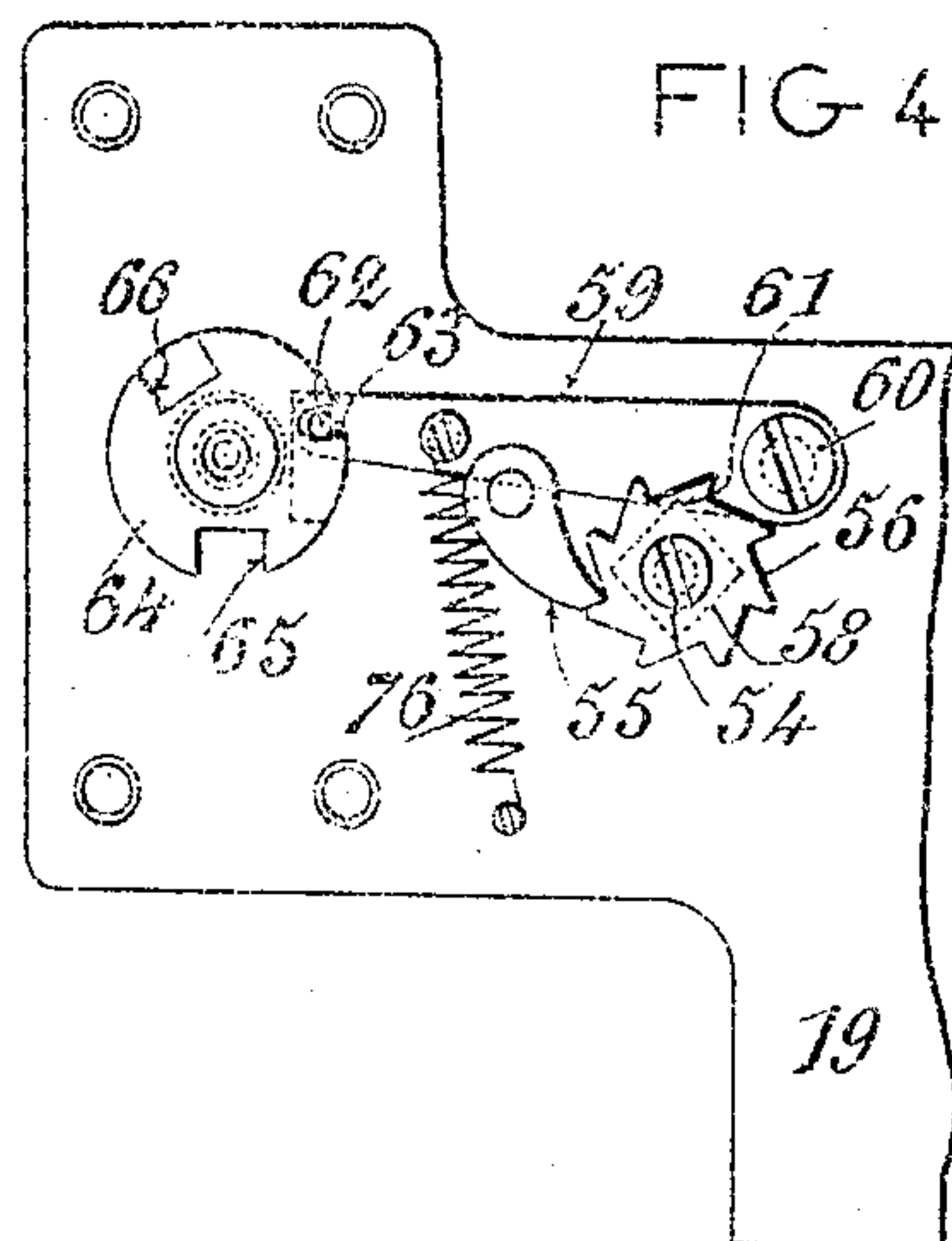
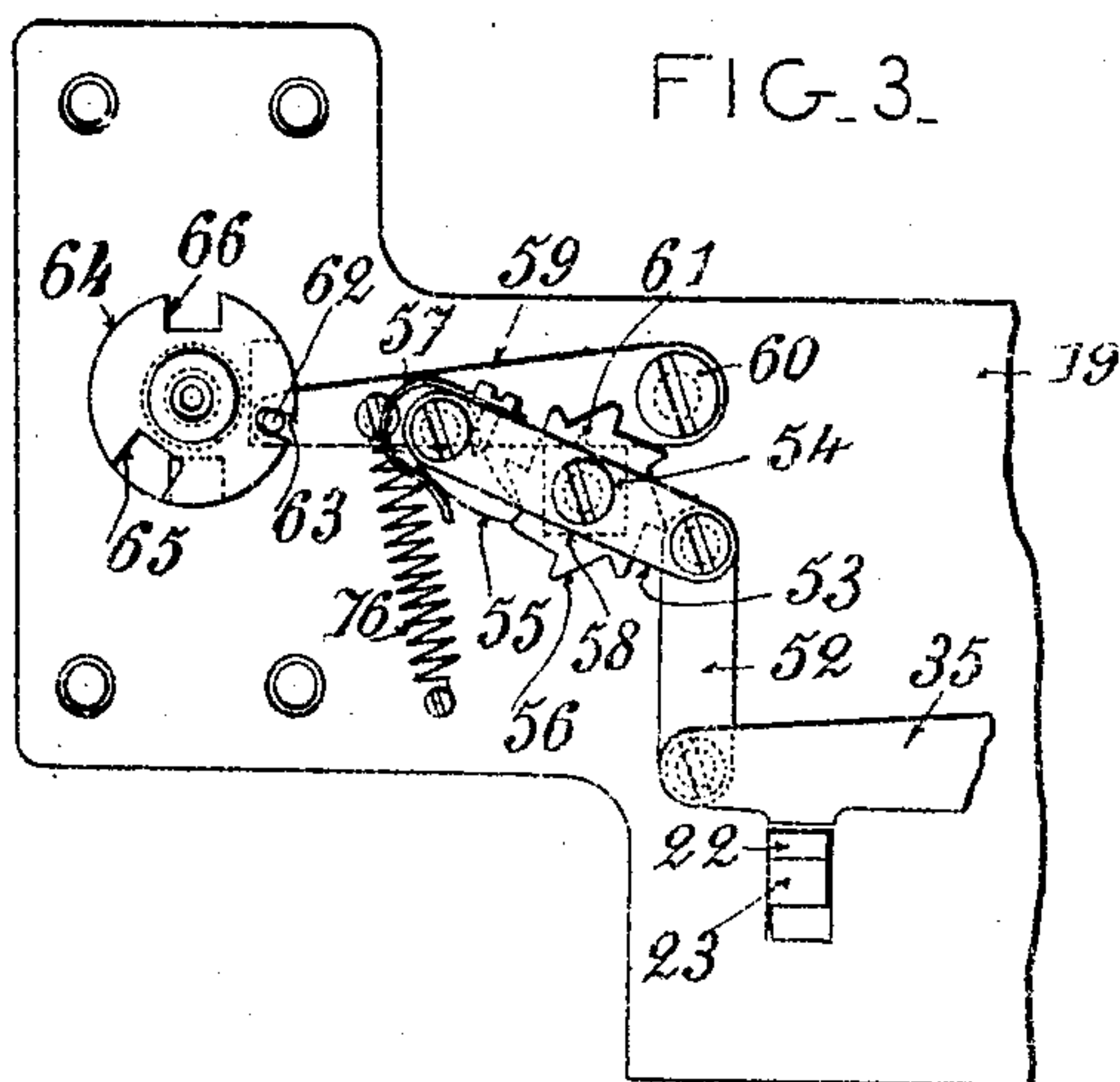
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6 SHEETS—SHEET 3.



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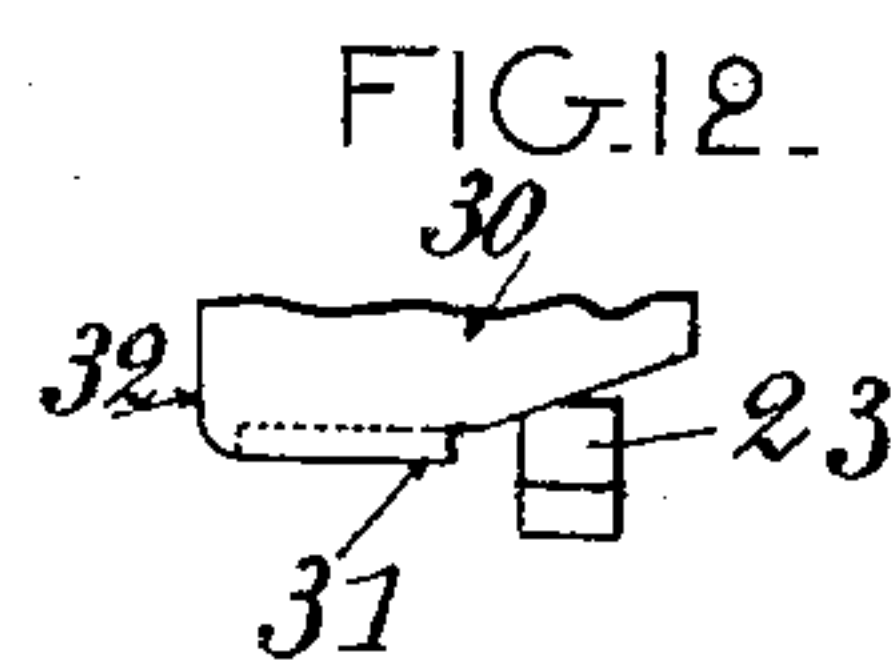
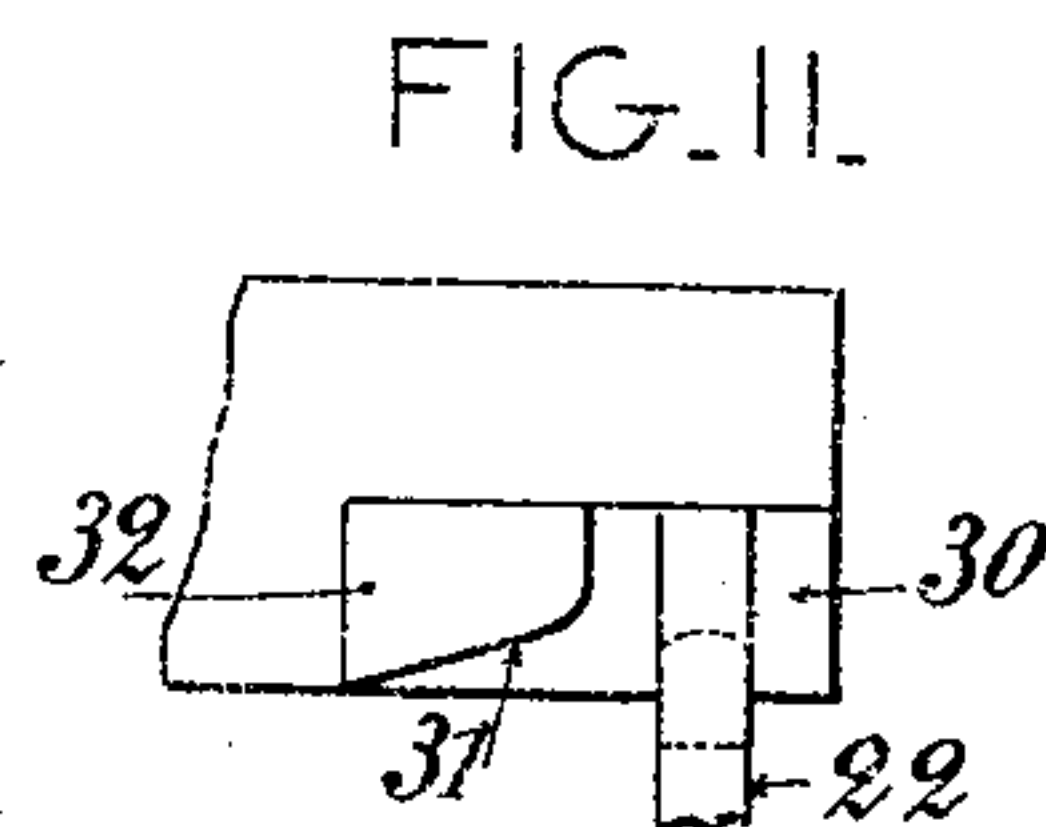
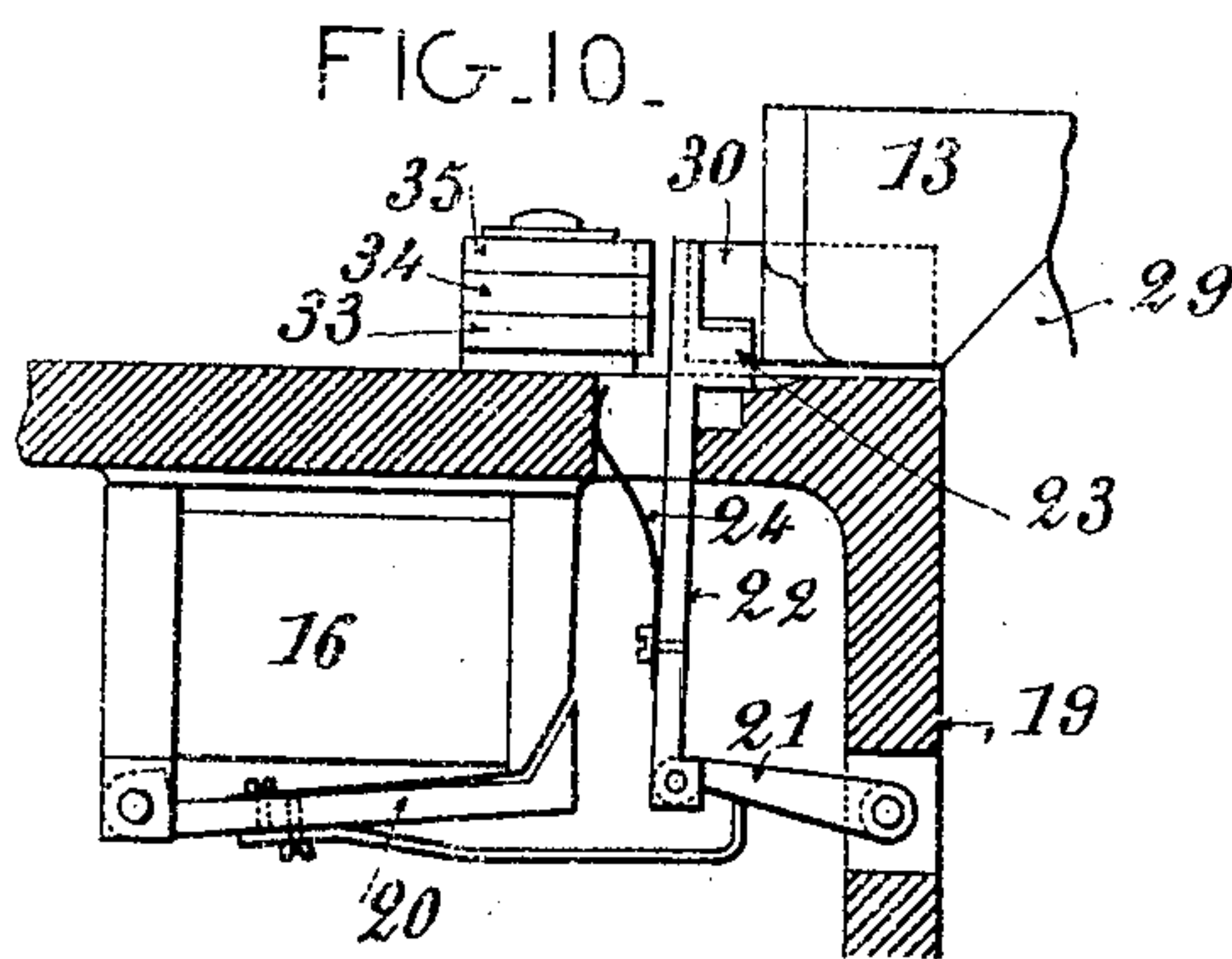
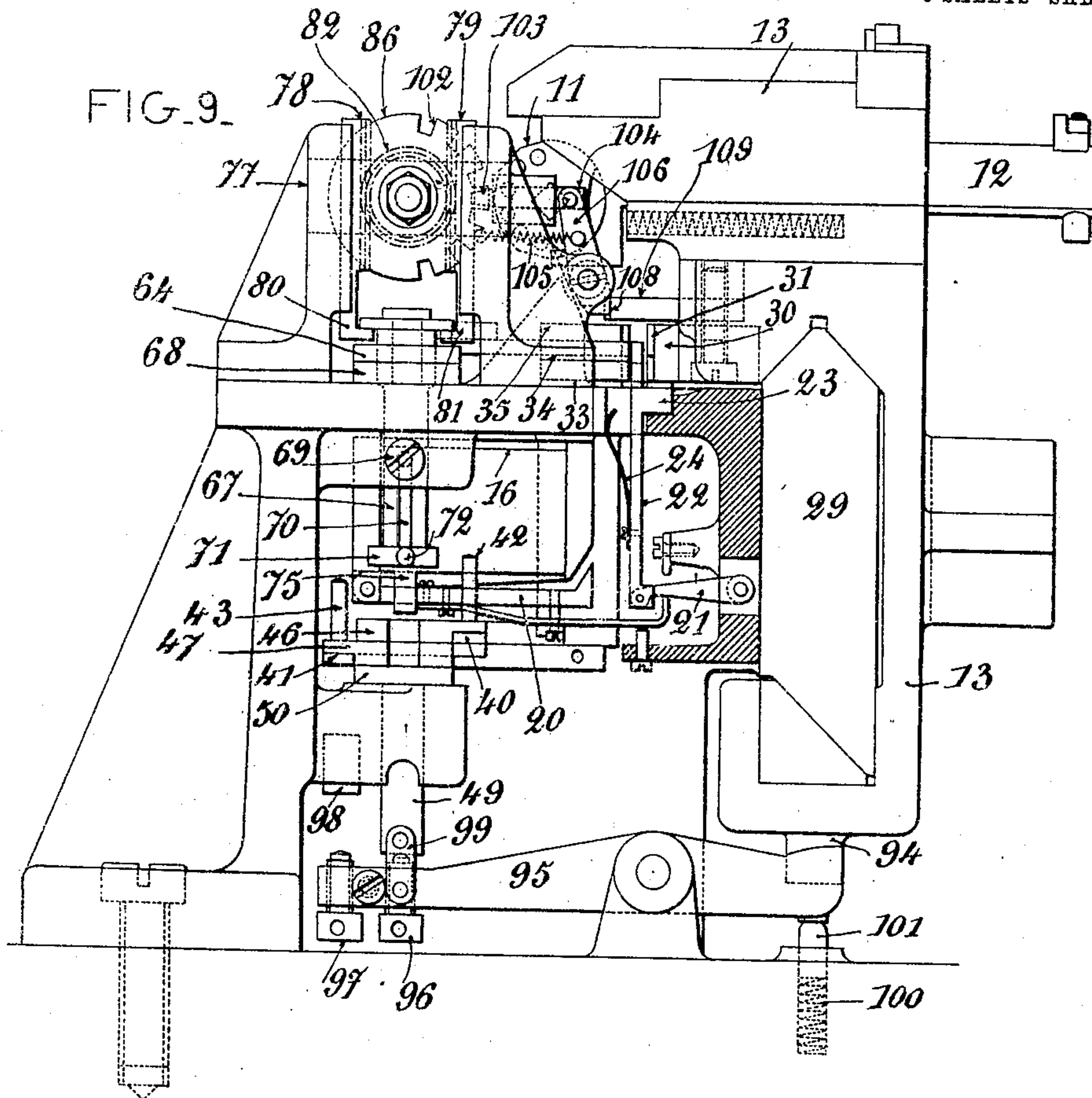
PATENTED JULY 12, 1904.

M. WEHRLIN.  
TYPE CASTING AND COMPOSING MACHINE.

APPLICATION FILED JUNE 6, 1903.

NO MODEL.

6 SHEETS—SHEET 4.



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NO MODEL.

6 SHEETS—SHEET 5.

FIG. 13.

FIG. 14.

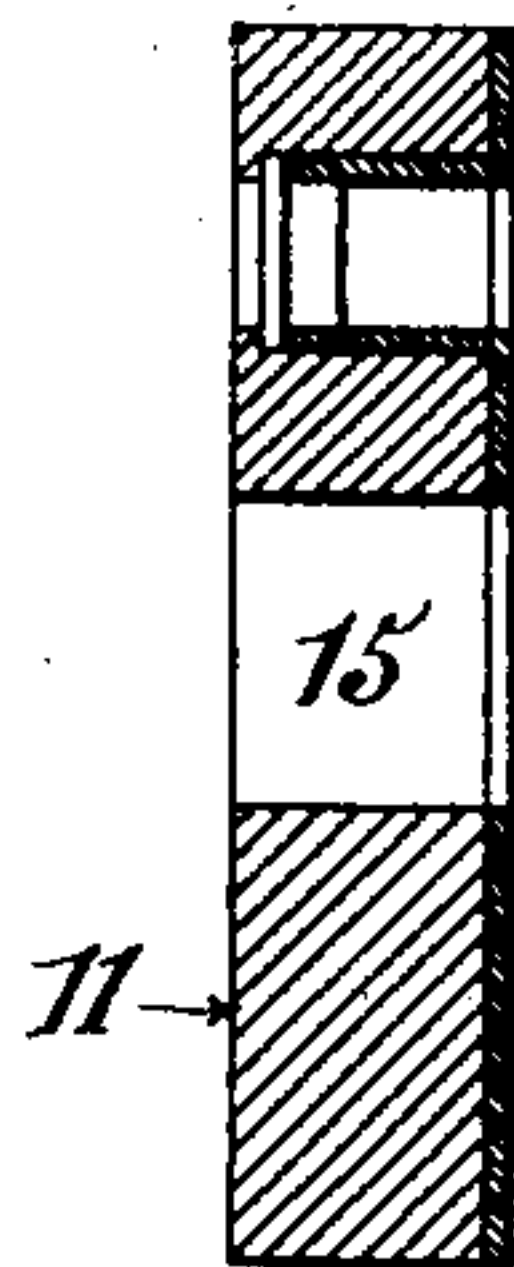
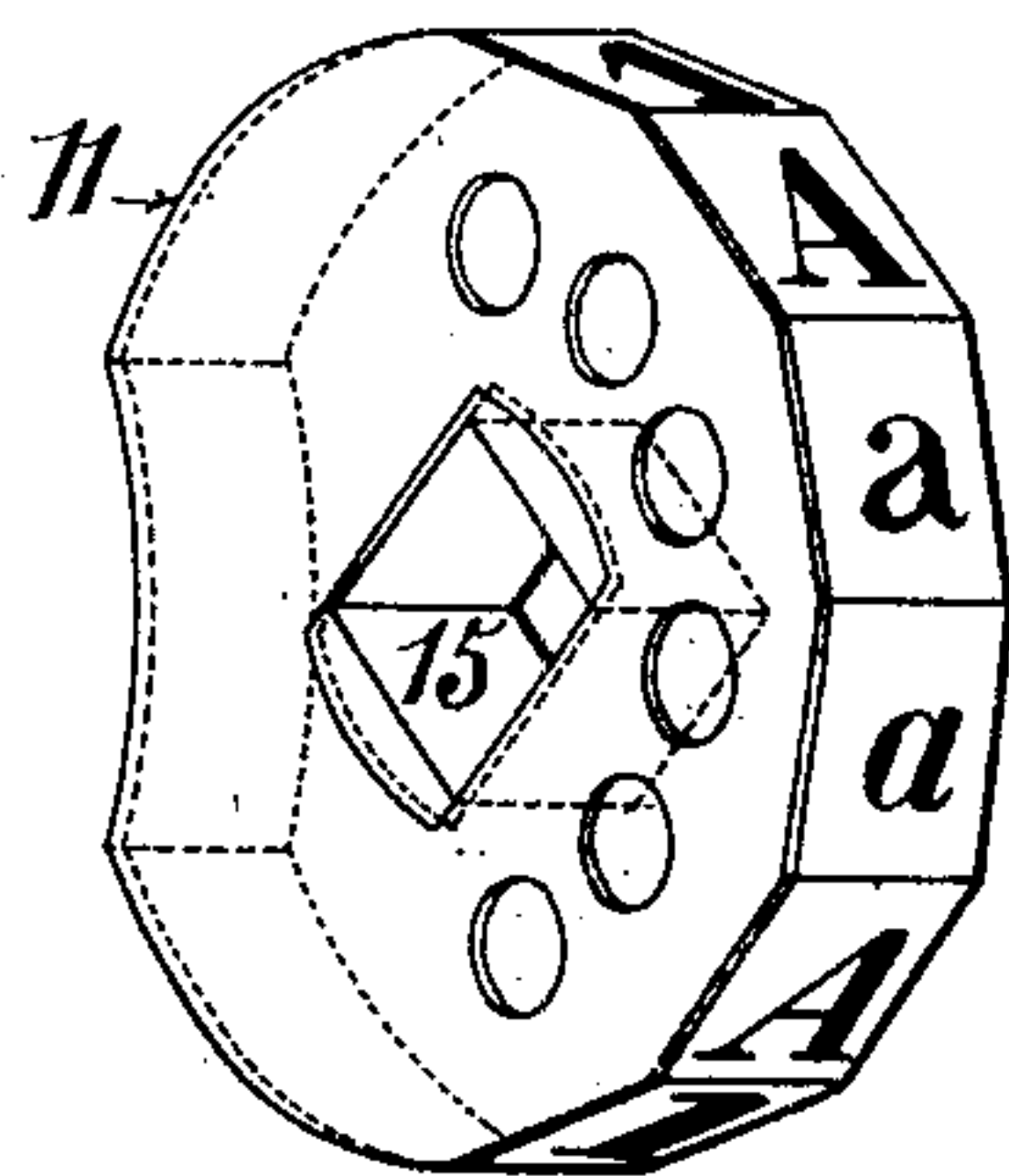


FIG. 15.

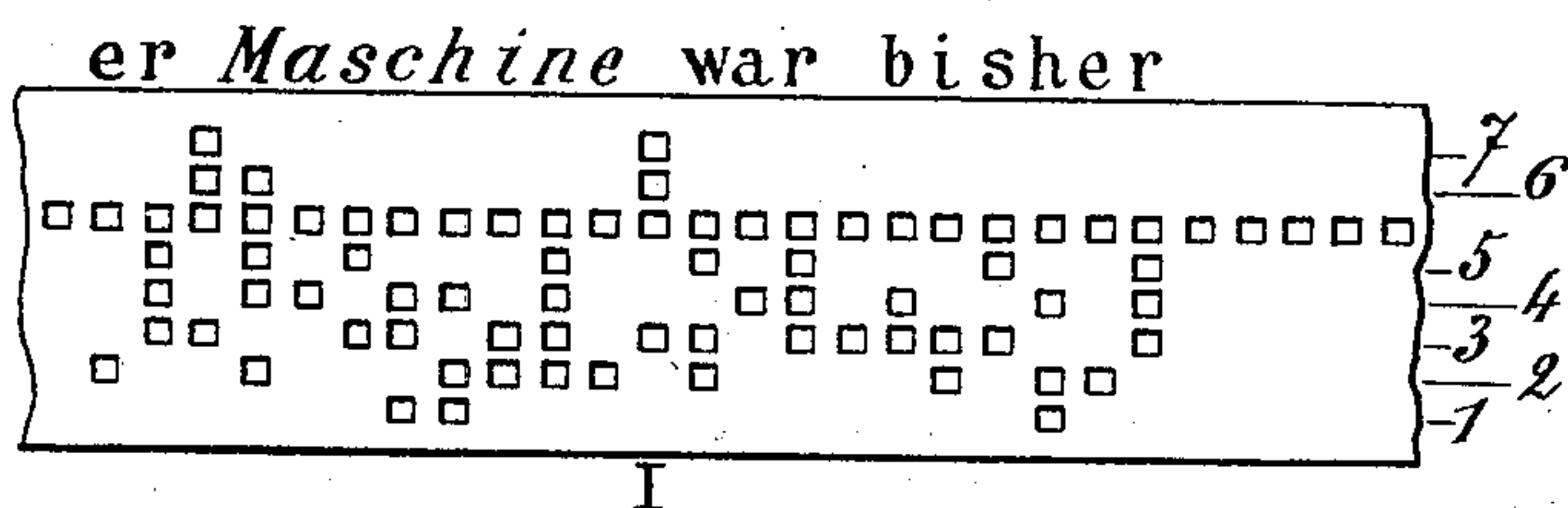
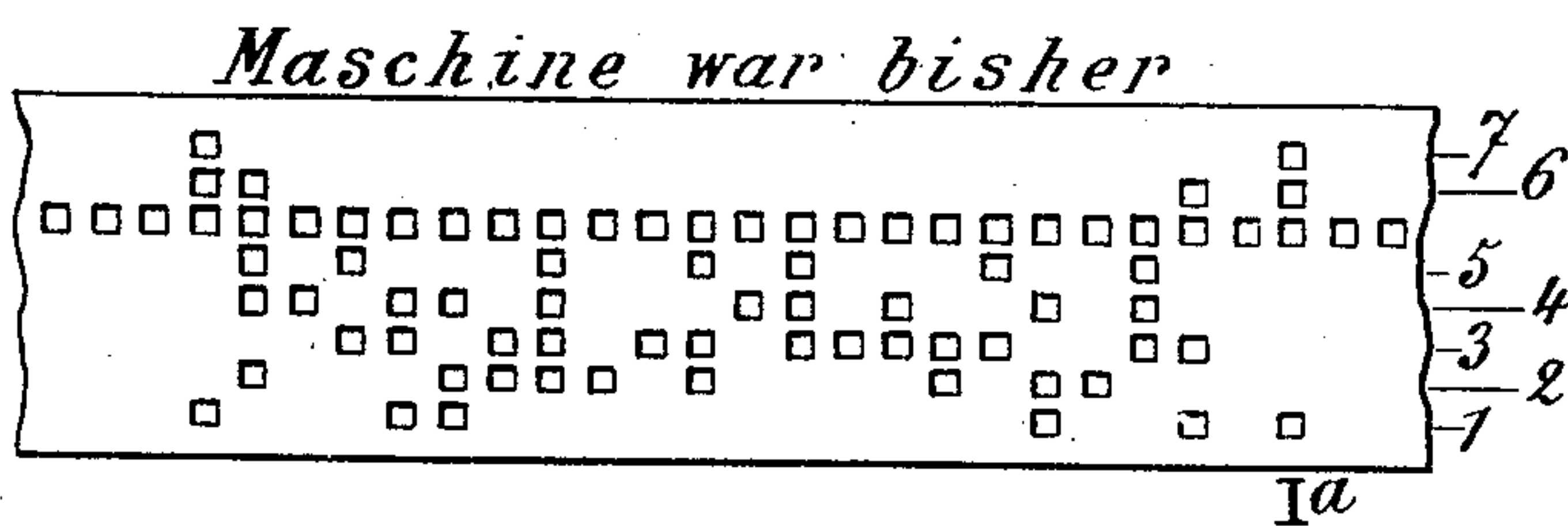


FIG. 16.



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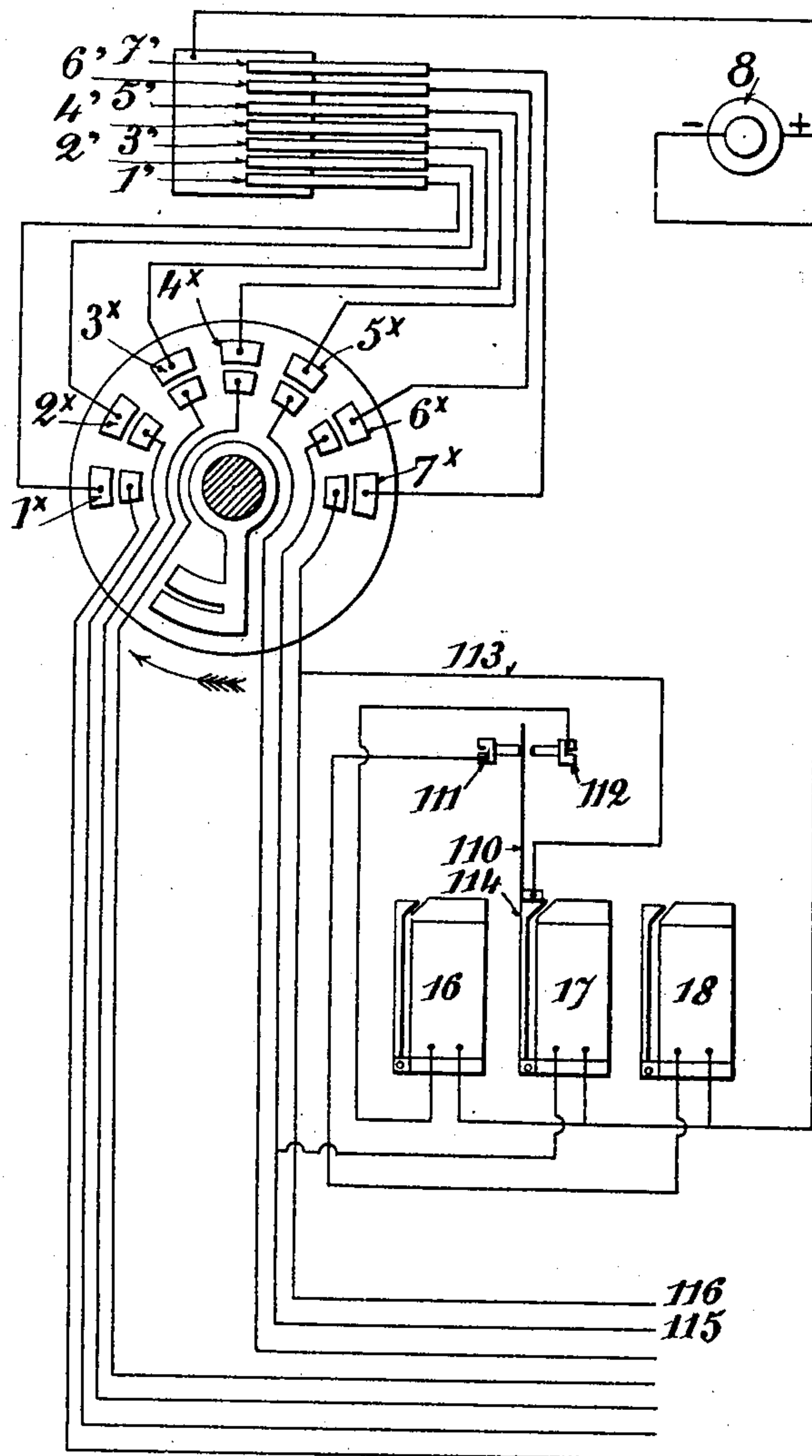
M. WEHRLIN.  
TYPE CASTING AND COMPOSING MACHINE.

APPLICATION FILED JUNE 6, 1903.

NO MODEL.

6 SHEETS—SHEET 6.

FIG. 17.



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# UNITED STATES PATENT OFFICE.

MAURICE WEHRLIN, OF PARIS, FRANCE, ASSIGNOR TO COMPAGNIE INTERNATIONALE DE L'ELECTRO-TYPOGRAPHE MERAY & ROZAR, OF PARIS, FRANCE.

## TYPE CASTING AND COMPOSING MACHINE.

SPECIFICATION forming part of Letters Patent No. 765,059, dated July 12, 1904.

Application filed June 6, 1903. Serial No. 160,358. (No model.)

*To all whom it may concern:*

Be it known that I, MAURICE WEHRLIN, engineer, a citizen of the Republic of France, residing at 74 Rue de la Victoire, Paris, in the Republic of France, have invented certain new and useful Improvements in Type Casting and Composing Machines, of which the following is a specification.

In movable-type casting and composing machines operating by means of register-bands such as those known heretofore, chiefly those in which in the course of the operation of producing a type the dies are withdrawn from their conducting-pieces for the purpose of being held motionless against the mold at the time when casting takes place, whereas their conducting-pieces continue to move freely, it has not been possible hitherto to produce at the same time as the usual printing-type a second sort of writing, called "distinguishing" printing-type, whereby a varied composition might be made.

This invention relates to a device whereby without increasing the number of the perforations (combinations of perforations) of the registering-band or the number of dies, and consequently the number of the brackets supporting the same, it becomes possible to compose besides the usual printing-type a second sort of printing-type called "distinguishing" printing-type. This second sort of type may be in that which concerns the shape and thickness of the type absolutely independent of the first handwriting, which, as is well known, could not be carried out by the machines heretofore known for the production of the varied composition, (for example, on the linotype,) because in those machines the thickness of the type is limited by that of the die-carrying plates—that is, that the two types must have absolutely the same thickness—a condition which mars the beauty of the composition.

In the accompanying drawings, Figure 1 is a side elevation of the device taken altogether. Fig. 2 is a plan corresponding to Fig. 1, showing also some parts of the movable-type casting and composing machine, notably the carriage of the die-carrying arms and the

square mandrel, which receives the dies when the type are being cast. Fig. 3 is a plan of the part of the mechanism which insures the passage of one sort of type to another sort. Fig. 4 shows some of the parts of Fig. 3 in another position. Fig. 5 is a plan of the part of the mechanism which insures for each sort the casting of the different type—small letters, capital letters, and punctuations. Fig. 6 shows a part of the elements represented in Fig. 5. Fig. 7 is an elevation of an inclined plane fixed under the carriage. Fig. 8 is a plan of a coupling device located between the square mandrel and the shaft which turns the same. Fig. 9 is a front elevation of the apparatus taken altogether. Fig. 10 shows certain parts represented in Fig. 9 in the positions they assume when one of the electromagnets has been energized. Fig. 11 is a side view of certain parts represented in Fig. 10. Fig. 12 is a plan corresponding to Fig. 11. Fig. 13 is an inclined side view of a die, showing its six impressions. Fig. 14 is a sectional view of the die on the axial line of the square hole. Fig. 15 represents a fragment of the registering-band relating to the case when the distinguishing printing-type (in italics) begins and ends in the course of the line. Fig. 16 represents a fragment of the registering-band when the distinguishing printing-type begins and ends with the line. Fig. 17 is a diagram of the wiring of the currents relating to the functions of the present invention.

As is known, by the English Patent No. 13,891, June 5, 1897, the dies 11, Figs. 1, 2, and 9, carried by the arms 12 in a reciprocating carriage 13, are moved out of the latter under the action of the perforations of a registering-band and take onto the square mandrel 14, Figs. 1 and 2, by means of the square hole 15 in the same each time they are to be used in casting. These dies, Figs. 13 and 14, receive on the same half of their periphery six different impressions—say, for instance, the characters "a, A, 1"—in usual printing-type in the upper quadrant and the same characters in distinguishing type (in italics) on the lower quadrant. By this arrangement it be-



comes possible in using only one combination of perforations per die to get six different characters on the condition of giving each time to the said die preparatory to casting and by means of a suitable apparatus one of the six rotations or turns for the purpose of bringing the desired impression opposite the mold.

The apparatus for moving the die into the proper position preparatory to casting is controlled by means of the three electromagnets 16, 17, and 18, Figs. 1, 9, and 10, contained in the main frame 19. The armature 20 of the electromagnet 16 when attracted so moves a lever device 21 22 that the latter rises, Figs. 9 and 10. In the movement a heel 23 on the arm 22, under the action of a spring 24, comes and takes up a position on the upper part of the frame 19, so that when the energization of the electromagnet ceases and the armature falls down into its position of rest the arm 22 remains in its uppermost position. The electromagnets 17 and 18 control a similar lever device. (Shown in Fig. 2 in part by the levers 25 26, together with their heels 27 and 28.) The carriage 13, Figs. 2 and 9, is reciprocated back and forth on the wedge-shaped way 29, as described in the patent above referred to. The carriage which contains the arms 12 and the dies 11 carries also a cam-piece 30, provided with the projection 31 in the shape of an inclined plane.

Assuming that the carriage is making its forward stroke in the direction shown by the arrow in Fig. 2 and one of the electromagnets 16, 17, or 18 has been previously energized, then one of the corresponding arms 22, 25, or 26 will be in its uppermost position, Fig. 10. Let us take, for instance, the arm 22. This arm will be moved toward the left by the cam 30; but immediately afterward, when the inclined plane 31 reaches the heel of the arm 22, the latter will be moved downward and into its normal position to be ready to be again moved upward by its electromagnet during the next stroke of the carriage—that is to say, to begin operating again. The arms 25 26 move in the same manner, if they have been located by their electromagnets within reach of the cam 30.

Above the main frame 19 and within reach of the arms 22 25 26 lies a system of three levers of the first order, located one above another, the lever 33 below, the lever 34 in the middle, and the lever 35 above, Figs. 1 and 2.

The two levers 33 and 34 are fixed, respectively, on two spindles 36 and 37, Fig. 5, which telescope one into the other and traverse the main frame 19, which serves as a bearing for the same. To their lower part are fixed the arms 38 and 39, Figs. 1, 5, which are pivoted to the rods 40 and 41. The latter carry at their ends long vertical pins 42 43, Figs. 5, 6, and 9. The said pins are engaged in corresponding slots of two disks 46 and 47. The

said disks can revolve around a necked screw 48, fixed on the shaft 49, which is mounted in the main frame 19 and terminates at its upper part by the plate 50, which serves as a support for the disks 46 and 47.

If we assume, for instance, that the electromagnet 18 has caused the arm 26 to move up the latter when moved to the left by the cam 30 puts in motion the lever 33, which is within its reach, Figs. 1 and 2. This motion transmitted to the disk 46, the spindle 36, the arm 38, the rod 40, and the pin 42 causes the said disk to turn, the said disk remaining in its new position. The arm 26, as seen hereinbefore, is moved into its normal position by the inclined plane 31.

During the return stroke of the carriage 13 the rounded angle 32 of the cam 30, Fig. 2, comes and impinges the second arm 33<sup>a</sup> of the lever 33, which had moved to the right in the previous movement of the said lever and moves it against the abutting piece 51, which fixes the normal position of the lever. By this movement the disk 46 will also be moved back into its normal position, since, as hereinbefore described, it is connected to the lever 33 by parts which do not yield and must obey its movements. The electromagnet 17 produces the same effect on the disk 47 through the medium of the lever 34<sup>a</sup>. The electromagnet 16 has another function to fulfil. When the arm 22 has been replaced by it in its normal working position, the movement toward the left which it receives from the cam 30 is communicated to the third lever, the upper one, 35, Fig. 3. The end of the lever 35, which is within reach of the arm 22, carries a link 52, which is pivoted to one end of a pawl-carrying lever 53 able to revolve around the necked screw 54, which serves as a spindle for the same. The pawl 55, mounted on the free end of the lever 53, meshes with one of the eight teeth of a ratchet-wheel 56 under the action of the spring 57, Fig. 3. The ratchet-wheel 56 has a downward extension of square shape 58, Figs. 1, 3, and 4, and is loosely mounted on the plain part of the screw 54, which is fixed in the main frame 19.

Lower down than the ratchet-wheel 56 and within reach of the square extension of the latter is the lever 59, carried by the screw 60, around which it turns. The free end of the lever 59 carries a pin 62, which is engaged in the corresponding slot 63 of a disk 64. The disk 64 is rotatably mounted on the shaft 67 and rests on a plate 68, fixed on the said shaft, Figs. 1 and 9. The shaft 67 has a bearing in the main frame 19 and is capable of endwise movement; but it is prevented from revolving by the screw 69 and the groove 70. The lower part of the shaft carries a plate 71, provided with two arms 72, to which are attached the springs 73, the other ends of which are attached to the screws 74, fixed in the main



frame 19. The plate 71 is also provided with two pins 75, turned downward.

The parts being in the position shown in Fig. 3; a rotation of one tooth of the ratchet-wheel 56 will have the effect of pushing the lever 59 through the medium of a ridge of the square-extension 58, and in this position the notch 61 will cause the lever 59 to remain against the said ridge. This movement will have the effect of imparting to the disk 64 a certain amount of rotation. The disk will then be in the position shown in Fig. 4. This movement is obtained during the forward stroke of the carriage 13 when the electromagnet 16 has been energized, because the greater arm of lever 35, through the medium of 52, causes 53 to turn around 54, the pawl 55 then causing the ratchet-wheel 56 turn one tooth. Then when the carriage 13 makes its backward stroke the rounded part 32 of the cam 30 replaces here again the lever 35 in its normal position in pushing its smaller arm 35<sup>a</sup> against the part 51. This movement, transmitted to the lever 53, replaces the pawl 55 in the position shown in Fig. 4, when it gears with the next tooth of the ratchet-wheel 56, preparatory to further impulsion. This further impulsion will occur when the electromagnet 16 has been energized; but the construction of the apparatus will show that during this following movement the square part 58 will again present one of its level faces to the lever 59, which will come against it under the action of its spring 76, thus causing the return of the disk 64 into its primary position. (Shown in Fig. 3.)

Above the disk 64, Figs. 1, 2, and 9, lies a special part of the main frame 77, in which work the two tooth-racks 78 and 79, the said racks moving upward in suitable ways. These racks have each a heel 80 or 81, engaged in a groove of the disk 64. A toothed wheel 82, keyed on the shaft 83, meshes with the two racks and, for reasons which will be seen further on, either one of the latter can operate the toothed wheel without the other rack interfering.

The shaft 83, mounted in bearings 84 and 85, carries a position-disk 86, and its right-hand end carries a disk 87, in which there is a diametrical groove 88, Figs. 1, 2, and 8. This groove receives the corresponding rib of an intermediate disk 89, which is provided in its other face with a similar rib 90 at a right angle to the former one. This second rib takes into a diametrical groove in the disk 91, which here takes the place of the abutment-plate, already known by the patent hereinbefore referred to and which was used for turning the square mandrel 92 and 14, onto which the dies come and place themselves when casting takes place. The parts 87 89 91 constitute a coupling, which allows the shaft 83 to transmit a rotary movement to the square mandrel while the latter is being con-

veyed, together with its support, in a direction parallel to its axis.

If one of the racks 78 79 is moved vertically through the medium of the toothed wheel 82, a rotary movement will be communicated to the shaft 83 and from thence to the square mandrel 14. This rotation has the effect, according to its extent, of placing the die in the proper position when casting takes place and in varying the amount and the direction of the rotation one can get from one and the same die three different characters of ordinary type and three others of distinguishing type. The amount of rotation to be received by the shaft 83, and consequently the die, for the casting of a small letter, a capital letter, or a numeral, the impressions of which follow each other on the periphery of the die, as from the horizontal diameter when the die is in its normal position, (shown in Fig. 13,) is determined by the disks 46, 47, and 50, Figs. 1, 5, and 9. As hereinbefore mentioned, above and near to the said disks lie two abutment-pins 75, fixed in a plate 71. The disks 46 and 47 in their normal position present in front of the said pins two wide slots 44 45, into which the pins can pass without touching the disks each time the latter are raised.

At each forward stroke of the carriage 13 an inclined plane 94, fixed to the said carriage, oscillates the double lever 95, which, through the medium of its pressure-spring 96, lifts at the proper time the shaft 49 and with it the disks 46 and 47 to meet the abutment-pins 75. The precise amount of this movement is regulated by the abutment-screw 97, fixed to the lever 95 and which comes to a stop against a tempered block 98, inserted into the cast-iron of the frame. The lever 95 is connected with the shaft 49 by two links 99, which have the effect of preventing any rotation of the shaft and of causing its certain return into its initial position. A spring 100 and a piston 101 cause the return of the lever 95 and of the shaft 49 into their normal position after the inclined plane 94 has passed by.

Assuming that the die is to be turned to produce a punctuation or a cipher, in this case the registering-band, besides the characteristic combination of the die, presents a perforation in the seventh line. The characteristic combination will have in the first place the effect of causing the arrival of the die onto the square mandrel 14 through the medium of known devices, and then the seventh perforation will produce the energization of the electromagnet 18.

The moving of the disk 46, for which the passage of the cam 30 then occurs, as hereinbefore described, will now have the effect when the shaft 49 and the disks 46 47 will be moved up to meet the abutment-rods 75 of presenting to the latter solid parts of the disk 46, so that the said rods will be pushed back at the



same time and will lift up with themselves the shaft 67 and the disk 64.

The disk 64, in the circular groove of which, as hereinbefore described, are engaged the heels of the two toothed racks 78 79, has two grooves 65 and 66, Figs. 3 and 5, so arranged that in each of its two positions one of the said grooves lies under one of the toothed racks, so that if the shaft 67 and with it the disk 64 is lifted up there is only one of the said toothed racks actually connected with the said disk and which moves up with it, while the other finds a free passage to move down into one of the grooves 65 or 66. Farther down the toothed rack when moving down again finds a free passage into the grooves in the plate 68, which is fixed on the shaft 67.

According to whether the one or the other of the disks 47 or 46 will have been moved under the influence of its electromagnet 17 or 18 the system of abutment or impingement, which controls the vertical displacement of the shaft 67 and of the toothed racks will have different dimensions and will cause different rotations of the shaft 83—that is to say, of the die 11 on the mandrel 14. The thickness of the disks 46 47 and the extent of the movement of the shaft 49 have been so selected that the displacement of the disk 46 gives the greatest rotation of the die and corresponds, consequently, to the impression located the farthest from the horizontal diameter, (punctuation or cipher,) that the displacement of the disk 47 corresponds to the second impression, (capital letter,) and that the plate 50 of the shaft 49 corresponds to the first impression (small letter) when none of the disks 46 47 have been displaced.

According as to whether ordinary type or distinguishing type (italic type, for instance) are to be cast, the electromagnet 16 causes a certain rotation to be communicated to the disk 64, so that the latter on being lifted up carries with it sometimes the one and sometimes the other of the toothed racks 78 or 79 and according to which there is communicated to the square mandrel 14 a rotation toward the right or a rotation toward the left.

To determine very exactly the position of the impressions of the die at the time of casting, the following arrangement is made use of: The disk 86, which is invariably connected with the shaft 83, which controls the square mandrel 14, is provided in its periphery with mortises 102 of trapezoid shape in side view, the positions of which rigorously correspond to the impressions of the die, but which are diametrically opposed to the same. Furthermore, a seventh mortise, 103, is located on the horizontal diameter, Fig. 9.

In the normal position of the mandrel a stop-wedge 104 is inserted into the mortise 103 and is solidly held there by the spring 105, whereby the mandrel is held exactly in

the position which corresponds to the reception and the departure of a die.

Preparatory to casting—that is to say, before the mandrel is turned—the stop-wedge is withdrawn from the mortise 103 by means of an arm 106, to which it is jointed, of the shaft 107, and of the lever 108, on which acts a cam-piece 109, fixed to the carriage 13. When the rotation of the mandrel takes place, a moment before casting, the cam 109 no longer acting, the stop-wedge 104 penetrates, under the action of the spring 105, into the mortise of the disk 86, which corresponds to the impression which is to receive the cast of molten metal, so that the die is always sure to be before casting takes place exactly in the required position.

After casting takes place during the return stroke of the carriage 13 the other end of the cam 109 acts in the same manner as before on 108, &c., so that the wedge 104 is withdrawn from its mortise to allow the mandrel to turn back into its normal position. On the arrival of the mandrel in this position the wedge again penetrates into the mortise 103.

There remains to be described how the currents circulate and in what manner they have been used to produce the movements just described, the perforations already known of the registering-band without increasing the number of the same. Fig. 17 is a diagram of the circuits through which the currents move in that which concerns the operation of the present invention. 1' to 7' designate the spring contacts of the deciphering apparatus, the description of which is given in the hereinbefore-mentioned patent. + and — are the poles of a battery 8. 16, 17, and 18 are the electromagnets which control the above-described mechanisms. The armature of the electromagnet 17 supports a spring 110, which is isolated from the said armature and which when in its normal position rests against a contact-piece 111. When the electromagnet 17 is energized, the spring 110 comes and rests against another contact-piece 112. The said spring 110, which is a conductor, is connected by a wire 113 with the spring-contact 7'.

The removal of the dies from and the placing of the same on the square mandrel 14, Figs. 1 and 2, are insured by the combinations of the perforations 1 to 5, Figs. 15 and 16. The perforations 7 added to a combination gives with the same die the casting of the punctuation. The addition of the perforation 6 gives the capital letter. The perforation 3 alone controls the casting of a space; but if it is accompanied by the two perforations 6 and 7 it controls the beginning and the end of the distinguishing type—italic type, for instance—when the latter occurs in the course of the line at I, Fig. 15, for instance. The perforation 1 alone controls the ascension of a line terminating



toward the galley; but if it is accompanied by the two perforations 6 and 7 it controls at the same time the beginning and the end of the distinguishing type when the latter begins and finishes at the same time as the line at I<sup>a</sup>, Fig. 16, for instance. As the currents move in the same manner in the two cases, we will only describe the first case, where the perforations 6 and 7 accompany the space-perforation 3, which immediately precedes the first word in italics and the space-perforation which comes immediately after the last word in italics, Fig. 15.

Let us call to mind that in the casting-machine constructed according to the hereinbefore-mentioned patent when a combination of the registering-band passes into the deciphering apparatus the making of the circuits corresponding to the different perforations of this combination is not simultaneous, but successive, on account of a rotary distributor passing onto pairs of segments, such as I<sup>x</sup>, Fig. 17. In the present case for the combination I of the band, Fig. 15, the third perforation will begin to operate first, after which a circuit will be made by the sixth perforation, and in the last place the same effect will be produced by the seventh.

The third perforation, as described in the hereinbefore-mentioned patent, has the effect of placing the space-die onto the square mandrel. The sixth perforation makes a circuit in which the current from pole + of the battery passes into a contact-cylinder located under the registering-band, then through the perforation into the spring-contact 6', and from thence through 6<sup>x</sup> to the electromagnet 17, through the coil of which it returns to pole — of battery 8.

The currents cannot follow the wires 115 116, which are connected to broken circuits, which are only closed during the periods of justification and for purposes which do not concern the present invention.

By the energization of the electromagnet 17 which results from the previous current the armature 114 is attracted and the spring-contact comes against the contact-screw 112. As in the apparatus, this contact-spring is in reality connected with a lever which is similar to 20, Fig. 9. It then remains against the contact-screw 112 so long as the arm 25, Fig. 2, remains in its uppermost position. An instant after the energization of the electromagnet 17 the seventh perforation makes a circuit in which the current from the pole + of the battery passes through the spring-contact 7' 7<sup>x</sup>, 113 110, the contact-screw 112, the electromagnet 16, back to pole — of the battery. The armature of the electromagnet 16 is therefore attracted and causes the disk 64 to so swing as to produce, as hereinbefore described, the changing of the type.

By the action of the cam 30, hereinbefore described, the arms which have been moved

up are pushed toward the left, first the arm 25 and then the arm 22. Then immediately afterward they are pushed downward by the inclined plane 31. By this latter movement the spring-contact 110 will again be placed against the contact-screw 111, so that for the following combination of the registering-band the holes 6 and 7 may, if required, send currents into their respective electromagnets 17 and 18 to put in operation the arms 25 and 26 to determine by the respective or relative position of the disks 46 47 the sort of characters to be cast (capital letters or punctuation) in the kind of type which has been determined, as just described. That will also be the case until the registering-band again presents a space-perforation accompanied by the holes 6 and 7, as can be seen in Fig. 15, after the word in italics, the result being a fresh change in the kind of type, the lever 59 passing in from one ridge of the square 58 onto the flat face of the said square, and so on.

When the perforation 7 exists in the band without being accompanied by hole 6, the current from the pole + of the battery passes through 7' 7<sup>x</sup>, 113, 110, and 111 to the electromagnet 18 and from thence back to pole — of the battery. The electromagnet 18 then produces the oscillation of the disk 46, and consequently the setting of the mechanism which directs the dies so as to prepare for the casting of a sign of punctuation or of a cipher. In a similar manner when a perforation 6 appears in the deciphering without being accompanied by a corresponding perforation 7 the current passes through 6' 6<sup>x</sup> and the electromagnet 17, so as to act on the disk 47 and to change the setting of the same mechanism for the purpose of obtaining a capital letter.

To sum up, the present apparatus allows of the dies being presented in front of the mold in different ways in order to obtain a varied composition without increasing the number of the combinations of the registering-band already known or the number of dies.

#### I claim—

1. In a type-casting and a type-composing machine operating through the medium of a perforated registering-band, and having dies which can be presented in different ways in front of the mold, the combination of a die having two groups of characters, of a mechanism controlled by the action of an electric current and which is operated intermittently to present in front of the mold one of the groups of characters, and of a mechanism controlled by the action of another electric current and which is operated intermittently to regulate the position of the required character in the said group.

2. In a type-casting and a type-composing machine operating through the medium of a perforated registering-band, and having dies



which can be presented in different ways in front of the mold, the combination of a die having two groups of characters, of a mechanism controlled by the action of an electric current and which is operated intermittently to present in front of the mold one of the groups of characters, and of a mechanism controlled by the action of another electric current and which is operated intermittently to regulate the position of the required character in the said group, and of means to produce the said electric currents at the passage of the parts of the perforated band in which certain rows of perforations comprise, besides the combination of the perforations corresponding to a space or to a change of line, two perforations (lines 6 and 7) corresponding to a change in the kind of characters or type.

3. In a type-casting and a type-composing machine operating through the medium of a perforated registering-band, and having dies which can be presented in different ways in front of the mold, the combination of a die having two groups of characters, of a mandrel 14, of a shaft 83, of a wheel 82, of the toothed racks 78, 79, on the opposite sides of the said wheel, and of means controlled by the action of an electric current and which are operated intermittently to move one or the other of the said toothed racks.

4. In a type-casting and a type-composing machine operating through the medium of a perforated registering-band, and having dies which can be presented in different ways in front of the mold, the combination of a die having two groups of characters, of a mandrel 14, of a shaft 83, of a wheel 82, of the toothed racks 78, 79 on the opposite sides of the said wheel, and of means controlled by the action of an electric current and which are operated intermittently to move one or the other of the said toothed racks, and of means controlled by the action of another electric current and which are operated intermittently to regulate or adjust the displacement of the toothed rack moved or carried along.

5. In a type-casting and a type-composing machine operating through the medium of a perforated registering-band, and having dies which can be presented in different ways in front of the mold, the combination of a die having two groups of characters, of a mandrel 14, of a shaft 83, of a wheel 82, of the toothed racks 78, 79 on the opposite sides of the said wheel, of a disk 64 having slots, of a sliding shaft 67, of means to lift up intermittently the said shaft, and of means controlled by an electric current to change the direction of the said disk 64, whereby a slot is brought alternatively under one of the toothed racks and whereby the latter is not lifted up, while the other toothed rack is the only one to be lifted up.

6. In a type-casting and a type-composing

machine operating through the medium of a perforated registering-band, and having dies which can be presented in different ways in front of the mold, the combination of a die having two groups of characters, of a mandrel 14, of a shaft 83, of a wheel 82, of the toothed racks 78, 79 on the opposite sides of the said wheel, of a disk 64 having slots, of a sliding shaft 67, of means to lift up intermittently the said shaft, of a lever 59, of a cam 58, of a ratchet-wheel 56, of a lever connected with the ratchet-wheel, of an inclined plane 30 capable of intermittent movement, of an electromagnet 16, and of means operated by the said electromagnet to put the said levers in connection with the said inclined plane.

7. In a type-casting and a type-composing machine operating through the medium of a perforated registering-band, and having dies which can be presented in different ways in front of the mold, the combination of a die having two groups of characters, of a mandrel 14, of a shaft 83, of a wheel 82, of the toothed racks 78, 79 on the opposite sides of the said wheel, of a disk 64, of a sliding shaft 67, of a disk 71, of the pins 75, of the disks 46, 47 having slots, of an unpierced disk 50, of means to lift up intermittently these disks altogether, and of means controlled by the electromagnets 17, 18 to regulate the direction of the disks having slots.

8. In a type-casting and a type-composing machine operating through the medium of a perforated registering-band, and having dies which can be presented in different ways in front of the mold, the combination of a die having two groups of characters, of a mandrel 14, of a shaft 83, of a wheel 82 of the toothed racks 78, 79 on the opposite sides of the said wheel, of a mechanism to lift up alternatively the toothed racks, of a two-armed lever 35, 35<sup>a</sup> connected to the said mechanism, of the inclined planes 30, 31, 32 capable of intermittent movement, of an electromagnet 16, of a lever 22, and of a projection 23 on the said lever; the inclined plane 30 acting on the arm 35 through the medium of the raised lever 22; the inclined plane 31 acting afterward on the projection 23 to move the lever 22 downward again; and the inclined plane 31 acting lastly on the arm 35<sup>a</sup> to bring the lever 35, 35<sup>a</sup> backward again.

9. In a type-casting and a type-composing machine operating through the medium of a perforated registering-band, and having dies which can be presented in different ways in front of the mold, the combination of a die having two groups of characters, of a mandrel 14, of a shaft 83, of means operated by an intermittently-moving carriage 13, and controlled by electric currents to regulate the direction of the shaft, of a disk 86 having slots, of a stop-wedge 104, of a spring 105, of the levers 106, 108 connected to the stop-wedge, and of a double-inclined plane 109 fixed to the



said carriage to act on the said levers, whereby the wedge is withdrawn from the disk by the action of the carriage while the shaft is being regulated or adjusted and takes into the disk again after such regulation or adjustment.

10. In a type-casting and a type-composing machine operating through the medium of a perforated registering-band, and having dies which can be presented in different ways in front of the mold, the combination of a die having two groups of characters, of a mechanism controlled by the action of an electric current and which is operated intermittently to present in front of the mold one of the groups of characters, and of a mechanism controlled by the action of another electric current and which is operated intermittently to regulate the position of the required character of the group, of the electromagnets 17 and 18 to regulate the action of the mechanism mentioned in the second place and which is influenced by the perforations of the lines 6 and 7, respectively, of an electromagnet 16 to regulate the action of the mechanism mentioned in the first place, of the means for sending successively the currents through the perforations 6 and 7, of a commutator 110, operated by the electro-

magnet 17, of a circuit 113, 110, 111 normally closed by the commutator, passing through the electromagnet 18, and which is influenced by the perforations 7, and of another circuit 113, 112 closed by the commutator under the influence of the electromagnet 17, the latter circuit passing through the electromagnet 16 and being influenced also by the perforations 7, whereby when a perforation 7 presents itself without a corresponding perforation 6, the electromagnet 18 acts alone to regulate the mechanism mentioned in the second place, whereas when a perforation 6 comes first into action, the electromagnet 17 acts on the same mechanism and, furthermore, prepares the electromagnet 16 for being influenced by the corresponding perforation 7, if required, in order to regulate also the mechanism mentioned in the first place.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

MAURICE WEHRLIN. [L. s.]

Witnesses:

J. ALLISON BOWEN,  
MAURICE ROUX.