

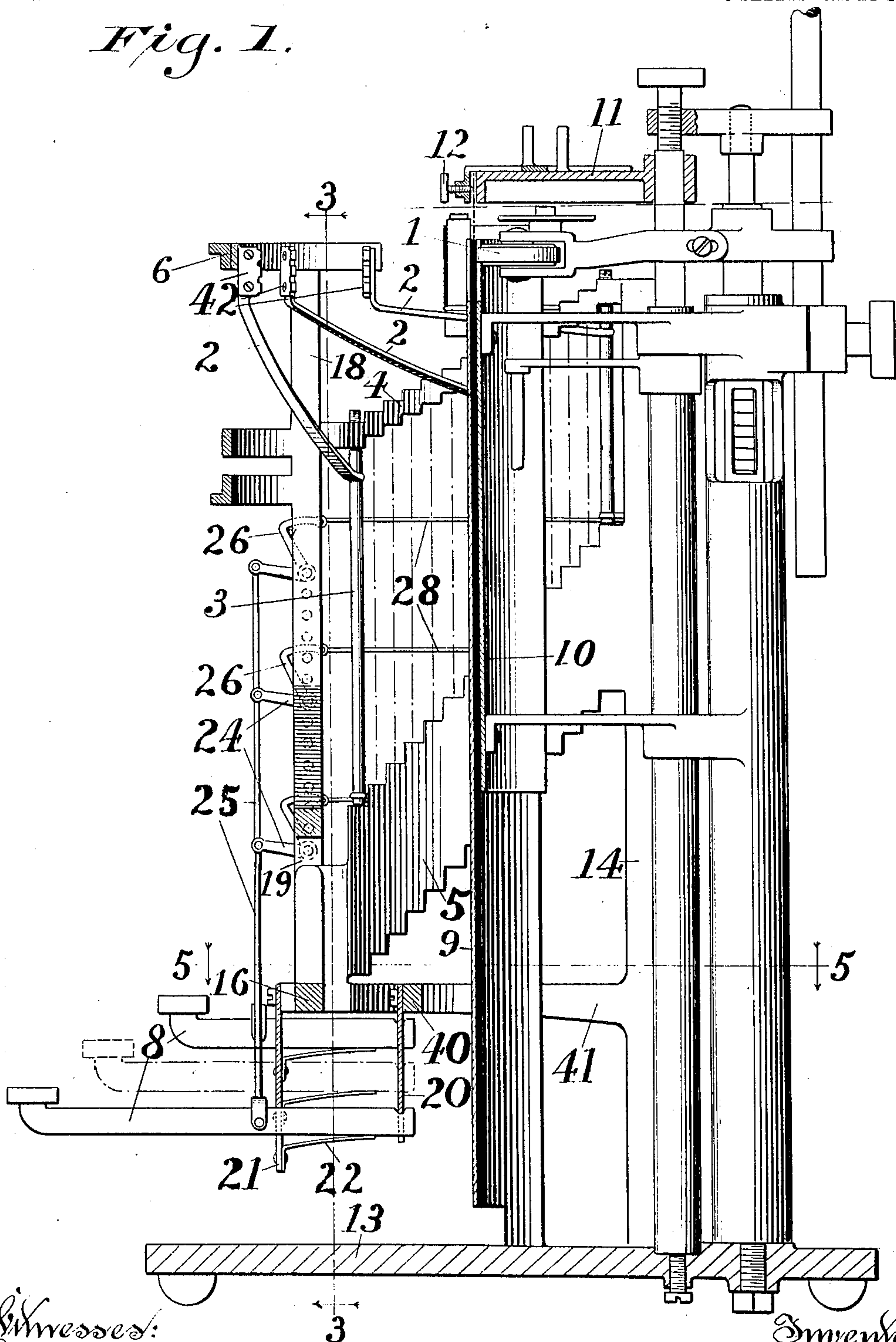
C. S. NICKERSON.
TYPE WRITING MACHINE.
APPLICATION FILED AUG. 7, 1905.

913,039.

Patented Feb. 23, 1909.

6 SHEETS—SHEET 1.

Fig. 1.



Witnesses:
Geo. W. Young.
C. R. Wilkins

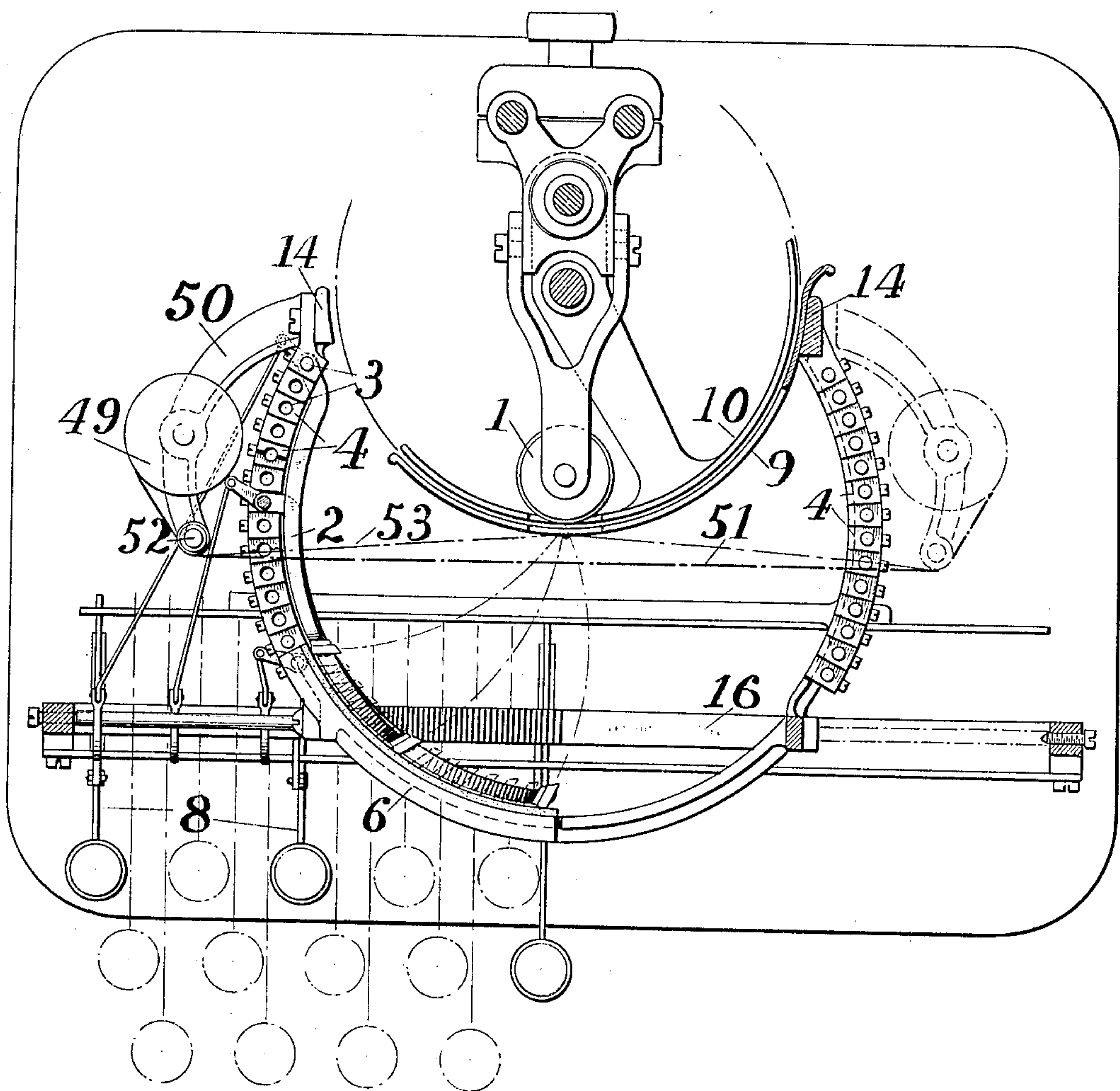
Inventor:
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 6 SHEETS—SHEET 2.

Fig. 2.



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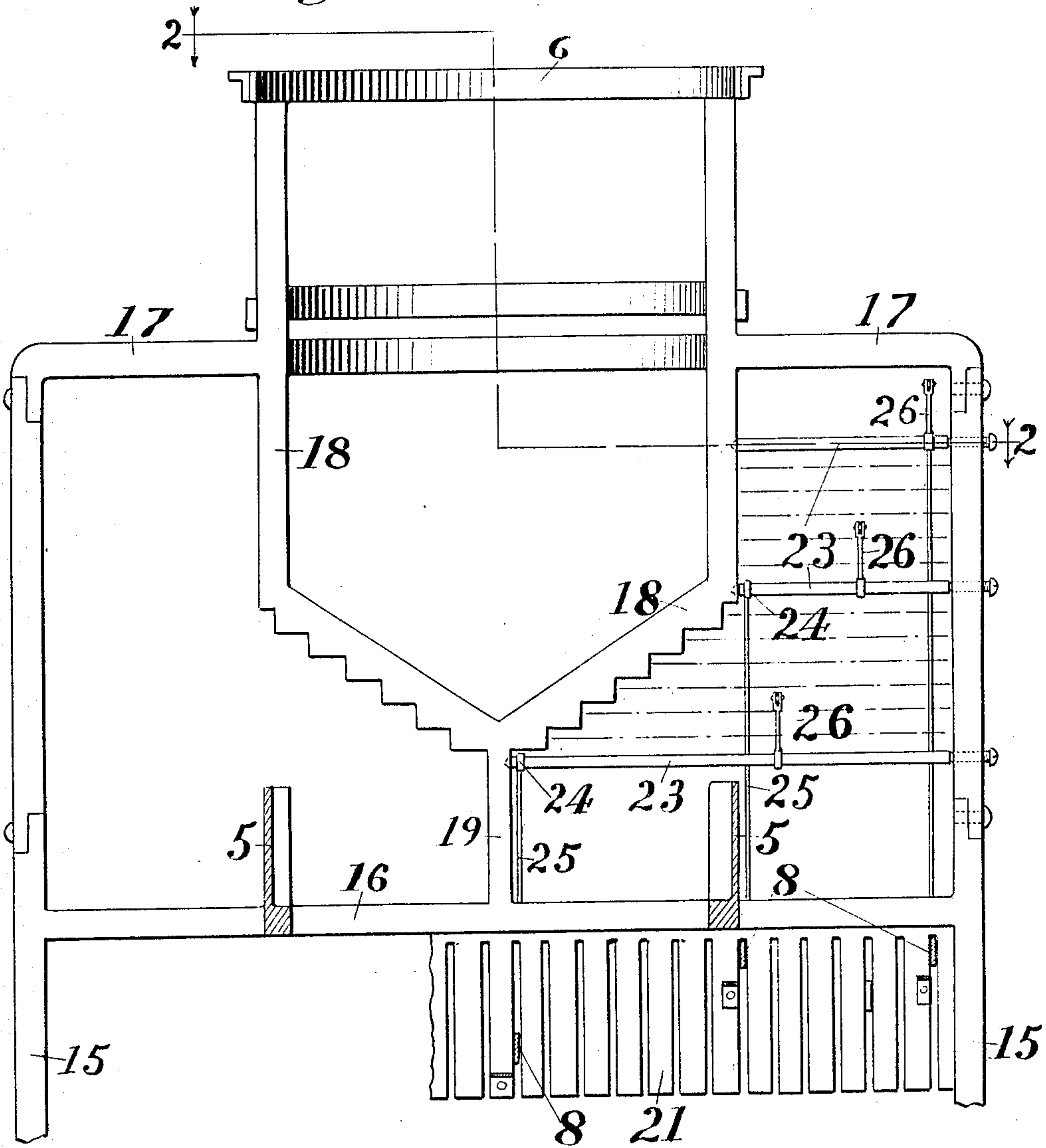
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6 SHEETS—SHEET 3.

Fig. 3.



Witnesses
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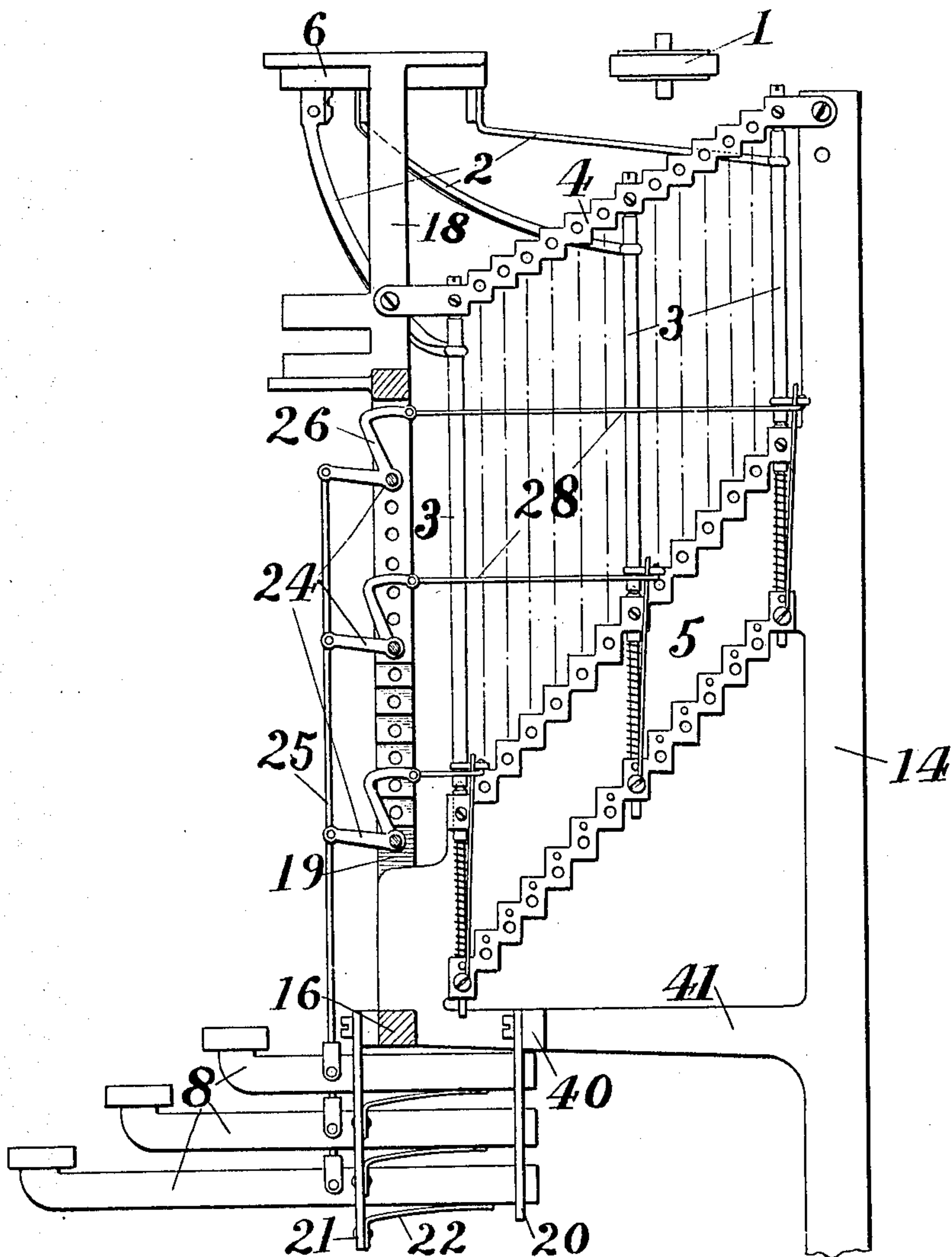
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6 SHEETS—SHEET 4.

Fig. 4.



Witnesses
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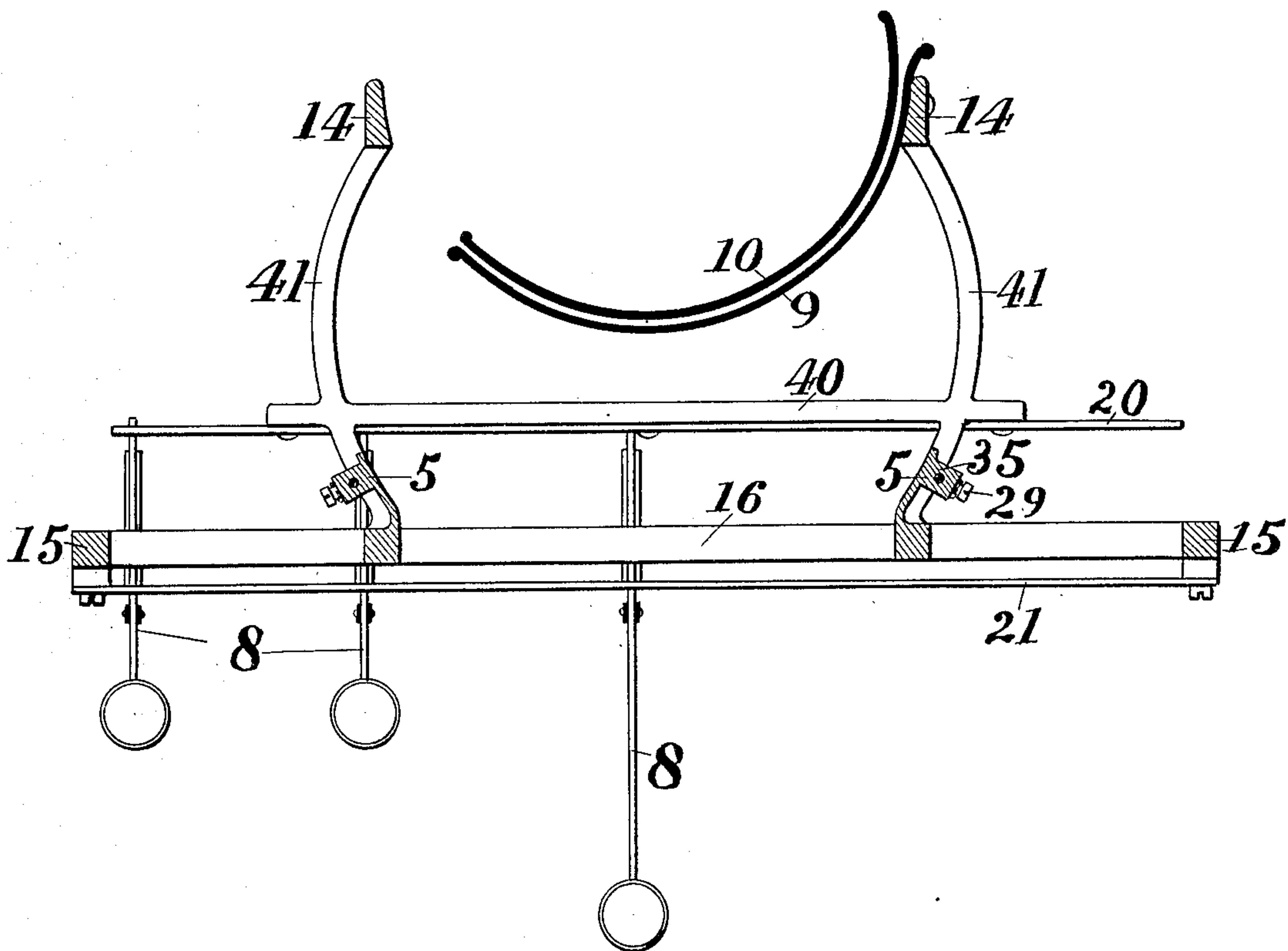
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6 SHEETS—SHEET 5.

Fig. 5.



Witnesses
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6 SHEETS—SHEET 6.

Fig. 7.

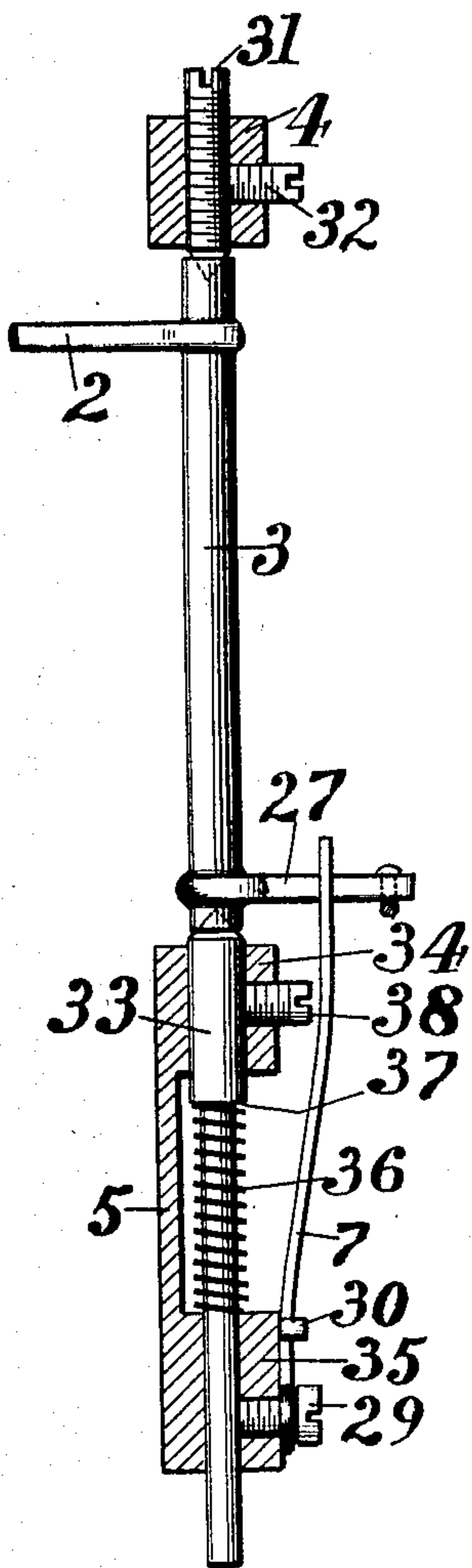


Fig. 8. Fig. 9.

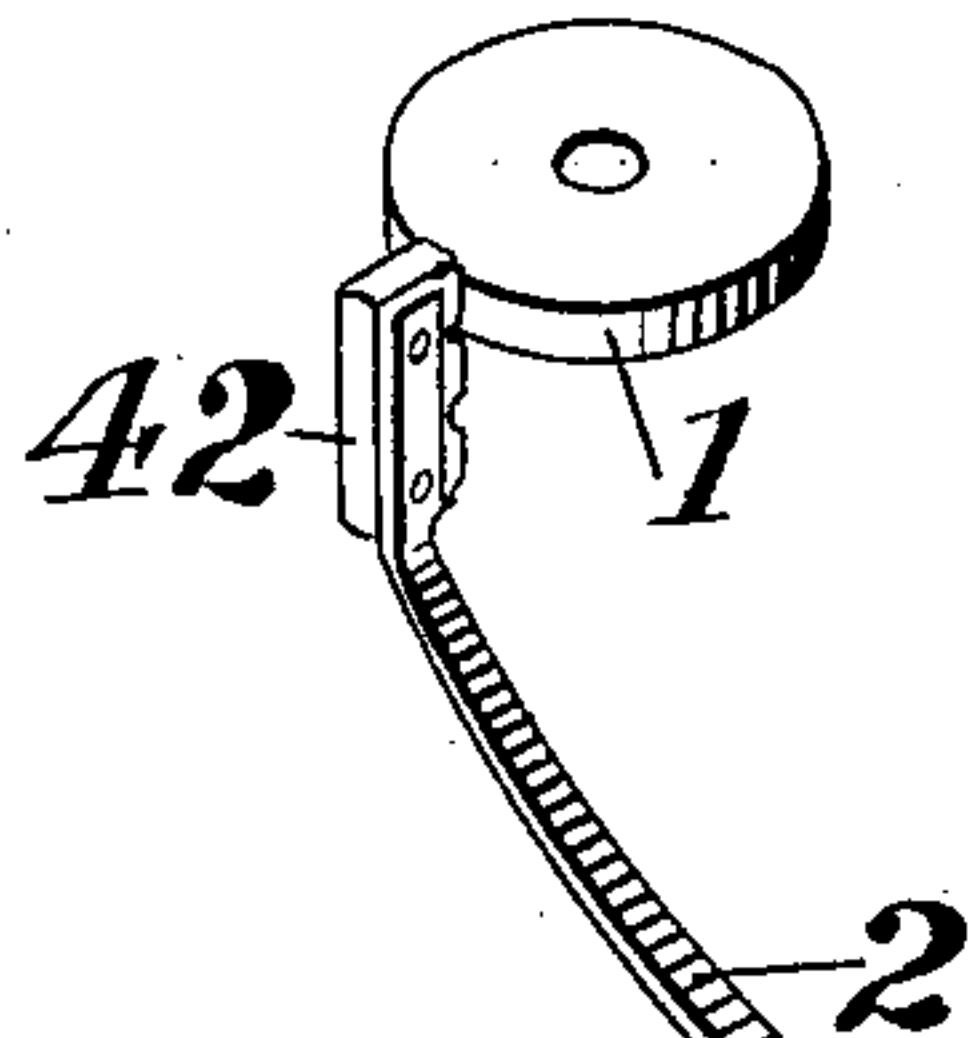
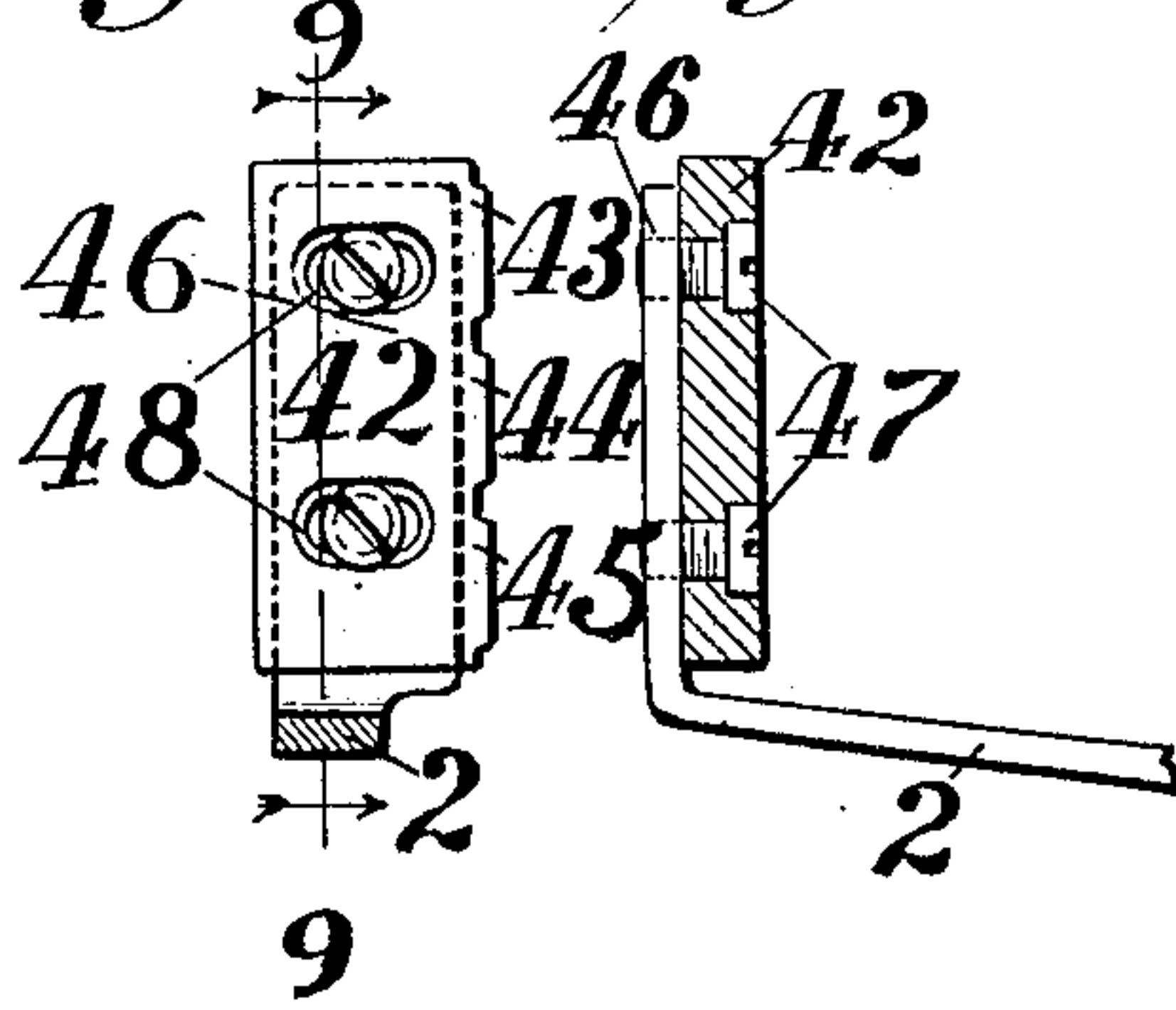
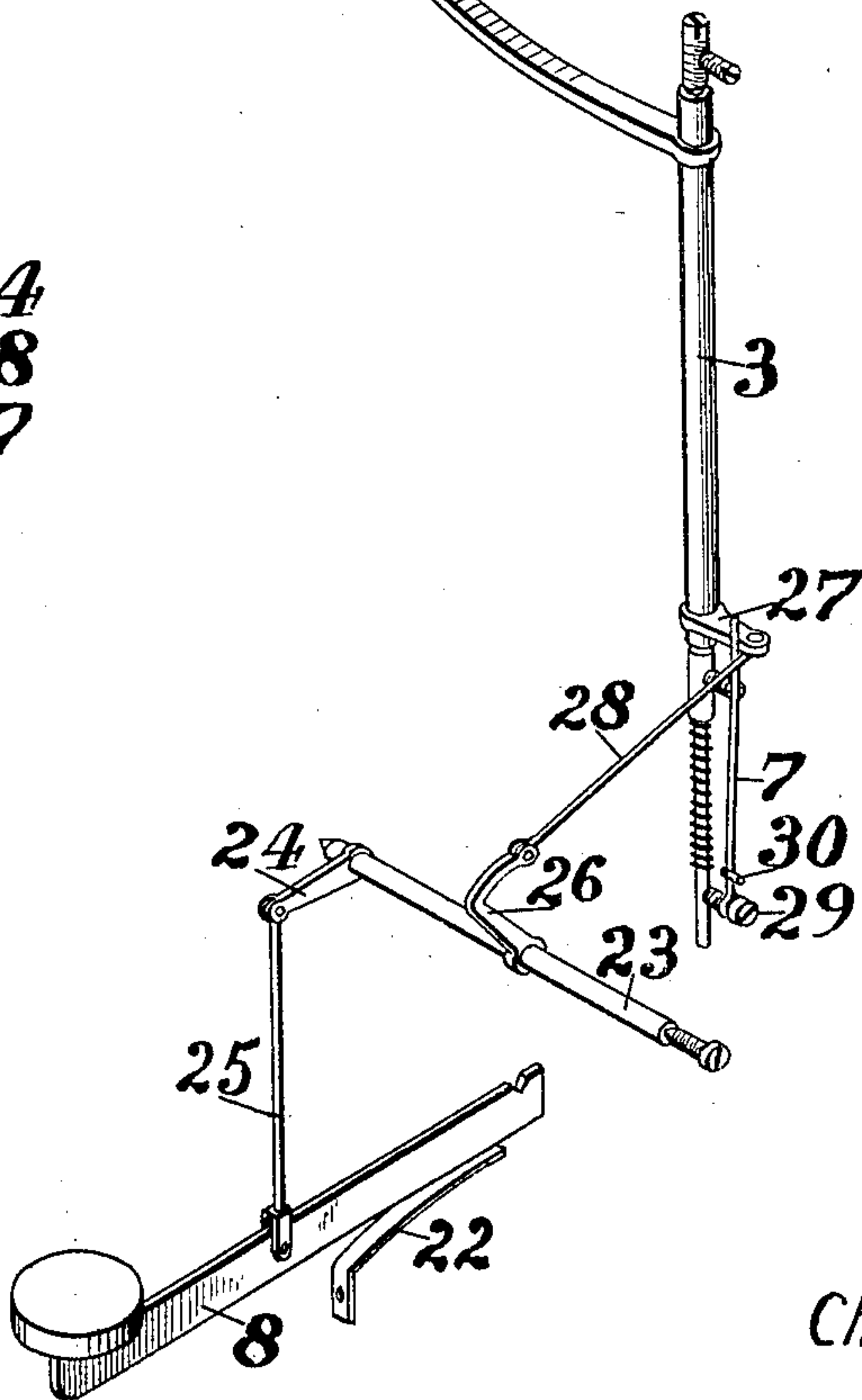


Fig. 6.



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UNITED STATES PATENT OFFICE.

CHARLES S. NICKERSON, OF EVANSVILLE, INDIANA, ASSIGNOR TO NICKERSON TYPEWRITER COMPANY, OF RACINE, WISCONSIN, A CORPORATION OF WISCONSIN.

TYPE-WRITING MACHINE.

No. 913,039.

Specification of Letters Patent.

Patented Feb. 23, 1909.

Application filed August 7, 1905. Serial No. 273,067.

To all whom it may concern:

Be it known that I, CHARLES S. NICKERSON, a citizen of the United States, of Evansville, in the county of Vanderberg and State of Indiana, have invented certain new and useful Improvements in Type-Writing Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the numerals of reference marked thereon, which form a part of this specification.

This invention relates to an improved type-bar mechanism for typewriting machines, and it consists in the matters hereinafter set forth and more particularly pointed out in the appended claims.

In a type-bar mechanism embodying my invention, the pivotal axes of the type-bars are arranged in a circular arc concentric with the striking point of the type, the type-heads are arranged at equal distances from the said pivotal axes of the type-bars, and the type-bars are substantially equal in length; the result of this construction being that the several type-heads swing through equal arcs in striking the paper and act with equal force or impact on the platen.

A type-bar mechanism embracing my invention may be employed with any suitable form of paper supporting, letter spacing and line spacing devices. In the accompanying drawings, such type-bar mechanism is illustrated in connection with a form of paper supporting and actuating mechanism that is shown and claimed in a separate application for patent filed by me on the 29th day of November 1904, Serial Number 234,705, but it is to be understood that said paper supporting and actuating mechanisms are shown in said drawings merely for the purpose of illustration and that any other well known or suitable devices for this purpose may be employed in connection with the type-bar mechanism constituting my invention.

As shown in the said drawings:—Figure 1 is a view in central vertical section of the main parts of a type-writing machine embodying my invention. Fig. 2 is a sectional plan view, taken on the indirect line 2—2 of Fig. 3. Fig. 3 is a vertical section showing the connections for actuating the type-bars, taken on line 3—3 of Fig. 1, looking from the rear forward. Fig. 4 is a detail side eleva-

tion showing the type-bar actuating mechanism only. Fig. 5 is a detail plan section of the frame of the type-bar actuating mechanism, taken on line 5—5 of Fig. 1. Fig. 6 is a detail perspective view of one of the type-bars, a key-lever and connections between the same. Fig. 7 is an enlarged detail section, taken longitudinally through the bearings of one of the type-bar pivot rods. Fig. 8 is a view in side elevation of a type-head and end of the type-bar to which the same is attached. Fig. 9 is a sectional view of the same, taken on line 9—9 of Fig. 9.

As shown in the said drawings, 1 indicates the platen of the machine which constitutes the support against which the paper rests in the operation of printing, and 2, 2 indicate the type-bars which are arranged in two groups at opposite sides of the printing or impression point of the platen, with their pivotal axes arranged vertically and equidistant from the said printing point, or on a circular arc concentric with said printing point. Type-heads, which are attached to the swinging ends of said type-bars, are located and swing in the same horizontal plane, and the type-heads on all of the bars are equidistant from the pivotal axes of the type-bars. Said type-bars are, moreover, attached to upright pivot rods 3, 3, which are mounted in two segmental frames located at opposite sides of the machine, and embracing upper and lower segmental frame members 4, 4, 5, 5, which are preferably inclined downwardly and forwardly from their rear to their forward ends, and which are provided with bearings for the upper and lower ends of said pivot rods. The inner ends of the type-bars which are attached to the pivot rods are located at varying distances vertically from the horizontal plane in which the type-heads swing or, in other words, the inner ends of the type-bars in each group are arranged in different vertical planes, so that the type-bars will swing clear of each other in the printing operation.

6 indicates a curved or segmental rest for the type-heads against which the same bear when in their outward or retracted position and which is concentric with the striking point of the type and preferably at the same radial distance therefrom as the frame segments 4 and 5. The type-heads are held against said type-bar rest 6 or at the outward limit of their throw by means of

5 springs 7, 7, 7, and are severally thrown inward toward the printing point in printing by the action of key-levers 8, 8, 8, which are located at the lower part of the machine, as hereinafter set forth.

The platen 1 illustrated constitutes part of a paper supporting and actuating device shown in my separate application hereinbefore referred to. Said platen consists of a
10 wheel or disk, arranged horizontally and turning on a vertical axis; said wheel or disk having a narrow marginal or working face, wide enough only to receive the impression of one letter. The platen thus constructed
15 is actuated to move vertically by a platen-device which also gives vertical movement to the paper and which is so constructed that both the platen and the paper have a rising and falling movement by which the narrow
20 face of the platen is brought into position for contact therewith of one or the other of the three vertically spaced types with which each of the several type-heads is provided. In the paper supporting and actuating device shown in the drawings, moreover, the
25 sheet of paper is held or confined between two stationary parallel guide plates 9 and 10 having the form of segments of upright cylinders, and by which the paper is caused
30 to move in a curved path as it is moved past the platen in letter spacing. The paper supporting and actuating devices illustrated also include an oscillating and vertically movable
35 paper supporting and actuating segment 11 which swings on a vertical axis and to the curved margin of which the upper edge of the paper is fastened by holding screws, indicated at 12, (Fig. 1), or otherwise. The
40 drawing illustrates parts of the devices shown in said separate application for giving vertical and oscillatory movement to the paper supporting segment 11, and for vertically shifting the platen 1, as required for
45 printing from either one of the types on the type-heads and also for giving letter space and line space movements to the segment 11, and the sheet held thereby, but inasmuch as these parts are fully illustrated and described in said separate application, and constitute
50 no part of the present invention, they need not be herein more fully described.

Now referring in detail to the construction of the machine, illustrated, 13 indicates a horizontal base plate of the machine, 14, 14,
55 two uprights which rise from the base plate at opposite sides of the machine and to which the upper and lower frame segments 4 and 5 are attached at their rear ends.

A vertically arranged supporting frame
60 for the key-levers and the mechanism connecting the same with the type-bars, is located transversely of the base plate and adjacent to the forward ends of the type-bar supporting segments 3 and 4, which latter
65 are attached to said frame. As clearly

shown in Fig. 3, said supporting frame consists of two frame uprights 15, 15, which rise from the base plate near the side margins of the same, a lower horizontal frame bar 16, to which the forward ends of the lower frame
70 segments 5, 5, are attached, horizontal frame bars 17, 17, extending inwardly from the upper ends of the uprights 15, 15, and frame bars 18, 18, the upper parts of which are upright and extend above and below the
75 horizontal bars 17, 17, and the lower ends of which extend obliquely inward and meet at the center of the front of the frame where they are joined to the upper end of an upright connecting bar 19, which extends
80 downwardly from the center of the bar 16. The forward ends of the upper frame segments 4, 4, are attached at their forward ends to the frame bars 18, 18, as clearly seen in Fig. 1.

The key-levers 8, 8, 8, are located at the lower part of the machine above the base plate and are preferably arranged in three vertically separated rows or banks. Said
85 key-levers, are loosely connected at their rear or inner ends with a slotted vertical plate 20 extending across the machine and have guiding engagement with a vertically slotted guide plate or comb 21, which is attached to and depends from the lower horizontal
90 frame bar 16. The plate 20 is shown as attached to a transverse horizontal frame bar 40 attached to two horizontal curved frame arms 41, 41, (Figs. 1 and 5), which extend forwardly from the frame uprights 14,
95 14 and are attached to the forward ends of the lower frame segments 5, 5, and also to the horizontal frame bar 16. Lifting springs 22 for the key-levers are shown as having the form of leaf-springs attached to the rear face
100 of the plate 21 and pressing at their free rear ends upwardly against the key-levers. The said key-levers are shown as loosely connected with the plate 20, by having their rear ends inserted in the vertical slots in said
105 plate and by being provided with notches in their upper edges which are engaged with the said plate at the upper ends of the slots therein.

Actuating connections between the several
115 key-levers and the pivot rods of the type-levers are provided as follows: 23, 23, 23, indicate horizontally arranged rock-shafts which are arranged with their pivotal axes in the same vertical plane and are pivotally
120 supported at their ends in the members 15, 18 and 19, of the front frame of the machine. Said rock-shafts are provided with forwardly projecting crank-arms 24, 24, 24, which are located severally above or in the same vertical
125 planes with the several key-levers, and are connected with the latter by means of connecting rods 25, 25, 25, as clearly seen in Figs. 1, 3 and 6. Each of the rock-shafts 23
130 is provided with an upwardly extending

rigid arm 26, which is connected with a laterally extending rigid arm 27 on one of the type-bar pivot rods 3, by means of a connecting rod 28. The arms 26 are extended upwardly and forwardly from the several rock-shafts, so as to avoid interference with superjacent rock-shafts, and said arms are provided with rearwardly bent end portions which extend between two of the rock-shafts and to the rear ends of which the connecting rods 28 are pivoted; this construction enabling the pivotal joint between the said arms and connecting rods to be located above the rock-shafts, so that the arms will give a substantially direct endwise movement to the connecting rods or will transmit thereto a minimum amount of vertical movement such as will necessarily take place owing to the movement of the ends of the arms in curved paths or arcs. The retracting springs 7, 7, 7, for the type-bars are herein shown as having the form of straight wire springs which are secured at their lower ends to the outer faces of the bearing segment 5 by means of screws 29, passing through eyes in the lower ends of the springs, and pins 30 which hold the springs from turning on the said screw-studs. The upper ends of the springs 7 are arranged to bear on the arms 27 of the pivot bars 3, in a direction to throw the type-heads outwardly or rearwardly and hold them normally in contact with the type-head rest 6. The parts last above described are clearly shown in Fig. 6, and so arranged that when a key-lever 8 is depressed the rock-shaft 23 will be turned so as to carry the upper end of the arm 24 thereon outwardly or forwardly thereby moving the crank-arm 27 in the same direction and swinging the free end of the type-lever and the type-head thereon toward the printing point, against the action of the spring 7.

Adjustable bearings by which the pivot rods 3, 3, are supported in the segmental frame members 4, and 5, are constructed, as shown in Figs. 6 and 7, and as follows: In the frame segment 4 above and in line with the pivot rod 3, is located an upright pivot screw 31 which passes through said frame segment and is provided at its lower end with a conical point which engages a conical recess in the upper end of said pivot rod. A set-screw 32 is inserted through the exterior part of the said frame segment so as to bear upon the pivot pin and thereby hold the same in its adjusted position. The upper end of the pivot pin 31 is provided with a slot for a screw-driver and being exposed at the top of said frame segment is easily accessible for adjustment. The set-screw 32, being located at the outer side or face of the frame segment, is also readily accessible to the operator.

At the lower end of the pivot rod 3, the same has bearing contact with the upper end with a bearing pin 33 arranged in axial align-

ment with the pivot rod and which passes through and has bearing in smooth bores or bearing apertures formed in upper and lower, outwardly projecting, lugs 34, 35, on the lower frame segments 5, 5. The upper end of the bearing pin 33 is conical and engages a conical bearing aperture in the lower end of the pivot rod. Between a suitable shoulder on the bearing pin 33 and an upwardly facing surface of the frame segment below it, is arranged a lifting spring 36 which acts on the pin in a direction to lift the same or press it upwardly toward the pivot rod. In the particular construction illustrated the bearing pin 33 is made larger at its upper than at its lower part and provided between its larger upper and smaller lower portions with an annular, downwardly facing shoulder 37, while the spring 36 is of spirally coiled form, and surrounds said pin between the said shoulder and the upwardly facing or top surface of the lug 35. In connection with the spring-pressed, sliding bearing pin, arranged as described, is used a set-screw 38, inserted in the frame segment, and bearing against the pin to hold the same from movement, said set-screw being preferably inserted from the outer face of the frame segment so as to be readily accessible to the operator.

The purpose of the sliding bearing pin 33, arranged as described, is to enable the lower bearing of the pivot rod to be readily adjusted vertically, it being manifest that the employment of an upright bearing screw at the lower end of the pivot rod would be inconvenient because of the inaccessibility of the lower pivot rod bearings from below the lower frame segment. Inasmuch as the lifting spring 36 tends to lift the bearing pin and also the pivot rod engaged therewith, it follows that if the set-screws 32 and 38 be loosened, the pivot rod may be raised or lowered by turning the upper pivot screw 31 and that the lifting spring 36 holds the pivot rod firmly pressed against the pivot screw 31, when the latter is either advanced or retracted. After the parts have been adjusted by movement of the pivot screw 31, as described, both said pivot screw and the sliding pivot pin 33 will be clamped or held rigidly in position by tightening the set-screws 32 and 38.

The types in the machine illustrated are formed on type-heads 42, 42, more clearly shown in Figs. 8 and 9, which are vertically elongated and each provided with three types 43, 44, 45, arranged in vertical alignment or one above the other. In order to provide means for adjusting the type-heads for bringing the faces of the type in a true vertical plane and thereby insuring uniformity in the impression made by the several types on each type-head, each of the said type-heads is made separate from the type-bar to which it is attached and has the form

of a flattened block on one edge of which the types are formed and which is secured to the type-bar with one of the flat side faces in contact with the upright flattened end 46 of the type-bars. The type-heads are secured to said flattened portion 46 of the type bar by attaching means affording angular adjustment of the type-head relatively to the type bar. The adjustable attaching means shown consists of two screws 47, 47, inserted through horizontal slots 48, 48, formed in the type-head 42 near the opposite ends of the same and extending into the flattened end 46 of the type-bar. This construction permits the printing faces of the types to be advanced or retracted with respect to the type-bar, and also permits the plane of the said faces to be changed with respect to the end of the type-bar by advancing or retracting either the upper or the lower end of the type-head relatively to the said upright end of the type-bar.

In Fig. 2 is shown, in full lines at the left hand side and in dotted lines at the right hand side of the figure, the ribbon spools 49 of the machine, which are supported in forwardly extending brackets 50 attached to the frame uprights 14, said ribbon spools being arranged to turn on vertical axes. The ribbon 51 passes from one spool to the other over guides 52 located on the forward ends of the brackets 50, the ribbon passing horizontally and transversely across the machine at some distance forward of the platen and in such position that the type-heads will strike and carry the ribbon against the paper at the time the impressions are made, the ribbon then assuming the position shown in dotted lines 53 in said Fig. 2. The guides 52, 52, are located laterally outside of the frame segments 4, 4, but above the level of the parts of said frame segments over which the ribbon extends, room being afforded for the passage of the ribbon by reason of the forward and downward inclination of the said frame segments.

As hereinbefore stated, the inner ends of the type-bars which are attached to the pivot rods 3, 3, are located at progressively increasing distances from the horizontal plane in which the type-heads swing in order to permit the type-bars in each group to pass each other without interference in the operation thereof. The innermost or rearmost type-bars have their points of attachment to the pivot rods located nearest the said horizontal plane in which the said type-bars swing, so that said type-bars are more nearly horizontal, while the outer or forward type-bars are located at the greatest distance from said horizontal planes in which the type-heads swing and therefore have a greater inclination. By reason of the oblique or inclined arrangement of the frame segments 4, 4, the upper bearings for the

pivot rods are arranged in progressively greater distances from the said horizontal plane in which the type-heads swing and in connection with this feature of construction, the points of attachment of the type-arms to the said pivot rods are adjacent to and at uniform distances from the upper ends of said pivot rods, so that both the said upper bearings for the pivot rods and the points of attachment of the type-bars to the pivot rods are located at correspondingly increasing distances from the said plane in which the type-bars swing. The result of this construction is that the points of attachment of all of the type-bars to the pivot rods are brought near the upper bearings of said pivot rods, with the result that the type-rods are rigidly supported in operative position or, in other words, are not liable to variation in position through bending or flexing of the pivot rods which might occur in the operation of the machine if the type-bars were attached to the pivot rods at greater distances from the upper bearings of the latter.

I claim as my invention:—

1. In a typewriting machine a plurality of type-bars the pivotal axes of which are parallel with each other and at a uniform distance from the printing point of the machine.

2. In a typewriting machine, a plurality of type-bars, the pivotal axes of which are parallel with each other and at uniform distances from the printing point of the machine, and the type-heads of which are at uniform distances from their pivotal axes.

3. In a typewriting machine, a plurality of type-bars the pivotal axes of which are parallel with each other and at equal distances from the printing point, and the type-heads of which are located and swing in the same plane.

4. In a typewriting machine, a plurality of type-bars and pivot rods to which said type-bars are attached, said pivot rods being arranged with their axes of rotation at uniform distances from the printing point of the machine, and the type-heads being at uniform distances from the axes of the pivot rods and located and adapted to swing in the same plane; the several type-bars being attached to the said pivot rods at unequal distances from the plane in which the type-heads swing.

5. In a typewriting machine, a plurality of type-bars, the pivotal axes of which are parallel with each other and at uniform distances from the printing point of the machine and the type-heads of which are at uniform distances from the said pivotal axes, and a segmental rest for the type-heads arranged concentrically with said printing point.

6. In a typewriting machine, a plurality of type-bars and pivot rods to which the

said bars are attached, said pivot rods being parallel with each other, segmental bearing members for the opposite ends of said pivot rods arranged concentrically with the printing point of the machine and a segmental rest for the type-heads also arranged concentrically with respect to said printing point.

7. In a typewriting machine, two groups of type-bars arranged at opposite sides of the printing point of the machine with the pivotal axes of the type-bars in each group at uniform distances from said printing point, and a segmental type-bar rest arranged concentrically with respect to said printing point and in the angular space between the pivotal axes of the groups of type-bars.

8. In a typewriting machine, two groups of type-bars arranged at opposite sides of the printing point with their pivotal axes at uniform distances from the said printing point, segmental frame members provided with bearings for type-bars, and a segmental type-bar rest arranged concentrically with said pivotal point in the angular space between the forward ends of said segmental frame members.

9. In a typewriting machine, a plurality of type-bars and pivot rods to which said type-bars are attached, the pivotal axes of said pivot rods being located at uniform distances from the printing point of the machine and the type-heads being at uniform distances from the central axes of said pivot rods, segmental frame members provided with bearings for said pivot rods, the bearings for the ends of the pivot rods nearest the plane in which the type-heads swing being located at varying distances from said plane and the type-bars being attached to said pivot rods at points adjacent to said bearings and at correspondingly varying distances from the said plane.

10. In a typewriting machine, a plurality of type-bars, a plurality of upright pivot rods to which said type-bars are attached, said rods being provided with rigidly attached crank arms, a plurality of key-levers, a plurality of horizontal rock-shafts located above the key-levers, said rock-shafts being provided with rigidly attached, horizontal and upwardly extending crank-arms, connecting rods joining the horizontal crank-arms with the key-levers, and connecting rods joining the upwardly extending crank-arms with the crank-arms on the pivot rods of the type-bars.

11. In a typewriting machine, a plurality of type-bars, a plurality of upright pivot rods to which said type-bars are rigidly attached, said pivot rods being provided with rigidly attached crank-arms, a plurality of key-levers, a plurality of rock-shafts arranged with their axes of rotation in the

same vertical plane, and above the key-levers, said rock-shafts being provided each with a forwardly extending rigid arm which is connected with one of the key-levers and with an upwardly extending rigid arm which is connected with the crank-arm on one of the pivot rods, said upwardly extending arms on the rock-shafts having a rearwardly directed upper end portion which extends between two of the rock-shafts above the rock-shaft to which it is attached.

12. In a typewriting machine, a plurality of type-bars, a plurality of upright pivot rods to which said type-bars are attached, said rods being provided with rigidly attached crank arms, a plurality of key-levers, a plurality of horizontal rock-shafts located above the key-levers, said rock-shafts being provided with rigidly attached horizontal and upwardly extending crank-arms, connecting rods joining the horizontal crank-arms with the key-levers, connecting rods joining the upwardly extending crank-arms with the crank-arms on the pivot rods of the type-bars, and springs applied severally to the said pivot rods for retracting the type-bars.

13. In a typewriting machine, a type-bar and a pivot rod to which said type-bar is attached, frame members affording bearing for said pivot rod, a crank-arm on the pivot rod and an actuating spring for the type-bar rigidly attached to one of the said frame members extending longitudinally of the pivot rod in bearing contact with said rigid arm on said pivot rod.

14. In a typewriting machine, a type-bar and a pivot rod to which said type-bar is attached, frame members affording bearings for said pivot rod, a crank-arm on the pivot rod, an actuating spring for the type-bar extending longitudinally of the pivot rod and provided with an eye at one end, a screw inserted in the frame member and engaging the eye on the spring and a pin in the frame engaging the said spring and holding the same in position to act on the said crank arm of the pivot rod.

15. In a typewriting machine, the combination with a type-bar and a pivot rod to which the same is attached, and frame members affording bearings for the opposite ends of said pivot rods, an endwise sliding bearing pin having endwise engagement with one end of said pivot rod, a spring applied to said pin to throw the same towards the pivot rod, and a set-screw for holding said bearing pin in its adjusted position.

16. In a typewriting machine, a type-bar, a pivot rod to which said type-bar is attached, and frame members provided with bearings for the opposite end of said pivot rod, one of said members being provided with two lugs provided with guide apertures, a shouldered bearing pin in endwise alinea-

ment with the pivot rod, sliding endwise in said apertures, a coiled spring surrounding said rod between the shoulder thereof and the adjacent face of one of said lugs, and a set-screw inserted in the frame for holding the bearing pin in its adjusted position.

17. In a typewriting machine, a type-bar, a pivot rod to which said type-bar is attached, and frame members provided with bearings for the opposite ends of said pivot rod, one of said bearings embracing a pivot screw in endwise alinement with the pivot rod, and the other of said bearings embracing an endwise sliding, spring-pressed bearing pin also arranged in endwise alinement with said pivot rod.

18. In a typewriting machine, a type-bar, a pivot rod to which said type-bar is attached, and frame members provided with bearings for the opposite ends of said pivot rods, one of said bearings embracing a pivot screw in endwise alinement with said pivot

rod and a set-screw to hold said pivot screw from turning and the other of said bearings embracing an endwise sliding spring-pressed bearing pin, also in endwise alinement with the pivot rod, and a set-screw for holding said bearing pin from movement.

19. In a typewriting machine, a type-bar, a type-head, and two attaching screws for securing the type-head to the type-bar, said type-bar having elongated apertures extending transversely of the bar through which said attaching screws pass permitting thereby relative movement of said parts.

In testimony, that I claim the foregoing as my invention I affix my signature in presence of two witnesses, this 3rd day of August A. D. 1905.

CHARLES S. NICKERSON.

Witnesses:

TAYLOR T. BROWN,
E. R. WILKINS.