

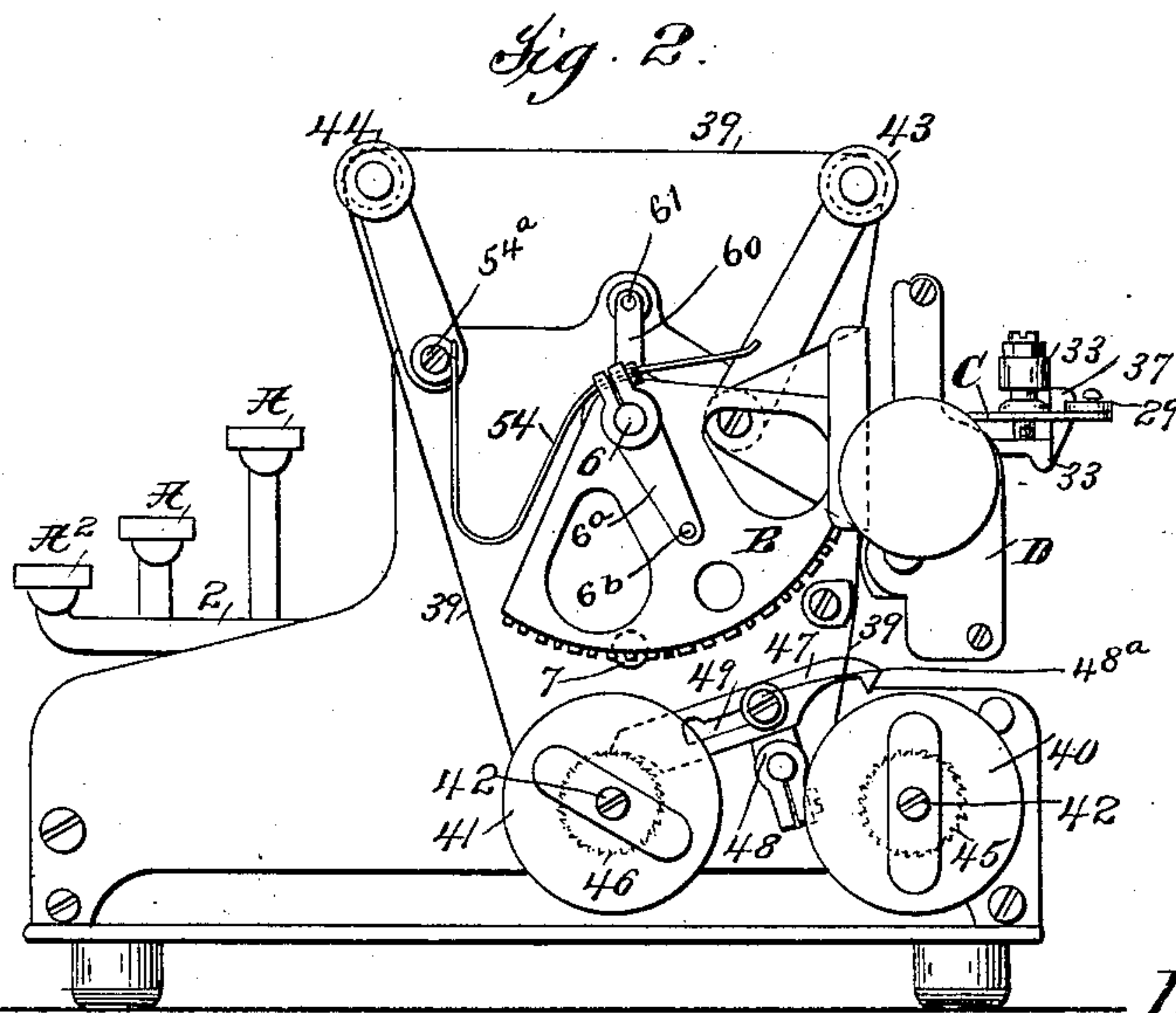
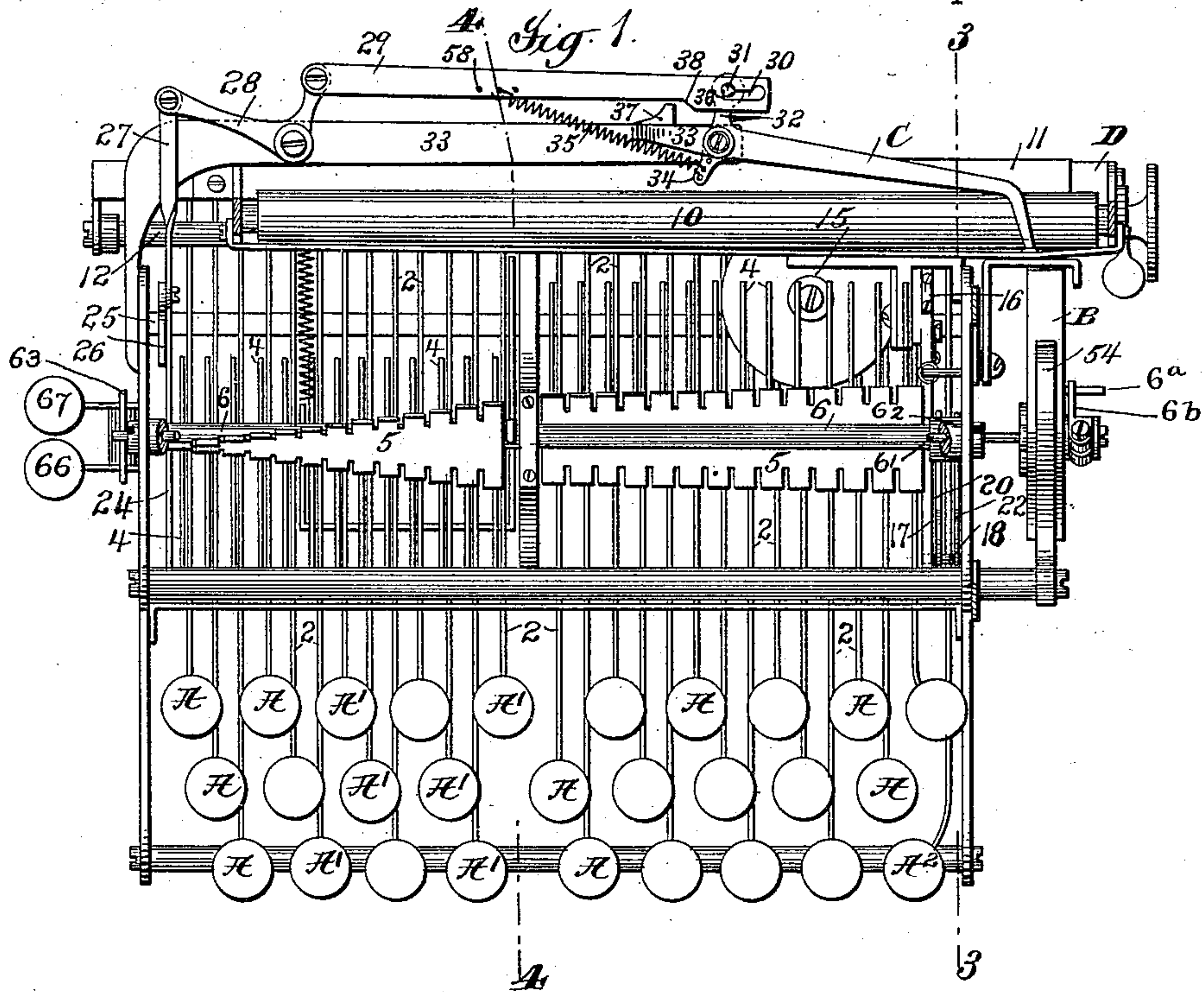
(No Model.)

3 Sheets—Sheet 1.

W. H. WHITEMORE.
TYPE WRITING MACHINE.

No. 538,308.

Patented Apr. 30, 1895.



Attest:
J. Kennedy
T. F. Kehoe

Inventor:
William Henry Whittemore
By Philip Munson Phelps

Attys

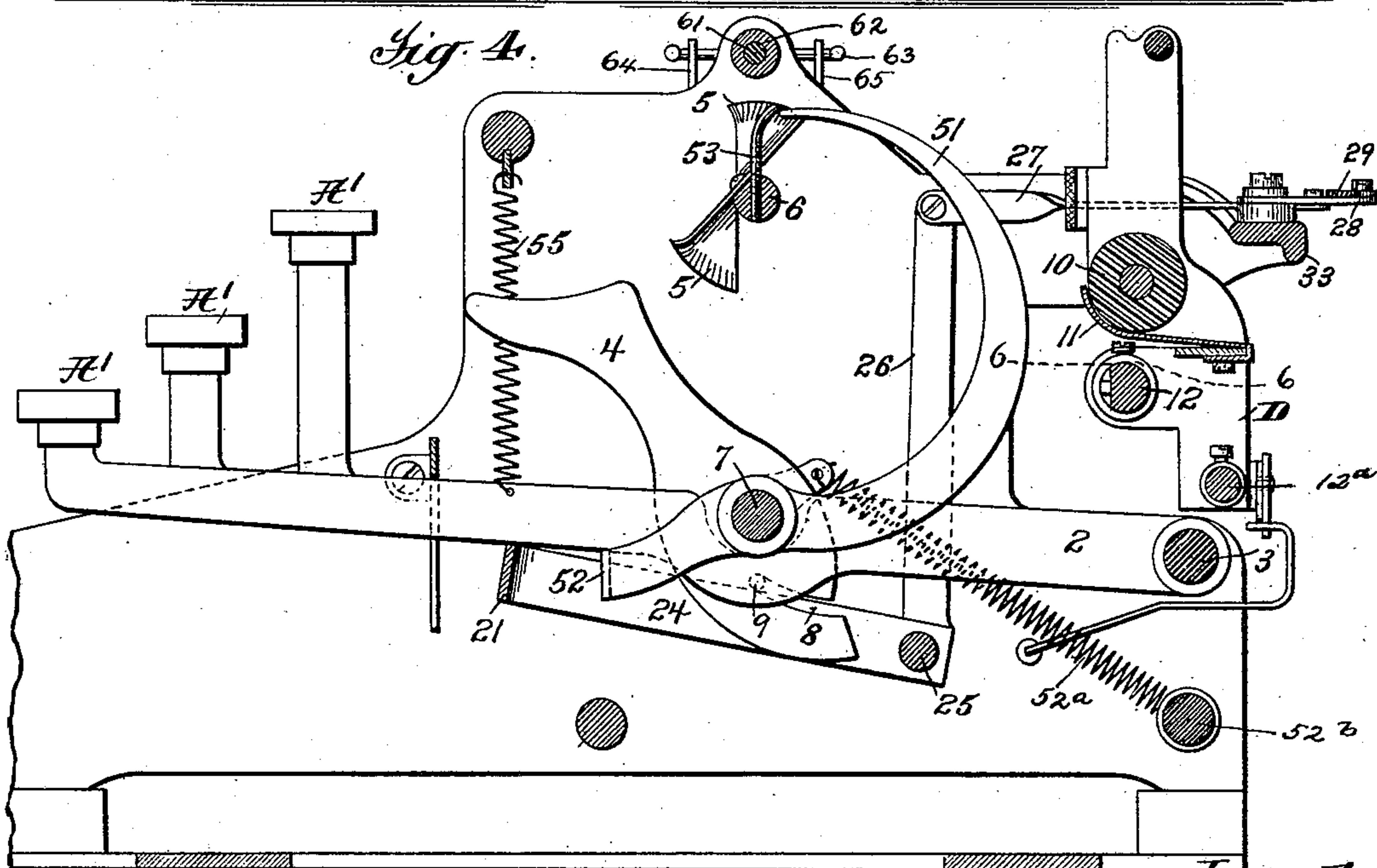
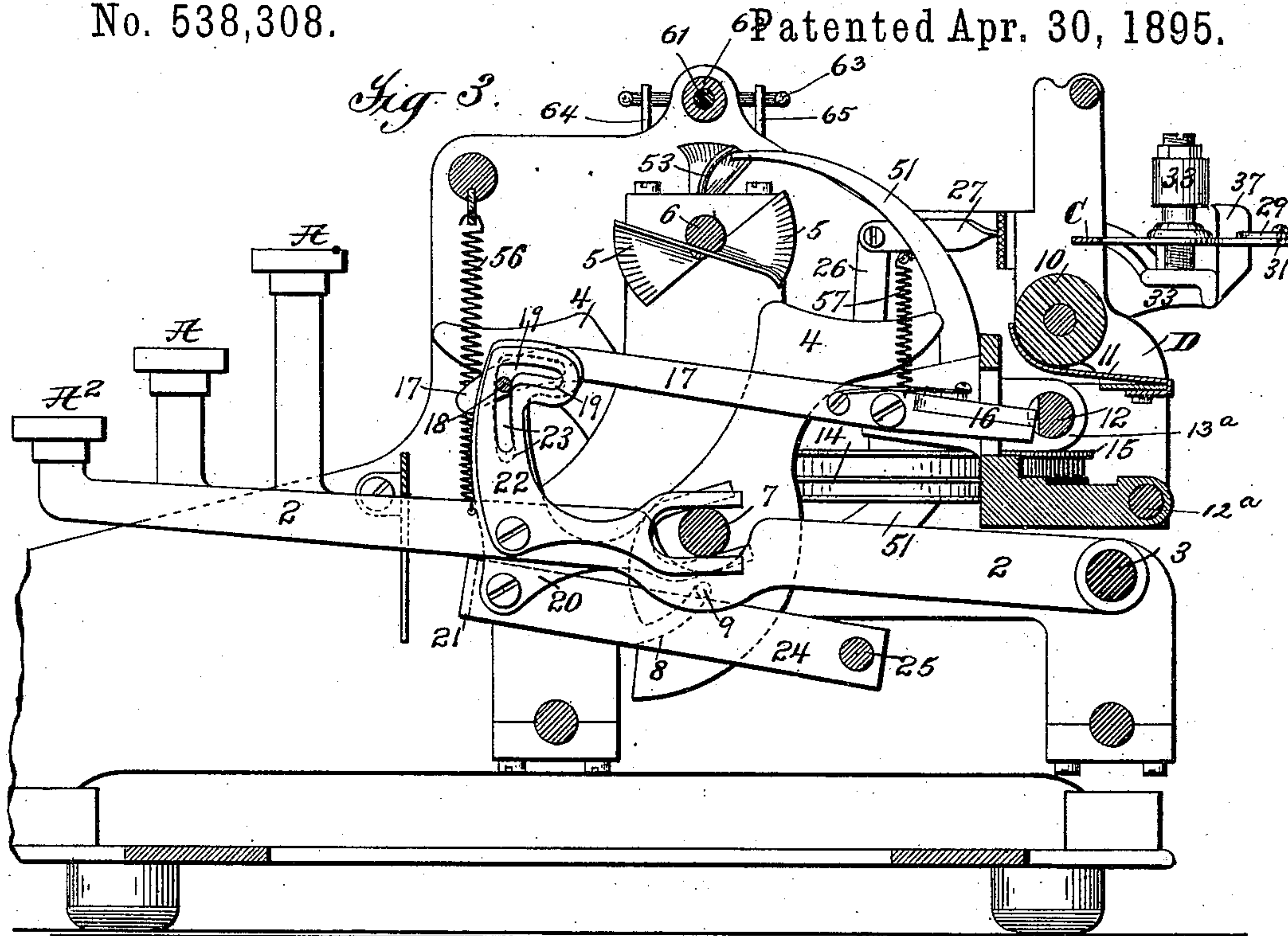
(No Model.)

3 Sheets—Sheet 2.

W. H. WHITTEMORE.
TYPE WRITING MACHINE.

No. 538,308.

Patented Apr. 30, 1895.



Attest:
J. H. K. K.
O. F. K. K.

Inventor
William Henry Whittemore
By *Philip Munsie Phelps*
Att'y

(No Model.)

3 Sheets—Sheet 3.

W. H. WHITEMORE.
TYPE WRITING MACHINE.

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Fig. 5.

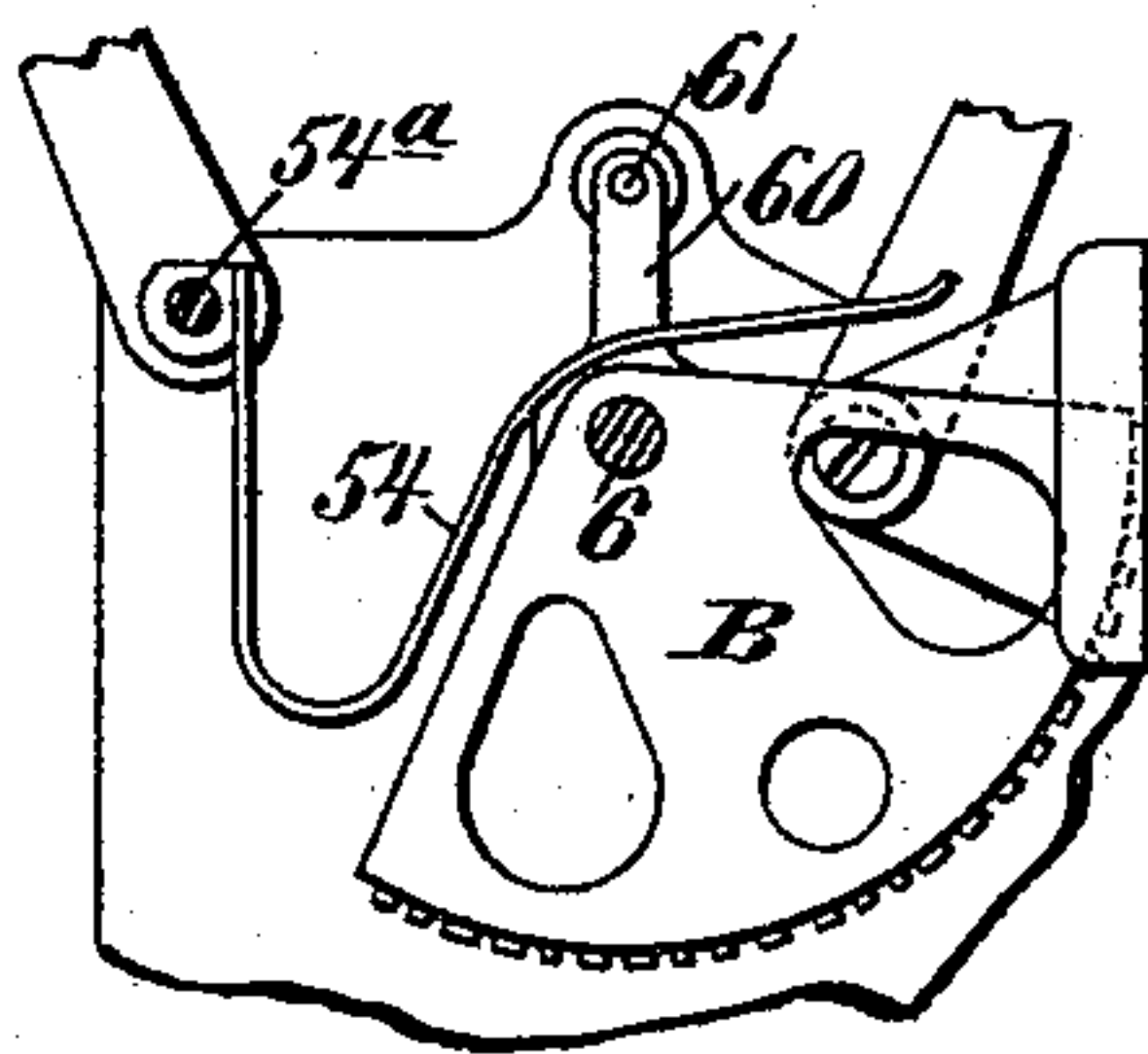
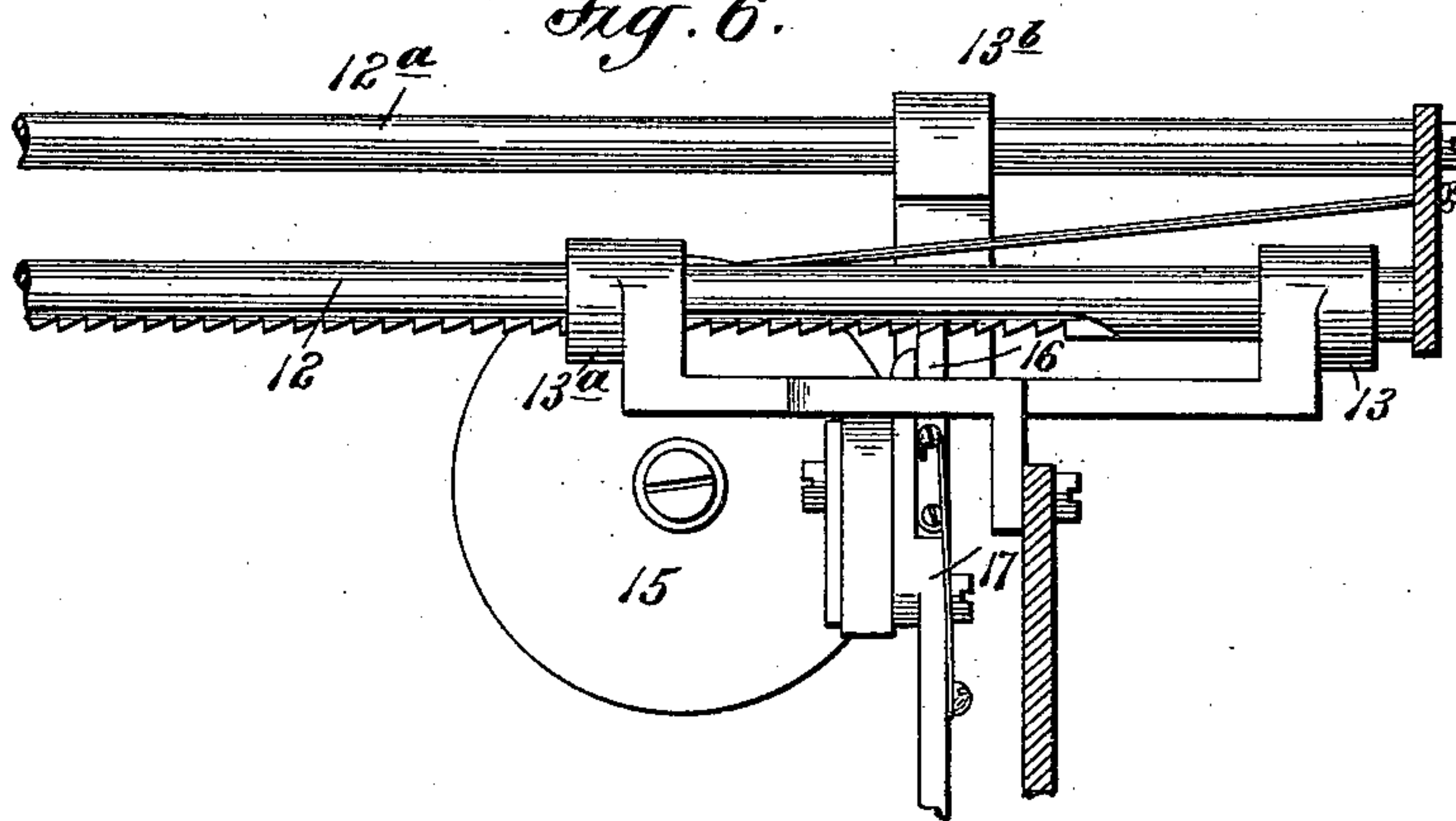


Fig. 6.



Attest:

J. Kennedy
Geo. H. Bots

Inventor:

William H. Whittemore
by Philip Munson & Phelps
Attys

UNITED STATES PATENT OFFICE.

WILLIAM HENRY WHITTEMORE, OF NEWARK, NEW JERSEY, ASSIGNOR TO
CHARLES C. HINE, OF SAME PLACE.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 538,308, dated April 30, 1895.

Application filed April 26, 1894. Serial No. 509,112. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM HENRY WHITTEMORE, a citizen of the United States, residing at Newark, county of Essex, and State of New Jersey, have invented certain new and useful Improvements in Type-Writing Machines, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to improvements in that class of typewriters in which type wheels or segments and a hammer coacting therewith are employed for making the impression as distinguished from those machines employing type bars.

In machines of this class in which position plates connected to the type wheel shaft are employed, which are engaged and operated by deflectors actuated by the key levers to move the type wheel or segment to position for the impression, the type wheels or segments have heretofore been movable in both directions for the impression. It has been found desirable to substitute in such machines for such type wheel or segment, a type wheel or segment movable in but one direction for the impression, but certain difficulties, hereinafter referred to, have been encountered in adapting such a wheel or segment to such a machine, which it is the object of the present invention to overcome. In such machines also where a spring has been employed for actuating the hammer, the sole function performed by the spring was that of actuating the hammer for the impression, the force of the spring, after the impression, being wasted. It is the object of the present invention to utilize this force for the operation of the other parts of the machine which have heretofore been provided with additional special springs for this purpose; thus dispensing with these special springs and, as such spring mechanism has to be put under tension by the depression of the keys, easing the action of the machine.

The invention has also for its object the provision of a spring for returning or aiding the return to normal position of the type wheel or segment after the impression, which spring is so positioned with relation to the wheel or segment as to offer no resistance or

no appreciable resistance to the wheel or segment during the first part of its movement to impression position, its resistance being reserved until after the movement of the wheel or segment is well begun. The wheel or segment will, therefore, acquire a certain amount of momentum so that whatever resistance occurs is not perceptible to the operator on depressing the keys.

In the accompanying drawings, Figure 1 is a plan view of the machine. Fig. 2 is an end view looking to the left of Fig. 1. Fig. 3 is a section on the line 3, 3 of Fig. 1, and Fig. 4 is a section on the line 5, 5 of said figure. Fig. 5, is a detail of the type segment and the spring for returning it to normal position after the impression. Fig. 6 is a horizontal section on the line 6, 6 of Fig. 4 illustrating a portion of the paper carriage and the mechanism for guiding and supporting it in the machine.

Referring to said drawings, A, A' represent the type keys and A² the space key of the machine; B, the type wheel or segment; C, the hammer coacting with the type wheel or segment to make the impression, and D the paper carriage. Each type key is provided with a lever 2 extending from the front to the rear of the machine and there fulcrumed upon a shaft 3 extending transversely across the machine. For each key lever there is provided an arm 4 known as a "deflector," and for each deflector there is provided a position plate 5 secured tangentially to a shaft 6 extending across the machine, upon one end of which shaft is mounted the type wheel or segment B bearing upon its edge the type (arranged in vertical rows) to be impressed upon the paper.

The segment B is connected to the shaft so as to rotate therewith by means of a pin 6^a entering an opening in the end of a lug 6^b rigidly secured to the shaft 6; the connection between the pin 6^a and lug 6^b being such as to permit lateral movement of the segment when desired to bring different rows of type characters to position for the impression.

The several deflectors are the same in construction, and in normal position their upper faces, which engage the position plates, lie in the same horizontal plane. Their respective

position plates, however, in their normal positions, are angularly arranged with relation to the deflectors and at different angles with relation to each other so as to be moved and
 5 when thus moved, through the shaft 6, move the type wheel or segment B varying distances in accordance with the particular key depressed so as to bring to the point of impression opposite the head of hammer C the
 10 proper type represented by that key.

The type wheel or segment B and its shaft and the various position plates are movable by the deflectors 4 in but one direction, namely, upwardly, for the impression. The
 15 several deflectors 4 are fulcrumed upon a shaft 7 extending across the machine above the key levers and each deflector is provided at its lower end with a cam slot 8 in which works a pin 9 secured to its key lever.

20 The deflectors for the keys at the right hand side of the machine are arranged in the rear of their position plates, so that upon the depression of their keys they are moved upward and toward the front of the machine; while
 25 those at the left hand end of the machine are arranged in front of their position plates, so that when their key levers are depressed these deflectors are moved upwardly and toward the rear of the machine.

30 The paper to receive the impression is carried by a paper feed roll 10, mounted in carriage D, and a spring pressed tension plate 11 between which and the feed roll the paper is fed. The carriage is further provided with
 35 a rack bar 12 below the feed roll traveling in guides 13 13^a in the frame of the machine. The carriage is supported and guided in the machine by the guides 13, 13^a embracing the rack bar 12 and a lower guide 13^b embracing
 40 a cross bar 12^a in the lower portion of the carriage frame, as best shown in Fig. 6. The carriage D has connected to it one end of a cord 14 wound upon a drum 15 containing a coiled spring. The movement of the carriage is controlled in the usual way by a split pawl 16 engaging the rack bar 12 and carried by a lever
 45 17 fulcrumed in the frame and extending toward the front of the machine where its forward end is provided with a pin 18 working
 50 in a slot 19 in the upwardly extending arm of a bell crank lever 20, the elbow of which is fulcrumed loosely in a bail 21 extending across the machine beneath and common to all the key levers so as to be depressed thereby. The
 55 lower or horizontal arm of the lever 20 is bifurcated and straddles some stationary part of the machine, preferably the shaft 7, as shown, so that as the bail 21 is depressed by a type key lever the lever 20 is moved downwardly with it and swung or rocked thereon
 60 by the shaft 7, the forward end of lever 17 being rocked downwardly thereby, its pin 18 during this movement traveling from the forward to the rear end of the transverse slot 19.
 65 Upon the return to normal position of bail 21 the pin 18 being engaged by the lower face of slot 19 the lever 17 is returned thereby to

normal position. This return movement of bail 21 has heretofore been accomplished by a spring specially provided for the purpose 70 but in the present case this spring is omitted and the return of the bail and lever 17 is accomplished by the hammer spring as will hereinafter appear. The lever 17 is connected also similarly by its pin 18 to a similar bell 75 crank 22 fulcrumed in the "space" key lever A², so that upon the depression of that key a like movement of the carriage results. As upon the depression of the space key A² the lever 20 does not move therewith, said lever is 80 provided with a longitudinal slot 23 in which the pin 18 moves when the space key is depressed, and as the lever 22 does not move with the bail 21 said lever is for the same reason provided with a similar slot 23. 85

The bail 21 just referred to is provided with arms 24 extending toward the rear of the machine, which are each connected to a rock shaft 25 journaled in the frame of the machine, and which is provided with a vertical 90 arm 26 rigid with the shaft 25 connected by a link 27 with the one end of a bell crank 28 fulcrumed on a vertical axis in the upper face of the rear frame of the machine. To the opposite end of this bell crank is connected one 95 end of a longitudinally movable latch plate 29, the free end of which is provided with a slot 30 receiving a pin 31 on the short arm 32 of the hammer lever C which is of double bell crank form and is fulcrumed in a bracket 33 100 in the frame of the machine and upon the operation of any one of the keys is adapted to be rocked on its shaft to and from the type wheel or segment B. To the other short arm 34 of the hammer lever is connected a spiral 105 spring 35, the opposite end of which is connected to the plate 29 for operating the hammer to make the impression. At the forward end of the slot 30 the plate 29 is provided with a shoulder 36 which is held normally, 110 while the plate 29 is at rest and during the major part of its longitudinal movement upon the depression of a key, in engagement with the pin 31. While the plate 29 is at rest the head of the hammer C lies close to but not 115 in contact with the wheel B. As the plate is moved longitudinally, the shoulder 36 and pin 31 being in engagement, the hammer lever is swung on its fulcrum, thus moving the hammer head away from the wheel or seg- 120 ment against the tension of spring 35. To effect the disengagement of shoulder 36 and pin 31 and thus permit the spring to actuate the hammer, the plate 29 is capable of movement transversely and is thus moved by a cam 125 37 on the bracket 33, which during the latter part of the longitudinal movement of plate 29 engages a similar cam 38 on the latter and forces the plate 29 outward transversely against the tension of spring 35 which resists 130 such movement. When the plate is thus moved outwardly, the shoulder 36 is disengaged from pin 31 which then enters the slot 30, thus permitting the spring 35 to rock the

hammer C on its fulcrum and throw its head inwardly toward and against the type, with the paper between it and said type, thus making the impression, the pin 31 during this movement of the hammer lever traveling along the slot 30 toward the opposite end thereof where it remains until the plate 29 is returned to normal position when the shoulder 36 re-engages pin 31.

The return to normal position of latch plate 29 is accomplished by spring 35, the whole force of which is not expended in actuating the hammer, and through the connections already described, between the plate 29 and bail 21, the latter and the mechanism connected therewith, namely the carriage feeding mechanism and rock shaft 25, are also simultaneously returned to normal position by the same spring.

The inking mechanism consists of a ribbon 39 wound upon drums 40, 41, journaled on studs 42, projecting from the side frame of the machine. From the drum 40 the ribbon passes upwardly in front of the type wheel or segment B and between it and the hammer lever C, thence over guide pulleys 43, 44 and downwardly to the other drum 41. Each drum is provided on its inner face with a ratchet 45, 46 respectively each adapted to be engaged, to rotate the drums, by an adjustable double ended pawl 47 carried by an arm 48 projecting from the rock shaft 25 and provided with a pin 48^a entering a longitudinal slot 49 in the pawl, so that, upon each depression of a key, said rock shaft being rocked by the bail 21, will similarly rock the arm 48 and pawl 47 to rotate that one of the drums 40, 41 with which the pawl is then in engagement. The pawl 47 is provided with a knob by which it may be moved into engagement with either of the drums 40, 41 to change the direction of feed, the pawl when thus moved being held in engagement with the ratchet of the drum by gravity. Upon the release of the key depressed, the arm 48 and pawl 47 will be returned to normal position by rock shaft 25 which, as before stated, is so returned itself by the hammer spring 35 when the next key is depressed.

From the foregoing it will be seen that the spring 35, in addition to its function of actuating the hammer, also performs the functions of returning to normal position the carriage feeding mechanism and the ribbon feeding mechanism. This is a feature of importance, particularly in the case of the carriage feeding mechanism, as in previous constructions the force of the hammer springs, which have necessarily been of considerable strength in order to secure the required force for the impression, has been wasted after the impression, while in the present case, this force is utilized for performing the additional functions referred to, which have heretofore been performed by special spring mechanism provided for that purpose. As the hammer of spring 35 in the present case need not be and

is not necessarily of increased strength because of the additional functions performed by it, the omission of this special spring mechanism has, aside from the saving in cost of construction resulting therefrom, the very important advantage that it renders the action of the machine much easier because in depressing a key there are less springs to be put under tension by the operator.

In machines of the class illustrated the type wheels or segments heretofore usually employed have been movable by the deflectors in both directions for the impression, and the position plates consequently were likewise adapted to move in both directions for the impression. In the present case, however, as before stated, the segment B is intended to be movable in but one direction for the impression, namely, upwardly, and the movement of the position plates for the impression by their deflectors is similarly limited to one direction. In adapting a type wheel or segment and position plates to such movement, however, it has been found difficult where a full bank of keys is employed, to accommodate the required number of position plates so as to be properly engaged by their deflectors to insure such a movement in one direction, as some of the position plates would occupy such position with reference to their deflectors that they would bind or lock together. To overcome this difficulty I provide means independent of the deflectors and operative by a few of the keys for starting or initiating the movement of the position plates of these keys, so as to cause them to take up proper positions for engagement by their deflectors by which their movement thus initiated is then continued and completed. This mechanism is illustrated in the drawings in what is considered its simplest and therefore most preferred form, and consists of an arm 51 carried by a bail 52 fulcrumed on the shaft 7 and adapted to engage and to remain in engagement for a limited time with a pin 53 projecting from the type wheel shaft 6. The bail 52 is located beneath levers 2 of those keys lettered A' and like the bail 21 upon each actuation of these key levers is depressed by the levers, thus throwing the arm 51 forward and, through the pin 53 in engagement with said arm 51, rocking the shaft 6 slightly on its axis. The arm 51 and pin 53 become disengaged before the required movement of the shaft is accomplished, but before such disengagement or simultaneously therewith, the deflector of the key lever which is being depressed (which is raised simultaneously by its key lever) comes into engagement with its position plate and completes the movement of the shaft and type segment.

The return movement of segment B to normal position is accomplished upon the release of the depressed key, after each upward movement of segment B to position for the impression, by its own weight aided by a spring 54 secured at 54^a to the frame of the machine

with its free end in the path of movement of the segment for the impression. The spring 54 is so located with reference to the segment that during the first part of its movement for the impression, its free end is out of contact with the segment and thus offers no resistance thereto, such resistance as it does offer occurring only after the segment has acquired such momentum that the resistance will be inappreciable at the keys. When the key depressed is released, the spring will aid the weight of the segment in returning the segment to normal position, accelerating its movement and thus securing a quick return. The spring will preferably be connected to the frame of the machine and the resistance of the spring will preferably be exerted directly on the segment. A light flat spring, such as shown, and actually cut off contact with the segment, will also preferably be employed but other forms of spring suitable for the purpose may be substituted. The point at which resistance will occur also may be varied according to the requirements of each case so long as no substantial resistance occurs during the first part of the movement of the segment. If a very light spring be employed, it may approach more nearly to the segment.

Each of the type keys A, A' is provided with a light spring 55 for returning it to normal position when released after having been depressed. The space key A² is also provided with a similar spring 56 but of greater strength than the springs 55 because of the additional work, viz: returning lever 17 to normal position, to be performed by this key.

The bail 52 and the arm 51 are returned to normal position after each actuation, upon the release of the key depressed, by a spring 52^a connected to the pawl and to cross bar 52^b in the rear of the machine.

The operation of the machine is as follows: Upon the depression of one of the keys, say, one of those lettered A, the pin 9 carried by the key lever working in slot 8 of the deflector 4 of that key will rock the same upwardly and toward its position plate 5 and engaging the latter rock the shaft 6 and the type wheel or segment carried thereby, so as to bring opposite the head of hammer C the character represented by the key depressed. The bail 21 is also depressed, thus operating lever 17 to lock the carriage against movement and rocking the shaft 25 and operating the ribbon feeding mechanism. Upon the depression of the bail 21 the arm 26 is also moved forward and through link 27 and bell crank 28 moves the plate 29 longitudinally against the tension of spring 35. This movement of plate 29 is continued until the type wheel or segment has been positioned when the cam 37 on bracket 33 engages cam 38 on plate 29 and moves the latter transversely and thereby disengages the shoulder 36 on said plate from the pin 31 carried by the hammer C. During this longitudinal movement of plate 29 and

prior to the disengagement of shoulder 36 and pin 31, the head of the lever has been moved outwardly away from the type wheel or segment, but as soon as the shoulder and pin are disengaged the spring 35, which has been put under tension by the longitudinal movement of plate 29, rocks the hammer lever inwardly, throwing its head against the paper and the latter against the type wheel, thus making the impression. During the first part of the movement of the type wheel or segment to position for the impression, the spring 54, as before stated, offers no resistance to the wheel or segment, and such resistance as it does subsequently offer, does not occur until after the type wheel or segment has acquired such momentum as to render the resistance imperceptible at the key. Upon the release of the key, the plate 29 is moved longitudinally in the reverse direction so as to bring its shoulder 36 again into engagement with pin 31 on the hammer, and at the same time and by the same spring, through the connections described, the bail 21 and with it the carriage feeding and ribbon feeding mechanisms are also returned to normal position, the lever 20 of the latter mechanism during its upward movement engaging the pin 18 of lever 17 and raising the latter to its horizontal position in which position it may be sustained against any tendency to fall in vertical slot 23 in any suitable way, as by balancing the lever or as in the present case, providing a very light spring 57 of just sufficient strength to sustain the weight of the lever.

In the case of those keys lettered A', the operation is precisely the same as that just described, except that on the depression of one of these keys, the movement of the type wheel shaft is initiated by the arm 51 carried by the bail 52 extending under these keys, which arm during the first part of the depression of the key engages the pin 53 on the wheel shaft 6 and partially rotates the latter and its position plates. The arm 51 and pin 53 then becoming disengaged, the deflector of the depressed key, which has meanwhile been raised and moved toward its position plate, engages the latter and continues and completes the movement of the shaft and type wheel to position for the impression.

The position plates are preferably constructed as shown, that is, of one or more blank strips of metal from which the position plates are struck out, leaving a body portion or strip to be screwed to the type wheel shaft after the strip and the several position plates have been twisted into spiral form so that the several position plates shall lie in different planes. Any other suitable construction or arrangement of these position plates would be included within the present invention, as would also a reversal of the position plates and deflectors so that the former would all lie in the same plane and the latter in different planes and at different angles from each other.

The spring 35 is connected to the plate 29 and arm 34 of the hammer lever by means of holes 58 in which the ends of the spring are hooked. Several such holes will preferably be provided in said plate and arm so that when desired the spring may be connected at different points to each to adjust the tension of the spring.

The type segment B is provided with the usual three vertical rows of type representing respectively lower case, upper case and figures and punctuation marks, the type segment being held normally in the position in which it is shown in the drawings to present the first or lower case row of characters in position for the impression by a spring not shown. As before stated, the type segment is adapted to move laterally to bring the second and third rows of type characters to impression position and in the present case these movements of the type segment are secured by connections consisting of a lug 60 fitted loosely in a collar on the inner face of the type segment, and connected at its upper end to one end of a rod 61 movable longitudinally through a sleeve 62, and provided at its opposite end with a cross pin 63 adapted to be engaged by levers 64, 65 fulcrumed in the opposite side of the machine, and provided with keys 66, 67 respectively which, when depressed, move the segment B inwardly from normal position to present the second or third row respectively, as the case may be, to position for the impression. The construction of this mechanism shown herein is a familiar one and, therefore, needs no further description here.

What I claim is—

1. The combination with a type wheel or segment and its shaft, of a type key, a position plate connected to said shaft, mechanism actuated by the key to engage and initiate the movement of the shaft, and a deflector also actuated by the key to engage the position plate and continue and complete the movement of the shaft, substantially as described.

2. The combination with a type wheel or segment and its shaft, of a type key, a position plate connected to said shaft, an arm actuated by the key to engage and initiate the movement of the shaft, and a deflector also actuated by the key to engage the position plate and continue and complete the movement of the shaft, substantially as described.

3. The combination with a type wheel or segment and its shaft, of a plurality of type keys, a corresponding number of position plates connected to the shaft, mechanism actuated by some of the keys to engage and initiate the movement of the shaft toward impression position, and deflectors for all of the keys and actuated thereby to engage their respective position plates and move the shaft into impression position, substantially as described.

4. The combination with a type wheel or segment and its shaft, of a plurality of type keys, a corresponding number of position plates con-

nected to the shaft, an arm adapted to engage and initiate the movement of the shaft toward impression position, a bail connected to the arm and common to and actuated by some of the keys, and deflectors for all of the keys and actuated thereby to engage their respective position plates and move the shaft into impression position, substantially as described.

5. The combination with a type wheel or segment and its shaft, of a plurality of type keys, a corresponding number of position plates connected to said shaft, a corresponding number of deflectors actuated by the keys to engage said position plates and rotate the shaft into impression position, a bail, as 52, fulcrumed in the machine and adapted to be engaged and operated by some of the keys, an arm, as 51, connected to said bail, and a pin 53 connected to the shaft and engaged by the arm 51 upon the movement of the bail 52 to initiate the movement of the shaft, substantially as described.

6. The combination with a type wheel or segment, of a hammer lever, a spring for actuating said lever for the impression, a paper carriage, feeding mechanism therefor and connections between the hammer spring and feeding mechanism for actuating the latter, substantially as described.

7. The combination with a type wheel or segment and type keys for actuating the same, of a hammer lever, a spring for actuating said lever for the impression and put under tension by the depression of the keys, a paper carriage, feeding mechanism therefor, actuated in one direction by the keys and connections between the hammer spring and feeding mechanism for actuating the latter in the opposite direction, substantially as described.

8. The combination with a type wheel or segment and type keys for actuating the same, of a hammer lever, a spring for actuating said lever for the impression, a bail adapted to be moved by the keys as the latter are depressed, a paper carriage, feeding mechanism therefor, connections between the bail and feeding mechanism for actuating the latter and connections between said bail and hammer spring whereby, upon the depression of a key, said spring is put under tension by the bail to actuate the hammer and upon the release of the key said spring returns the bail to normal position, substantially as described.

9. The combination with a type wheel or segment, of a hammer lever for the impression, a spring for actuating said lever, ribbon feeding mechanism, and connections between the hammer spring and feeding mechanism, substantially as described.

10. The combination with a type wheel or segment and type keys for actuating the same, of a hammer lever, a spring for actuating the same for the impression and put under tension by the depression of the keys, ribbon feeding mechanism actuated in one direction by the keys and connections between the hammer spring and ribbon feeding mechanism for

actuating the latter in the opposite direction, substantially as described.

11. The combination with a type wheel or segment and type keys for actuating the same, of a hammer lever, a spring for actuating said lever for the impression, a bail adapted to be moved by the keys as the latter are depressed, a paper carriage, feeding mechanism therefor, ribbon feeding mechanism, connections between said bail and feeding mechanisms for actuating the latter, and connections between said bail and hammer spring whereby, upon the depression of a key, said spring is put under tension by the bail to actuate the hammer and upon the release of said key said spring returns the bail to normal position, substantially as described.

12. The combination with a type wheel or segment and type keys for actuating the same, of a hammer lever, a spring for actuating said hammer lever for the impression, a bail adapted to be actuated by the type keys, connections between the bail and hammer spring, a paper carriage, feeding mechanism therefor, a lever pivotally connected to and movable with the bail, a pin and slot, the latter arranged transversely to the movement of the lever, connecting said lever and feeding mechanism, and connections between the lever and a stationary part of the machine for rocking said lever on its pivot when moved by the bail, substantially as described.

13. The combination with a type wheel or segment and type keys for actuating the same, of a hammer lever, a spring for actuating the hammer lever for the impression, a bail adapted to be actuated by the type keys, connections between the bail and hammer spring, a paper carriage, feeding mechanism therefor, a lever pivotally connected to and movable with the bail, a pin carried by the feeding mechanism, a slot in said lever arranged transversely to its movement for receiving said pin, and connections between said lever and a stationary part of the machine for rocking said lever on its pivot when moved by the bail, substantially as described.

14. The combination with a type wheel or segment, and type keys for actuating the same, of a hammer lever for the impression, a spring for actuating said lever, a bail adapted to be moved by the keys as the latter are depressed, connections between the bail and hammer spring, a paper carriage, lever 17 fulcrumed in the frame of the machine for feeding the carriage and provided with a pin 18, lever 20 pivoted to the bail and provided with a transverse slot 19 engaging the pin 18 and connections between lever 20 and a stationary part of the machine for rocking the same on its pivot when moved by the bail, substantially as described.

15. The combination with the type wheel or segment, and type keys for actuating the same, of a hammer lever for the impression, a spring for actuating the said lever, a bail adapted to be moved by the keys as the latter are de-

pressed, connections between the bail and hammer spring, a paper carriage, lever 17 fulcrumed in the frame of the machine for feeding the carriage and provided with pin 18, bell crank lever 20 pivotally connected to the bail and one arm of which is provided with a transverse slot 19 engaging the pin 18, and the other arm of which is bifurcated and straddles a stationary part of the machine, substantially as described.

16. The combination of a type wheel or segment, and type keys for actuating the same, of a hammer lever for the impression, a spring for actuating said lever, a bail adapted to be moved by the keys as the latter are depressed, connections between the bail and hammer spring, a paper carriage, lever 17 fulcrumed in the frame of the machine for feeding the carriage and provided with pin 18, lever 20 pivoted to the bail, a space key, lever 22 pivoted to the space key, transverse slots 19 in levers 20, 22, engaging the pin 18, longitudinal slots 23 in said levers, and connections between the levers 20, 22 and a stationary part of the machine for rocking the same on their pivots when moved by the bail, substantially as described.

17. The combination with a type wheel or segment, and type keys for actuating the same, of a hammer lever for the impression, a spring for actuating said lever, a bail adapted to be moved by the keys, as the latter are depressed, connections between the bail and hammer spring, a paper carriage, lever 17 fulcrumed in the frame of the machine for feeding the carriage and provided with pin 18, bell crank lever 20 pivoted to the bail, a space key, bell crank lever 22 pivoted to the space key, one arm of each of said bell cranks 20, 22 being provided with a transverse slot 19 engaging the pin 18, and with a longitudinal slot 23 and the other arm of each of which is bifurcated and straddles a stationary part of the machine, substantially as described.

18. The combination with a segment or wheel and type keys for actuating the same, of a spring adapted to be compressed between the segment or wheel and the frame of the machine but out of resisting contact with one during the first part of the movement of the segment or wheel, substantially as described.

19. The combination with a type wheel or segment, and type keys for actuating the same, of a spring, as 54, interposed in the path of movement of and adapted to be compressed by said type wheel or segment but out of resisting contact therewith during the first part of its movement, substantially as described.

20. The combination with a type wheel or segment, type keys for actuating the same, and a hammer lever fulcrumed in the frame of the machine coacting with the segment or wheel, of a bail adapted to be actuated by the keys, a latch pivoted medially at one end to the bail and adapted to be moved thereby and at its other end engaging and rocking the

hammer lever when thus moved, means for disengaging the latch and hammer lever during the latter part of the movement of the former, and a spring connected to the latch and hammer lever and put under tension by the movement of the former and operating the latter for the impression when the latch and lever are thus disengaged, substantially as described.

21. The combination with a type wheel or segment, type keys for actuating the same and a hammer lever fulcrumed in the frame of the machine coacting with the segment or wheel and provided with a pair of arms on opposite sides of its fulcrum, of a bail adapted to be actuated by the keys, a longitudinally movable latch plate pivoted mediately at one end to the bail and adapted to be moved thereby and at its other end adapted to engage the arm of the hammer to rock the latter when moved by the bail, a cam in the path of longitudinal movement of the latch plate for disengaging the latch plate from the hammer lever during the latter part of the movement of the former, and a spring connected to the other arm of the hammer lever and to the latch plate for operating the hammer lever for the impression when the latch plate is thus disengaged, substantially as described.

22. The combination with a type wheel or segment, type keys for actuating the same, and a hammer lever fulcrumed in the frame of the machine coacting with the segment or wheel, of a bail adapted to be actuated by the keys, a longitudinally movable latch plate pivoted mediately at one end to the bail and adapted to be moved thereby and at the other end engaging and rocking the hammer lever when thus moved, a cam in the path of longitudinal movement of the latch plate for disengaging the latch plate from the hammer lever during the latter part of the movement of the former, and a spring connected to the latch plate and hammer lever and put under tension by the longitudinal movement of the former and operating the latter for the impression when the latch plate is thus disengaged, substantially as described.

23. The combination with a type wheel or segment, type keys for actuating the same, and a hammer lever fulcrumed in the frame of the machine coacting with the segment or wheel, of a bail adapted to be actuated by the keys, a rock arm actuated by the bail, a bell crank lever, one arm of which is pivotally connected to the rock arm, a latch plate pivotally connected at one end to the other arm of the bell crank lever so as to be moved longitudinally when the bail is actuated, connections between the opposite end of said latch plate and the hammer lever for rocking the latter when the latch plate is thus moved, a cam in the path of longitudinal movement of the latch plate for moving the latter out of engagement with the hammer lever, and a spring connected to and operating the hammer lever for

the impression when the latch plate is thus disengaged, substantially as described.

24. The combination with a type wheel or segment, type keys for actuating the same and a hammer lever fulcrumed in the frame of the machine for co-acting with the segment or wheel, of a bail adapted to be actuated by the keys, a rock arm actuated by the bail, a bell crank lever one arm of which is pivotally connected to the rock arm, a latch plate pivotally connected at one end to the other arm of the bell crank lever so as to be moved longitudinally when the bail is actuated, connections between the opposite end of said latch plate and the hammer for rocking the latter when the latch plate is thus moved, a cam in the path of longitudinal movement of the latch plate for moving the latter out of engagement with the hammer lever, and a spring connected to the hammer lever and to the latch plate for operating the hammer lever for the impression when the latch plate is thus disengaged, substantially as described.

25. The combination with a type wheel or segment, type keys for actuating the same, and a hammer lever fulcrumed in the frame of the machine co-acting with the segment or wheel, of a bail adapted to be actuated by the keys, a latch plate pivoted mediately at one end to the bail and provided with a slot at its other end, a pin connected to the hammer lever entering said slot, a shoulder at the forward end of said slot for engaging said pin and rocking the hammer lever during movement of the latch plate by the bail, a cam located in the path of movement of the latch plate for moving the latter to disengage said shoulder and pin, and a spring connected to and operating the hammer lever for the impression when the latch is thus disengaged, substantially as described.

26. The combination with a type wheel or segment, type keys for actuating the same, and a hammer lever fulcrumed in the frame of the machine coacting with the segment or wheel, of a bail adapted to be actuated by the keys, a latch plate pivoted mediately at one end to the bail and provided with a slot at its other end, a pin connected to the hammer lever entering said slot, a shoulder at the forward end of said slot for engaging said pin and rocking the hammer lever during movement of the latch plate by the bail, a cam located in the path of movement of the latch plate for moving the latter to disengage said shoulder and pin, and a spring connected to the hammer lever and to the latch plate for operating the hammer lever for the impression when the latch plate is thus disengaged, substantially as described.

27. The combination with a type wheel or segment, type keys for actuating the same and a hammer lever fulcrumed in the frame of the machine and provided with arms 32, 34, upon opposite sides of its fulcrum, a pin, as 31, in arm 32, of a bail adapted to be actuated by

the keys of latch 29 pivotally connected immediately at one end to the bail, a slot 30 in the opposite end of said latch plate for receiving pin 31, shoulder 36 at the end of the slot for engaging the pin 31 when the latch plate is moved by the bail, a cam in the path of movement of the latch plate for moving the latter transversely to disengage the shoulder and pin, and a spring 35 connected to the latch plate and arm 34 of the hammer lever for actuating the latter when the shoulder and pin are thus disengaged, substantially as described.

28. The combination with the lever C fulcrumed in the frame of the machine and pro-

vided with arms 32, 34 on opposite sides of its fulcrum, latch plate 29 adapted to engage the arm 32, spring 35, a plurality of holes 58 in said latch plate and in the arm 34 for receiving the ends of said spring, bail 21 and connections between said bail and latch plate, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

WILLIAM HENRY WHITTEMORE.

Witnesses:

T. F. KEHOE,

J. J. KENNER.