

No. 858,650.

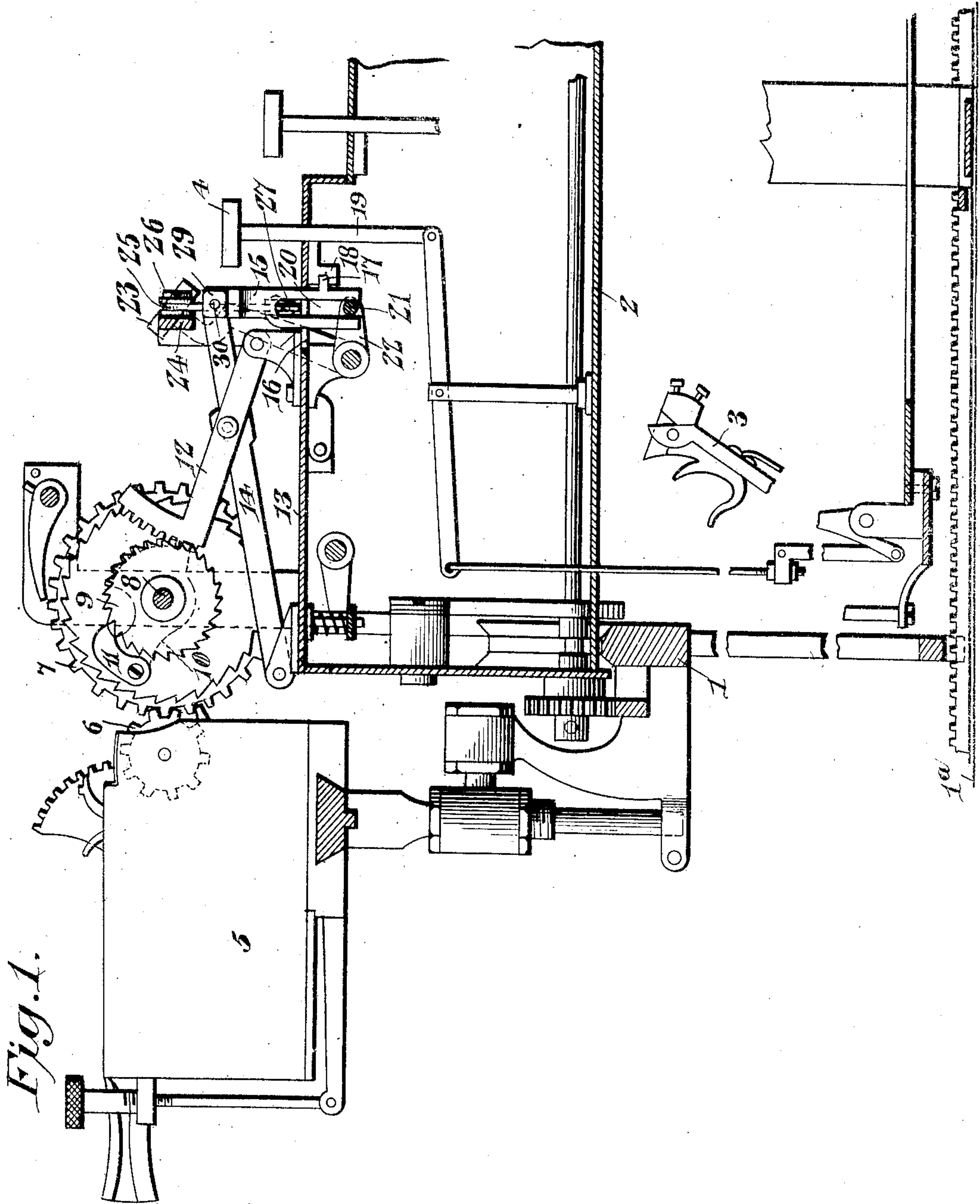
PATENTED JULY 2, 1907.

C. E. GREEN.

COMBINED CALCULATING AND TYPE WRITING MACHINE.

APPLICATION FILED AUG. 30, 1906.

3 SHEETS—SHEET 1.



C. E. Green, Inventor

By

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Witnesses
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Louis G. Julihn

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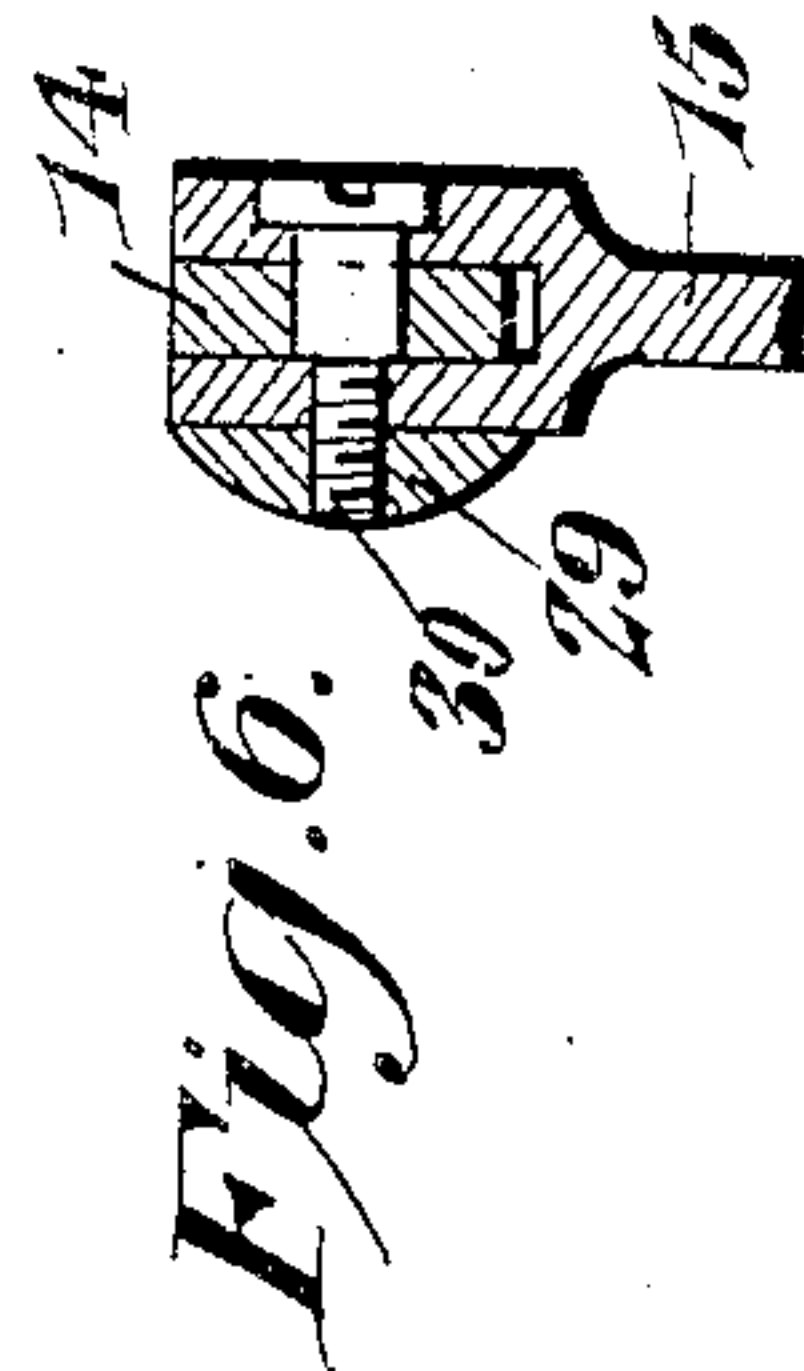
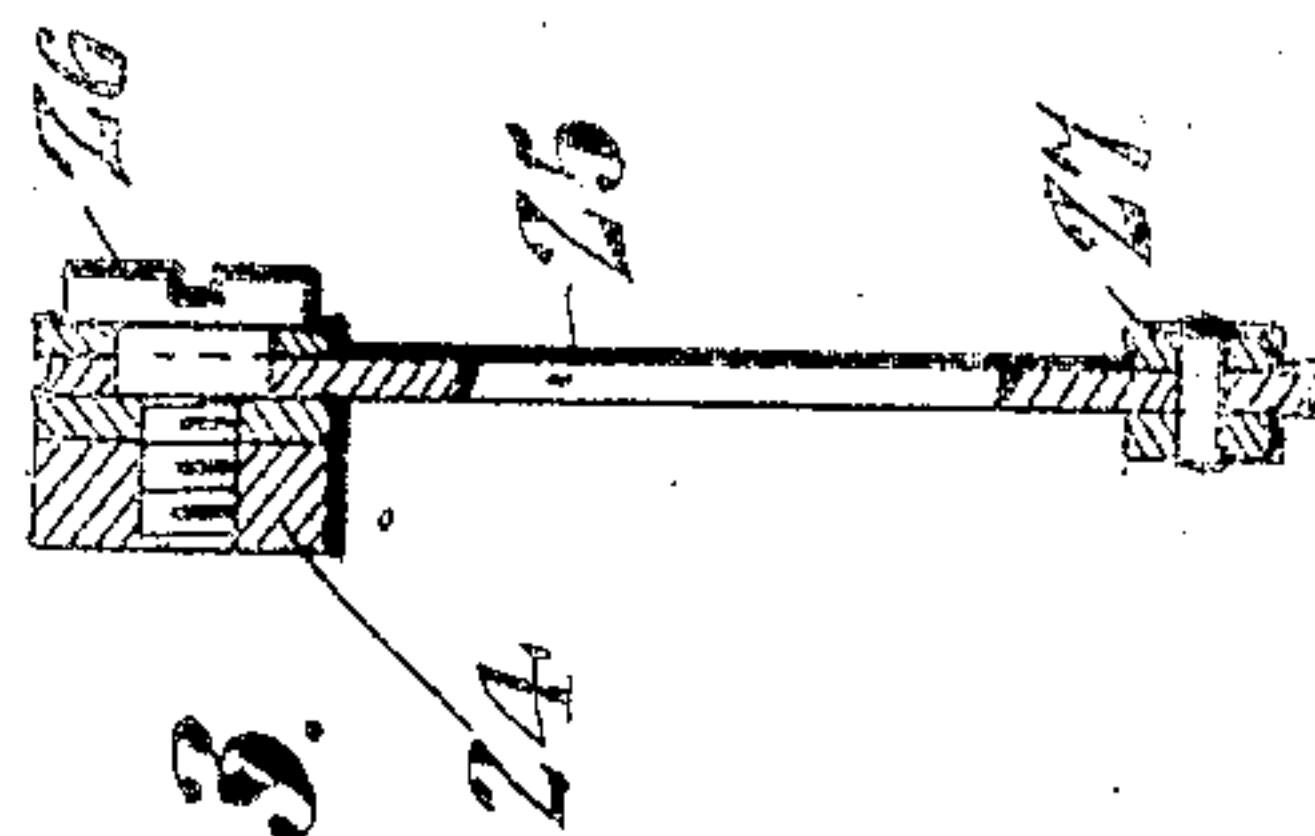
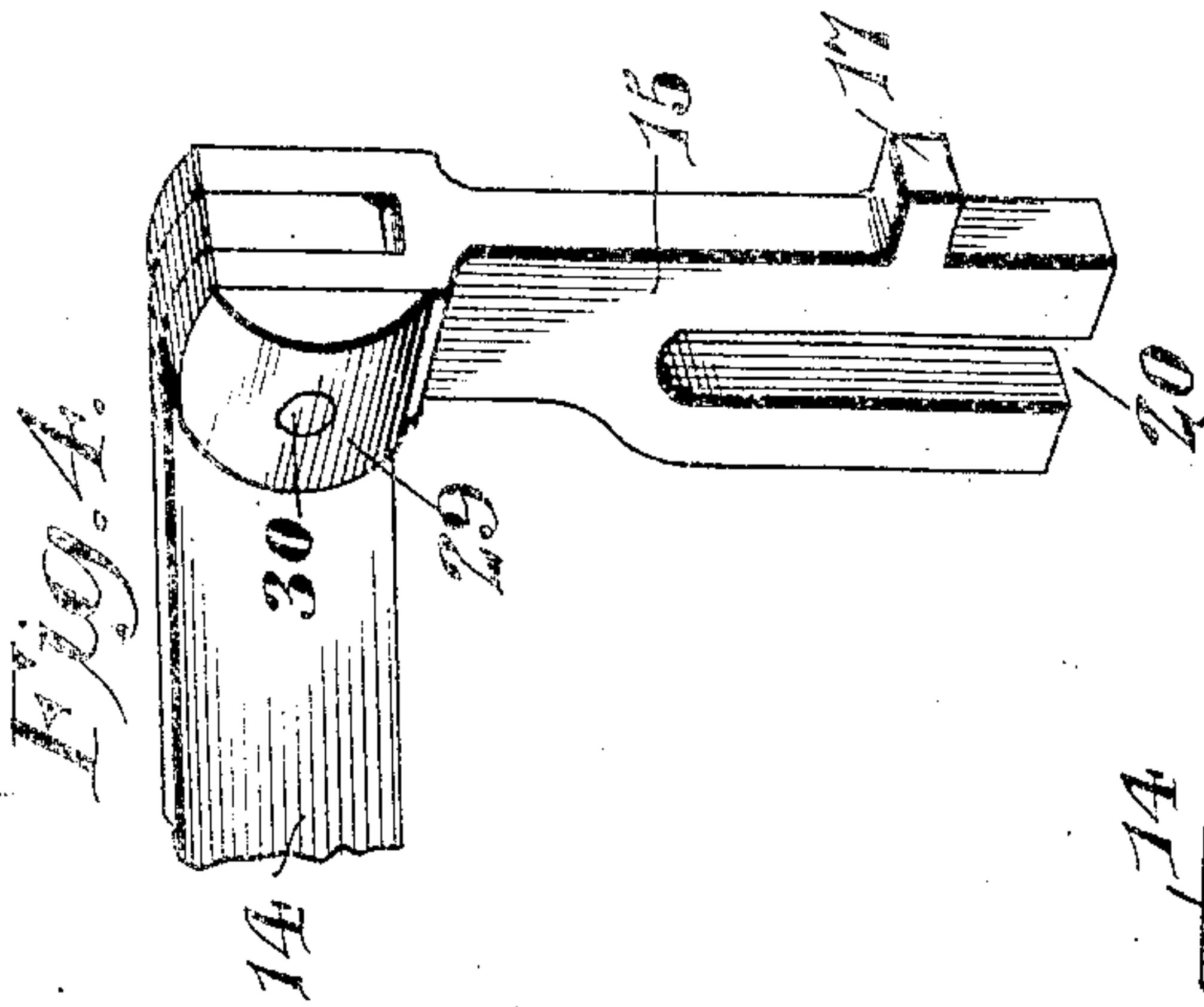
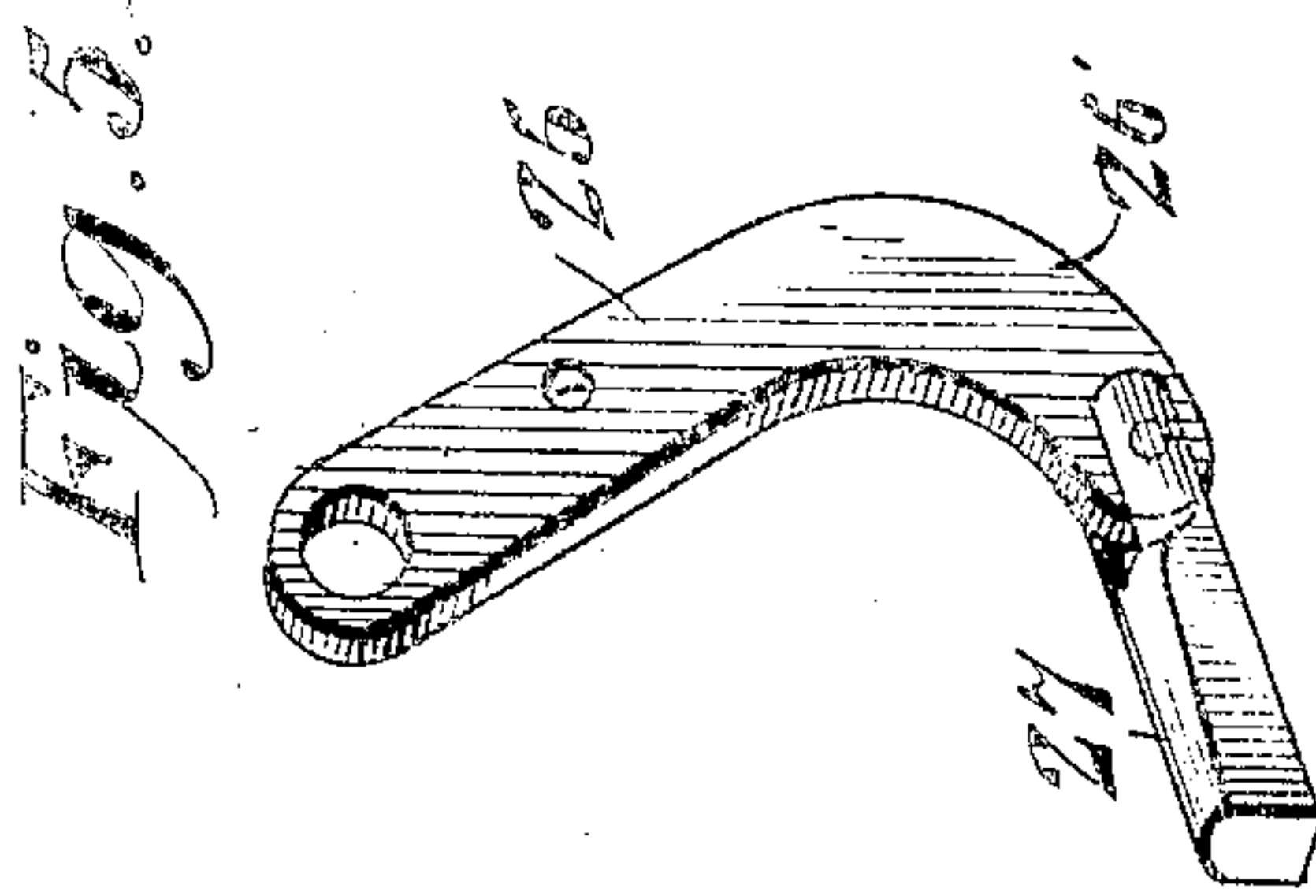
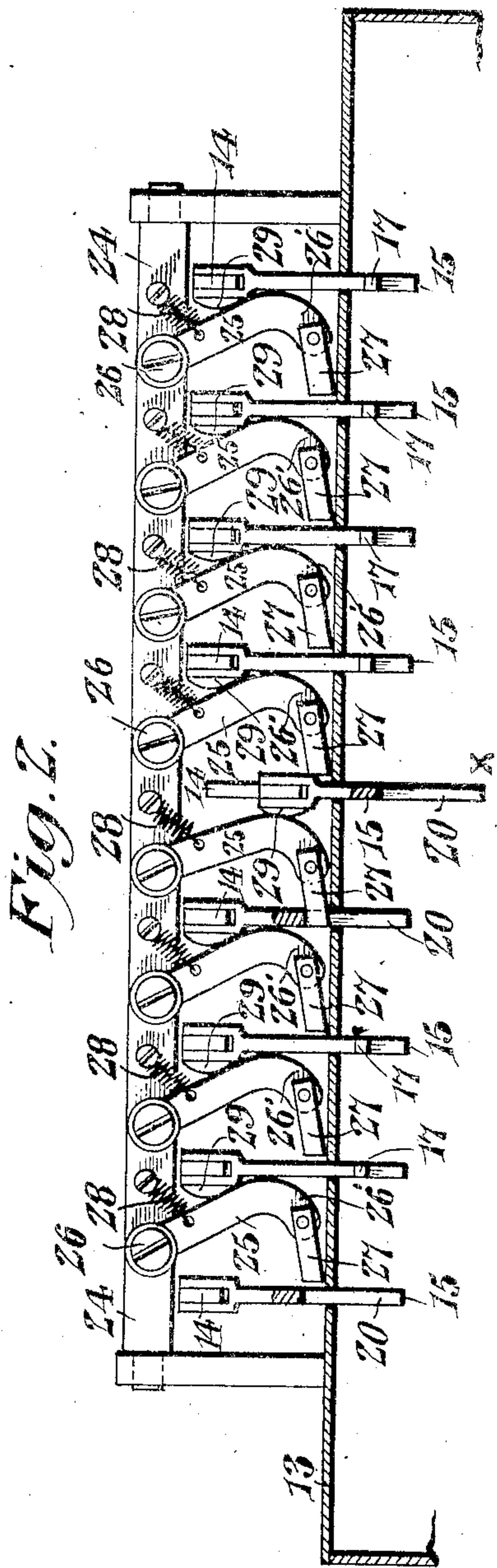
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3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

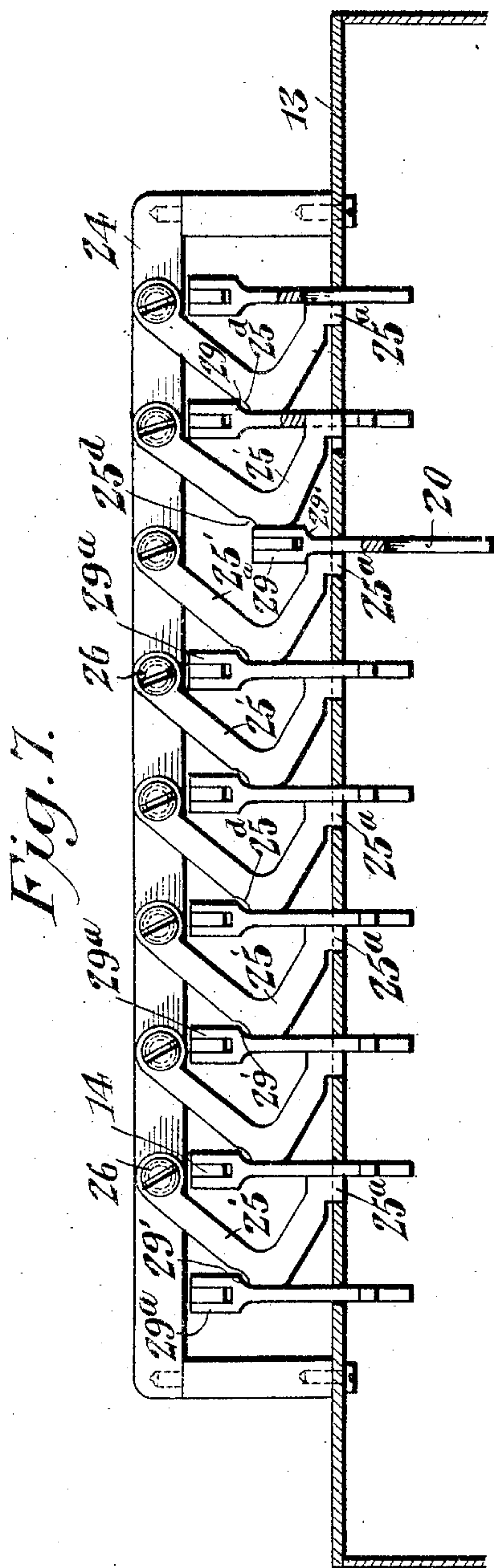
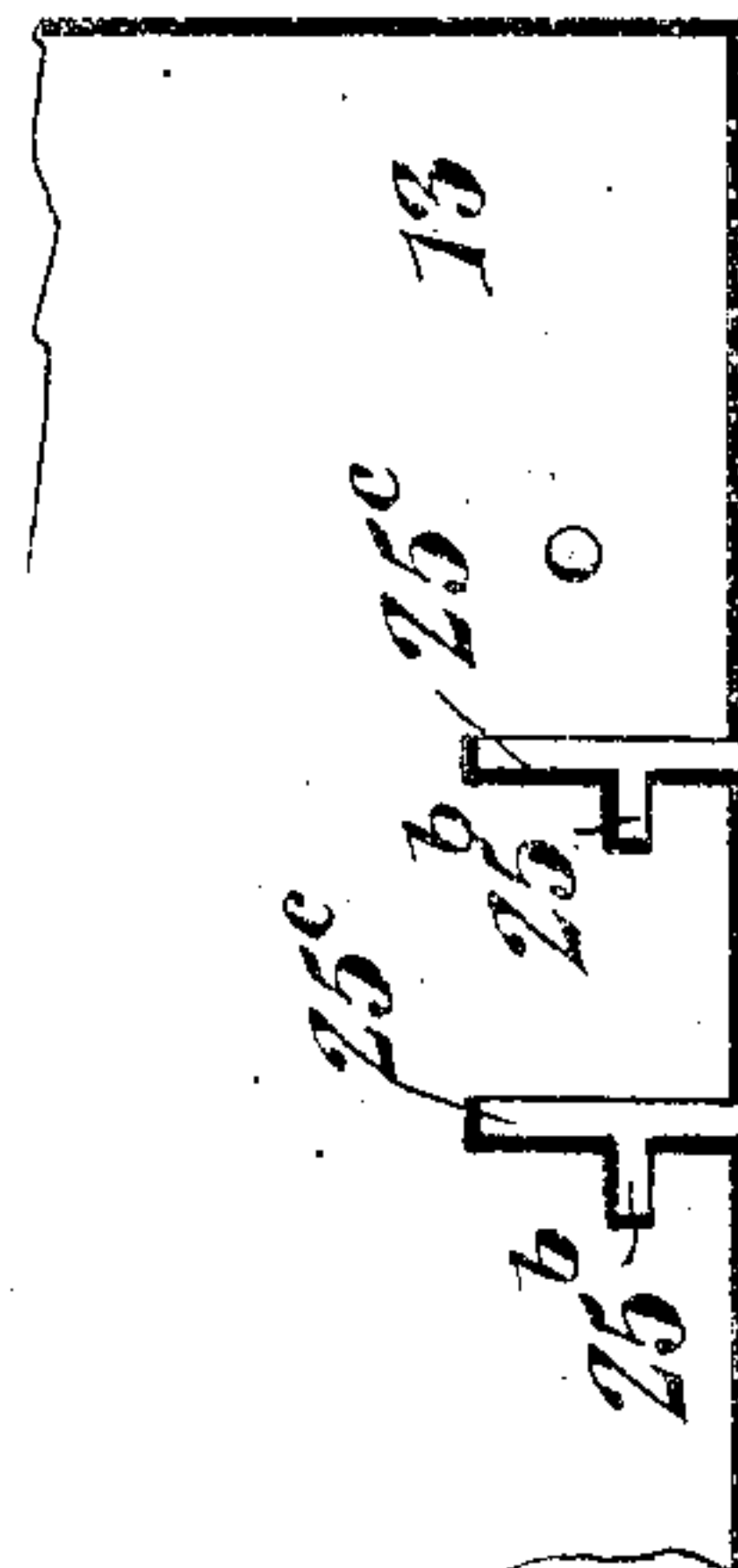
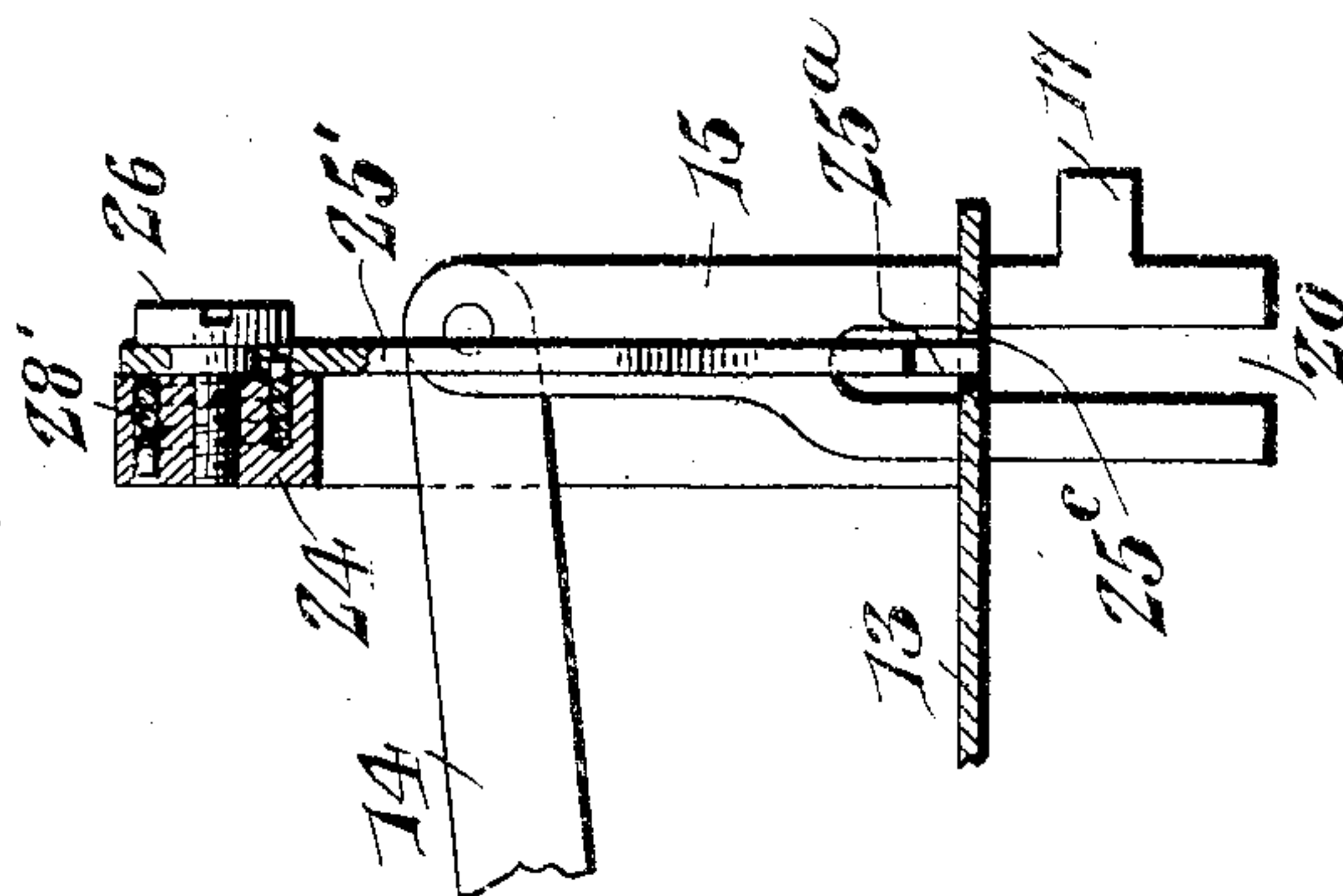
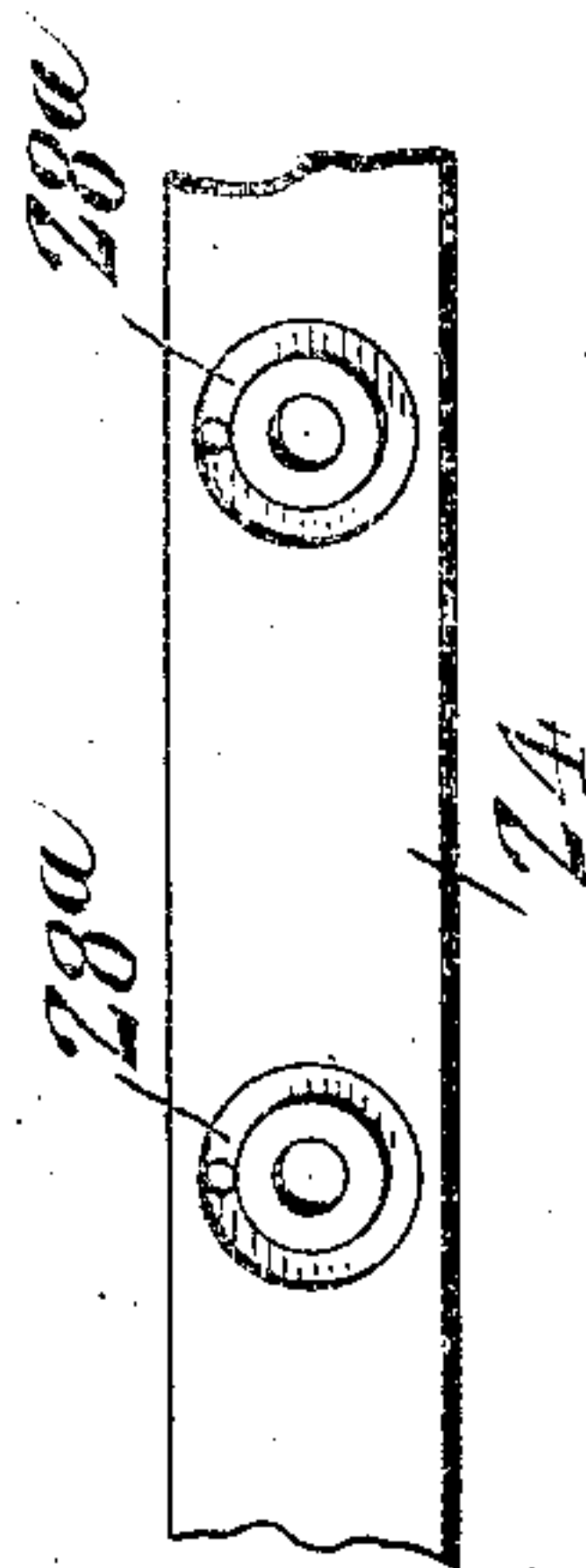
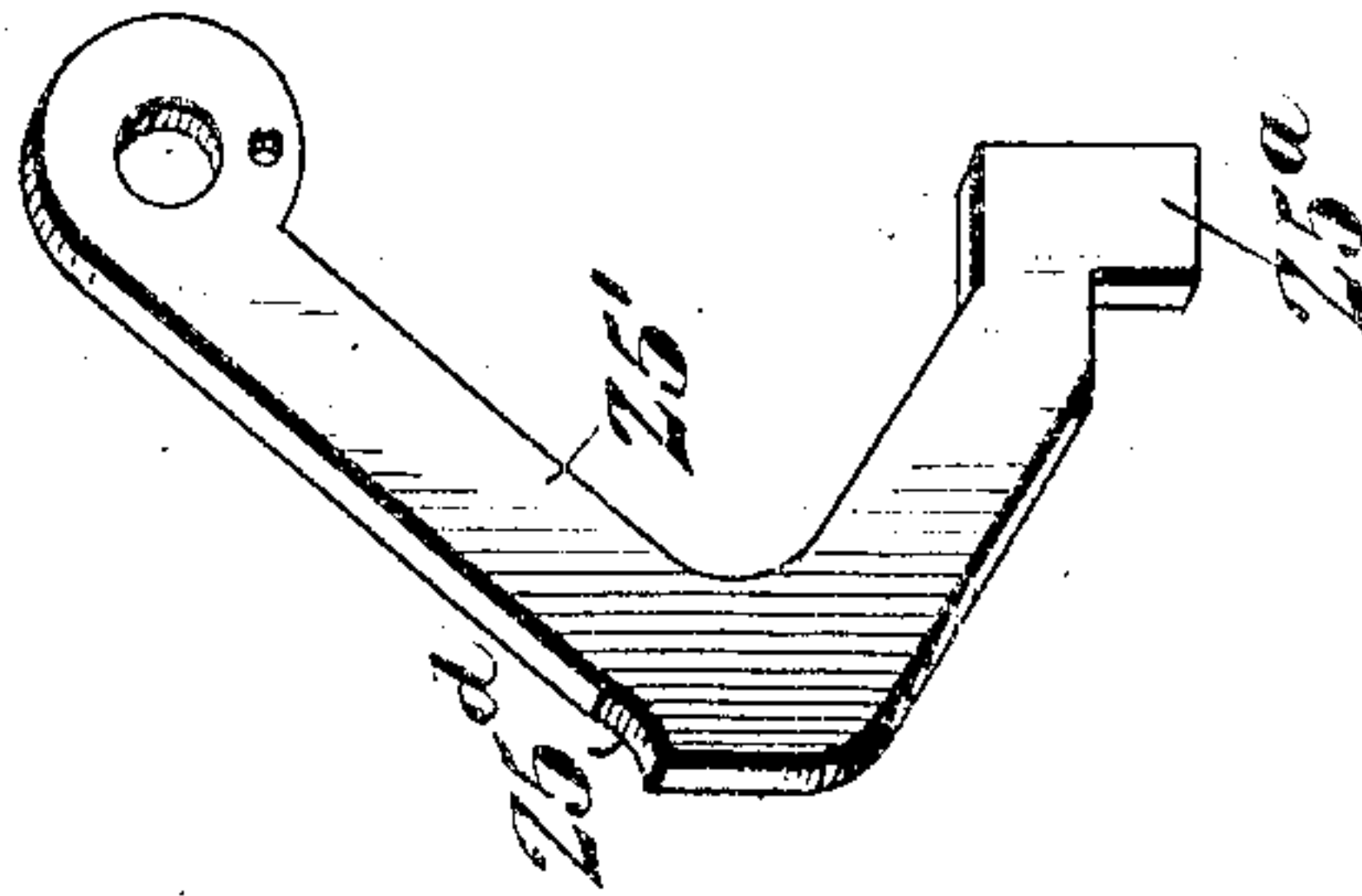


Fig. 7.



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UNITED STATES PATENT OFFICE.

CARROLL E. GREEN, OF CINCINNATI, OHIO, ASSIGNOR TO ELLIOTT-FISHER COMPANY, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE

COMBINED CALCULATING AND TYPE-WRITING MACHINE.

No. 858,650.

Specification of Letters Patent.

Patented July 2, 1907.

Application filed August 30, 1906. Serial No. 332,660.

To all whom it may concern:

Be it known that I, CARROLL E. GREEN, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented a new and useful Combined Calculating and Type-Writing Machine, of which the following is a specification.

This invention relates to key-operated machines in general, but more particularly to a combined calculating and typewriting machine wherein numeral keys operate printing and adding mechanisms, or printing mechanism alone.

It may be stated, by way of premise, that the present invention relates especially to mechanism for preventing immediately adjacent keys from being simultaneously operated. A number of ways in which this may be done have been proposed heretofore, but they have generally contemplated locking means arranged to prevent simultaneous depression of any two keys in the bank, and acting upon the depression of any single key to lock all of the other keys against depression until the operated key has been completely retracted after the completion of its operating movement. In most key-operated machines, however, the primary consideration is speed of operation, and therefore it has been ordinarily considered undesirable to guard against simultaneous depression of two keys by the employment of means which would materially retard the operation of the machine by preventing the depression of any key during the retraction of the key last operated.

In a large class of key-operated machines, as for instance, typewriters, the simultaneous partial depression of adjacent keys is immaterial, since upon noting the error, the operator may permit the keys to return to normal position before a character has been erroneously printed. In machines like the one under consideration, however, wherein the keys operate not only the writing mechanism, but the adding mechanism as well, the partial simultaneous depression of adjacent keys does constitute a material error, because the adding mechanism is operated by the erroneous actuation, and therefore the error may not be avoided by merely permitting the keys to return to their normal positions.

Having these considerations in view, one object of my invention is to provide key-locking means which will not affect the keys in any manner when the latter are depressed to operate the typewriting mechanism alone, but which will effectually prevent the simultaneous depression of adjacent keys when the latter serve as operating means for the adding mechanism.

Another object of the invention is to provide the machine with key-locking means which, while preventing simultaneous depression of any two adjacent keys, will permit the operation of any key in the bank during the retraction of the key previously operated, except the

keys which are immediately adjacent to the latter, so that, unless said last named keys are the ones to be next operated, the speed of operation of the machine will not be decreased by the presence of the key-locking means.

To the accomplishment of these objects, and others subordinate thereto, the preferred embodiments of the invention reside in those constructions and arrangements of parts to be hereinafter described, illustrated in the accompanying drawings, and succinctly defined in the appended claims.

In said drawings—Figure 1 is a sectional elevation of so much of an Elliott-Fisher billing and adding machine as is necessary for the purposes of this disclosure. Fig. 2 is a detail front elevation of the carriage cover, the key-operated links, and the cooperating locking mechanism. Fig. 3 is a sectional view of one of the locking members and its mounting. Fig. 4 is a detail perspective view of one of the links and its mounting and an associated locking cam. Fig. 5 is a similar view of one of the locking members. Fig. 6 is a detail sectional view through the upper end of one of the links, the lever from which it is suspended, and the associated locking cam. Fig. 7 is a view similar to Fig. 2, but showing a somewhat different embodiment of the invention. Fig. 8 is a sectional elevation illustrating the mounting of the locking members shown in Fig. 7 and the relation thereof to the links. Fig. 9 is a detail elevation of a portion of the supporting bar for the locking members. Fig. 10 is a detail perspective view of one of the locking members shown in Fig. 7, and Fig. 11 is a top plan view of a portion of the carriage cover used in connection with that form of the invention illustrated in the figures last preceding.

While the invention in its broader aspects comprehends key-locking means capable of being applied to any type of key-operated mechanism in which the simultaneous depression of adjacent keys is undesirable, the illustrated embodiment of the invention includes the key-locking means applied to the Elliott-Fisher billing and adding machine of commerce. This machine embraces a flat platen typewriter particularly adapted for tabulating and billing work, and an adding mechanism operated by the numeral keys of the typewriter to add the numbers recorded by the typewriter. The operating connections of the adding mechanism are adapted to be connected to or disconnected from the numeral keys so that the latter may operate both the recording and adding mechanisms, or the recording mechanism alone.

Briefly stated, the typewriter here shown embodies a machine frame 1 mounted to travel longitudinally of a flat platen 1^a for line spacing, and a carriage 2 which travels transversely of the platen on the frame 1 for letter spacing. Supported by and moving with the car-

riage is the downwardly acting recording mechanism including type bars 3 operatively connected to the numeral keys 4 by intermediate operating connections which need not be described. The carriage 2 is equipped with suitable feeding mechanism (not fully shown) controlled by the typewriter keys and arranged to advance the carriage one letter space during the retraction of the key operated.

Supported in rear of the carriage 2 by the frame 1 is an adding device or register 5 in which is mounted a series of number wheels 6 and certain other mechanism, with which the present invention is not directly concerned, the function of the wheels being to accumulate values which are automatically transferred to the wheel of next higher order when the capacity of any given wheel is reached, as is usual in adding devices. Supported by and moving with the carriage 2 to engage successive number wheels, is a master wheel 7 fixed to a master wheel shaft 8 operated from the numeral keys 4 through a series of operating connections extending between the keys and the shaft 8 and each designed to impart to the master wheel 7 rotary movement corresponding in extent to the value of its operating key. For the purpose of this disclosure one only of such operating connections is shown in Fig. 1, it being understood that the other connections are similar to the one shown, except as to the variation necessitated by the different degree of movement which each connection imparts to the master wheel. The connection shown includes a ratchet wheel 9 fixed to the shaft 8, a driving arm 10 mounted to swing loosely on the shaft, and a pawl 11 carried by the driving arm and arranged to engage and rotate the ratchet 9 when the driving arm is swung in the operating direction and to move back idly over the ratchet as the driving arm is retracted. The driving arm is geared to a lever 12 of the third class, fulcrumed at its front end in a suitable bracket fixed to the cover-plate 13 of the carriage 2.

The lever 12 is operated to swing its driving arm by a lever 14 of the second class, fulcrumed at its rear end to the cover-plate 13 and having a loose pivotal connection intermediate of its ends with the lever 12. At the front end of each lever 14 is suspended a link 15 extended downwardly through a slot 16 in the cover-plate of the carriage and provided below said cover-plate with a projection 17 engaging a notched pin 18 projecting from the stem 19 of the adjacent numeral key 4. Each link 15 is provided with a longitudinal slot 20 opening through its lower end and having its closed upper end located at a point above the plate 13. Within the slots 20 of the several links is disposed a guide bar 21 constituting an element of a swinging yoke 22 connected to a total key 23 by means of which the yoke may be swung for the purpose of shifting the links 15 laterally to disengage them from the key stems, or to engage said parts, as the case may be. The retractile movement of the links 15 is limited by a stop bar 24 located above and extended across the front ends of the levers 14, as shown in Fig. 1, and suitably supported from the carriage.

The machine as thus far described is the ordinary Elliott-Fisher machine now on the market, and it will be understood that in operation the depression of a numeral key 4 throws down a type arm to print a numeral and simultaneously moves the connected link 15 down-

wardly and thus through the intermediate lever connections causes the master wheel 7 to rotate for the purpose of adding the value of the printed digit to the amount already accumulated upon the register 5.

In accordance with my invention the stop bar 24 is utilized as a support for a series of swinging locking members or arms 25 each of which is located between a pair of the links 15 and is swung from a screw stud 26 screwed into the bar 24, see Fig. 3. Each locking member 25 has an angular lower end 26' to which is pivoted a locking plunger 27 disposed in position to enter the upper end of the slot 20 of the adjacent link 15 to the left, when the member 25 is swung in opposition to the retracting spring 28 connected at its opposite ends to the bar 24 and the member 25, as shown in Fig. 2. Normally, however, the plunger 27 is held back in an inoperative position, as shown at the right hand end of Fig. 2. In this position of the locking device the major portion of the arm 25 assumes an inclined position and extends in the downward path of movement of a locking cam 29 secured to the upper end of the adjacent link 15, at the side of the arm opposite the plunger, and preferably retained by the pintle 30 which connects the link with its lever 14. As best shown at the right hand end of Fig. 2, the outer end of the locking plunger 27 is disposed immediately adjacent to the side of a link and to the cover of the carriage, and the normal location of the upper end of the slot 20 in the link is such that while the plunger may enter the upper end of the slot and thus lock the link against depression, slight downward movement of the link will present the upper end of the slot 20 out of coincidence with the plunger and thus prevent the locking arm from moving until the link is again elevated to bring the slot and plunger into coincidence.

It follows from the described relation of the locking device and the links at opposite sides thereof, that one link can only operate while the locking device is in normal position and that the other link cannot operate without throwing the device out of normal position. Therefore it is impossible to operate two keys at the same time, because when downward pressure is exerted upon the two links the slight initial movement of the one to the left of the locking device will present the slot in said link out of coincidence with the plunger 27 before the slight initial movement of the link to the right of said device can urge said plunger into the slot. The plunger will therefore come against the side of the link to the left, and as the locking device will thus be prevented from further swinging movement, the link to the right will be locked against further depression after an almost inappreciable movement thereof. If one of the keys is depressed its initial movement effects the locking of the adjacent keys at opposite sides thereof. This is by reason of the fact that the depression of the link connected to said key (see link marked x in Fig. 2) will operate the locking device to the left to cause it to engage and lock the link to the left while the slot in the operated link is moved out of coincidence with the locking device to the right. This prevents the locking device to the right of the operated link from movement out of the path of the cam carried by the link to the right of the one operated, and as we have already seen that the link to the right cannot move without corresponding movement of the locking device engaged

thereby, it follows that the links at opposite sides of the one operated will be locked by the initial downward movement of the latter. As soon as the operated link returns to normal position the links at opposite sides thereof will become unlocked because the locking device to the left will be retracted by its spring to withdraw the locking plunger thereof from the link to the left, while the slot in the operated link will be brought into coincidence with the plunger of the locking device to the right, thus permitting said locking device to swing as the link to the right is operated. It should be noted, however, that the key locking means does not affect any keys except the ones immediately adjacent to the key operated. Therefore, any other key may be depressed while the key last operated is rising, and the speed of operation is not retarded by the key locking means, unless the key to be next operated happens to be one of the two keys locked, and in that event, the key may be depressed as soon as the key last operated returns to normal position.

In Figs. 7 to 11 inclusive, is shown a specifically different embodiment of the invention, the principal distinctions residing in the omission of the separate locking cams 29 and in forming the locking end of each locking device as an integral part of the locking arm instead of employing pivoted locking plungers, as in the construction previously described. In this embodiment the locking arms 25' are of angular form, as in the other embodiment, but are oppositely disposed. That is to say, the lower ends of these arms 25' extend to the right and terminate immediately adjacent to the side face of a link, the lower extremity of the arm being provided with a depending guide lug 25^a extended into a guide slot 25^b formed in the cover and extended laterally from the slot 25^c provided for the accommodation of the adjacent link. Instead of utilizing a separate cam 29, the angular portion or elbow of the arm 25' is extended under one of the cam-shaped shoulders 29' formed by the lower edge of the forked or bifurcated upper end 29^a of the adjacent link to the left. In order to secure a somewhat abrupt working face opposite the cam 29', the arm 25' is provided with a notch, as indicated at 25^d. In this embodiment of the invention the arrangement of the arm retracting springs 28 is also modified. The bar 24 is provided with annular spring sockets 28^a concentric with the screw studs 26 and in these sockets torsion springs 28' are located and secured at their opposite ends to the bar 24 and to the adjacent arms 25', see Figs. 8 and 9. By this arrangement the retracting springs are completely housed within the bar instead of being exposed as in the form of the invention previously described. As will be seen by reference to Fig. 7 of the drawings, the operation of the latter form of the invention is precisely like that of the first form described, the structural variations having been effected for facility of manufacture by reducing the number of working parts and simplifying the manner of mounting the same in the interest of economy and durability.

It is thought that from the foregoing, the construction and operation of the invention will be clearly comprehended, but while the constructions herein shown and described are thought at this time to be preferable, I reserve the right to effect such changes, modifications, and variations of the illustrated structures as may come fairly within the scope of the protection prayed.

What I claim is:—

1. The combination with two keys, of a locking device operated by one key to lock the other or second key, and means effective upon the initial movement of the second key to prevent the movement of the locking device from its normal position during continued movement of said second key. 70
2. In a key-operated machine, the combination with a series of keys and a series of key-operated members having locking faces intermediate of their ends, of a swinging locking device located between each pair of members and cooperating with the locking faces thereof, said locking devices being movable upon the initial movement of one member to engage and lock the other member and to hold the same locked during continued movement of the member operated. 75
3. In a key-operated machine, the combination with a series of keys and a series of parallel key-operated members having locking faces located intermediate of the ends thereof, a locking device between each pair of members and having its lower portion in cooperative relation with the locking faces thereof, said locking device being pivoted at its upper end and being operated by the initial movement of one member to engage and lock the other member and to hold the same locked during continued movement of the member operated. 80
4. In a key-operated mechanism, the combination with two keys, of a locking device normally in position to interfere with the operation of one key and movable by said key to lock another key, and key-operated means for positively preventing said locking device from being moved out of normal position during the operation of said other key. 85
5. In a key-operated mechanism, the combination with a series of keys, of locking means normally disposed in cooperative relation with the keys, and means whereby the locking mechanism will be rendered inoperative. 100
6. In a key-operated mechanism, the combination with a series of keys, of locking mechanism movable into or out of cooperative relation with the keys arranged in one position to prevent the simultaneous depression of two keys. 105
7. In a combined typewriting and adding machine, the combination with writing mechanism, adding mechanism, and operating keys adapted to operate one or both of said mechanisms, as desired, of locking means effective to prevent the simultaneous depression of adjacent keys when the latter are arranged to operate both the writing and adding mechanisms and ineffective when the keys are arranged to operate one only of said mechanisms. 110
8. In a combined typewriting and adding machine, the combination with writing mechanism and a computing device, of a series of keys, a series of operating connections between the keys and the computing device, means for preventing the simultaneous operation of adjacent operating connections, and means for disconnecting the operating connections from the keys. 115
9. The combination with a computing device, of operating keys therefor, operating connections between the keys and the computing device including a series of slotted members, and key-operated locking devices arranged to engage said slotted members. 120
10. The combination with an adding device, of a series of operating keys therefor, operating connections between the keys and the computing device, said connections including a series of members movable into and out of engagement with the keys and also independently movable with the keys, and means associated with said members and arranged to prevent the simultaneous operation of adjacent members by the keys. 125
11. In a key-operated machine, the combination with a series of keys, and a series of parallel key-operated members, of a locking device located between each pair of members and cooperating with said members at points intermediate of the ends thereof to permit the operation of either member and to prevent the simultaneous operation of both members. 130
12. In a key-operated machine, the combination with a series of keys, of a series of slotted members operated by the keys, and key-operated locking devices cooperating 135

with said slotted members to prevent simultaneous operation of adjacent keys.

13. In a key-operated machine, the combination with a key, of a member operated thereby and having an opening, a locking device, and a second key arranged to effect relative movement of the locking device and member to cause their engagement and the consequent locking of the key first named.

14. In a key-operated machine, the combination with a key, of a member operated thereby and having an opening, a locking device, and a second key arranged to move the locking device into the opening of said member to lock the key first named.

15. In a key-operated machine, the combination with a key, of a member operated thereby and having an opening, a locking device normally disposed in interfering relation with said key, a second key, a second member operated by the second key and having an opening normally arranged opposite the locking device, a third key, and a second locking device normally in interfering relation therewith and disposed opposite the opening in the first named member, whereby the depression of the first key will cause the first locking device to be moved into engagement with the opening in the second member, and will cause the opening in the first member to be moved out of coincidence with the second locking device to prevent the latter from moving out of interfering relation with the third key.

16. In a key-operated machine, the combination with two keys, of a member operated by one of the keys and having an opening, and a locking device in interfering relation with one key and movable thereby into the opening in the member operated by the other key, whereby the operation of one key will move the locking device into the opening in the member operated by the other key, or, whereby the operation of the last named key will prevent the movement of the locking member out of normal position by presenting the opening in the key-operated member out of coincidence with the locking device, and whereby the simultaneous depression of the two keys will be prevented.

17. In a key-operated machine, the combination with two keys, of two parallel members arranged to be operated by the respective keys, each of said members having a

stop face, a locking device located between the adjacent side faces of the members and normally in interfering relation with the stop face of one member and arranged to be moved by said member into interfering relation with the stop face of the other member, said last named member serving when moved from its normal position to lock the locking device in the normal position thereof, whereby the depression of one key will operate the locking device while the operation of the other key will merely lock said device against movement.

18. In a key-operated machine, the combination with two keys and two key-operated members each provided with a locking face, and a locking device pivoted at its upper end and movable to present its lower end in engagement with the locking face of one of the members, the locking face of the other member being in cooperative relation with the locking device at a point intermediate of the ends of the latter.

19. In a key-operated machine, the combination with two keys, and two key-operated members, of a locking device of angular form pivoted at its upper end and having its lower end movable into engagement with one of the members by the cooperation of the other member with the angular or elbow portion of the locking device.

20. In a key-operated machine, the combination with a series of keys and a series of key-operated members having openings, of a supporting bar, and a series of angular locking devices pivoted at their upper ends to said bar, each of said devices being disposed to be moved by one member to engage the opening in an adjacent member.

21. In a key-operated machine, the combination with a pair of keys and a pair of key-operated members, of a locking device pivoted at one end and movable by one member to engage the free end of said device with the other member, and guiding means for the free end of the locking device.

In testimony, that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

CARROLL E. GREEN.

Witnesses:

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J. T. JEMISON.