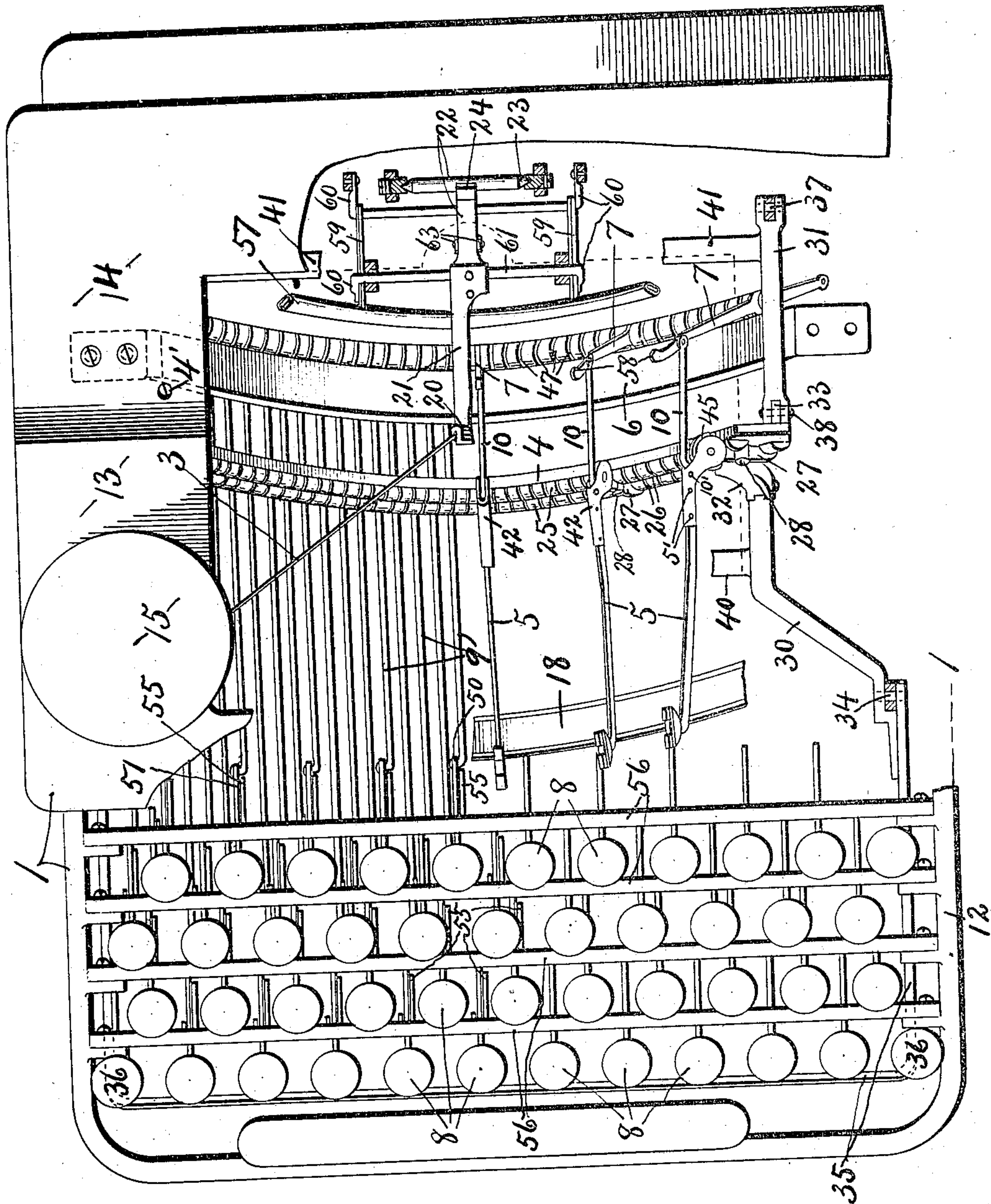


No. 819,782.

PATENTED MAY 8, 1906.

H. A. MOYER & E. G. LATTA.
TYPE WRITING MACHINE.
APPLICATION FILED APR. 18, 1905.

4 SHEETS—SHEET 1.



WITNESSES:

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Fig. 1.

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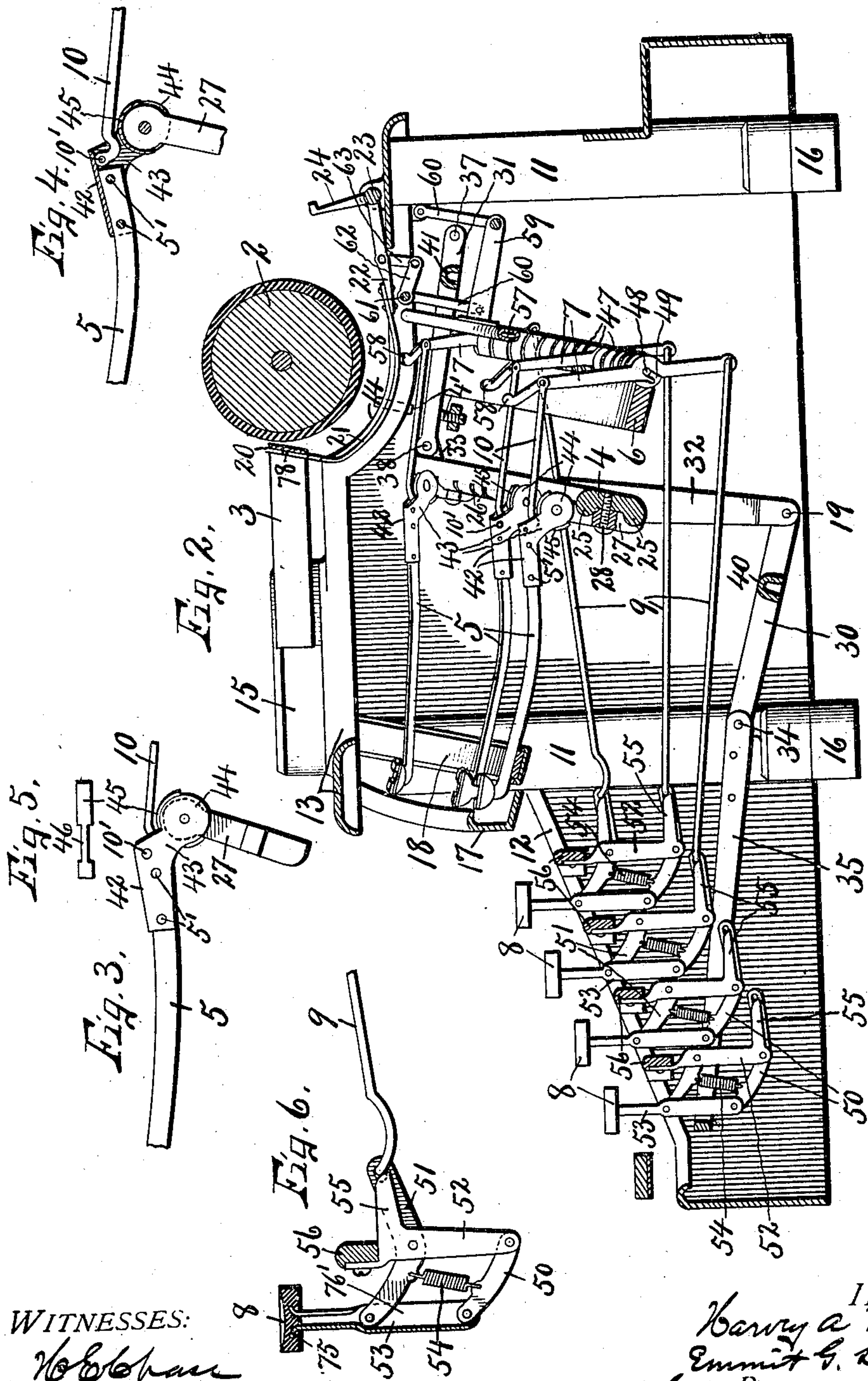
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4 SHEETS—SHEET 2.



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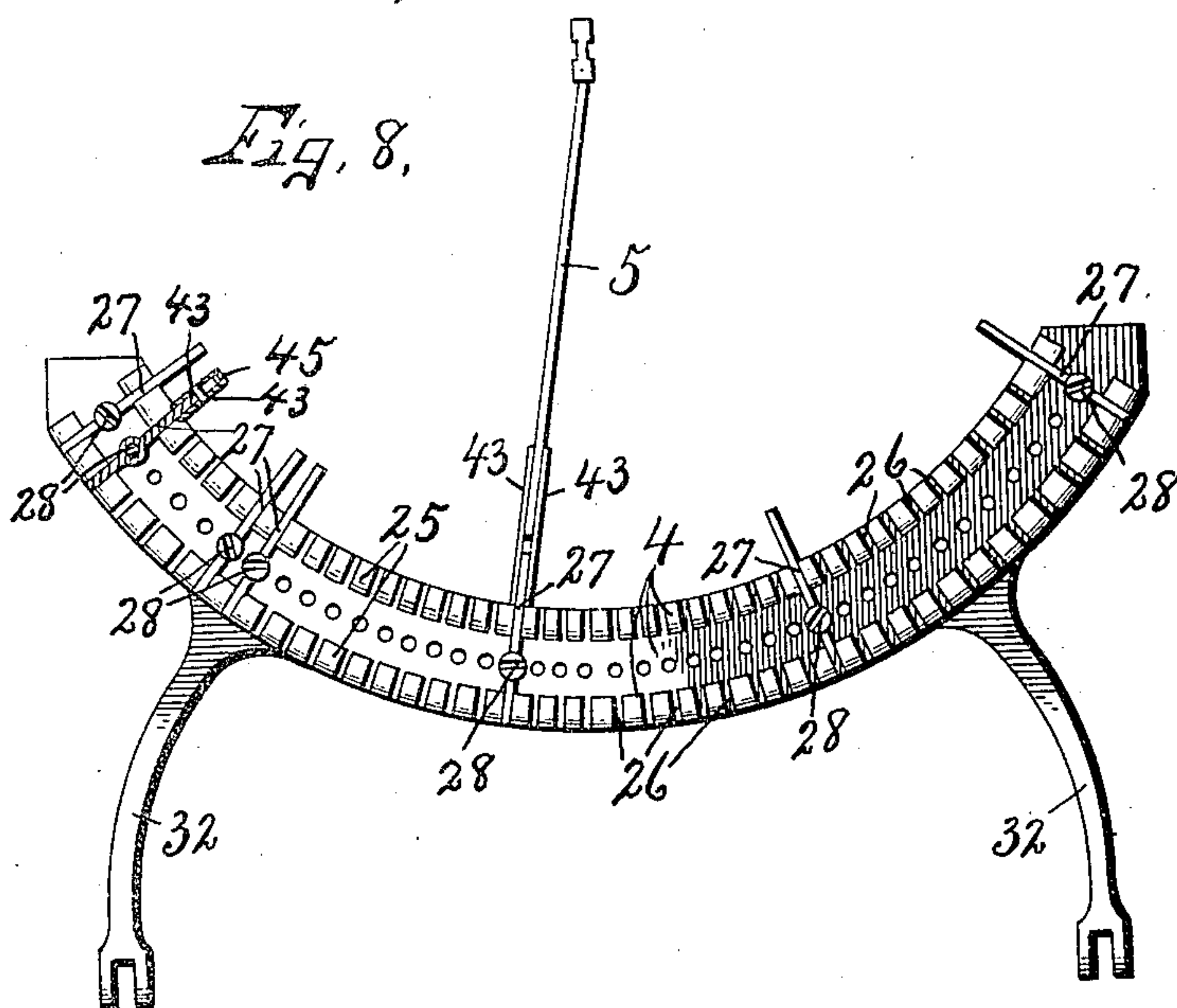
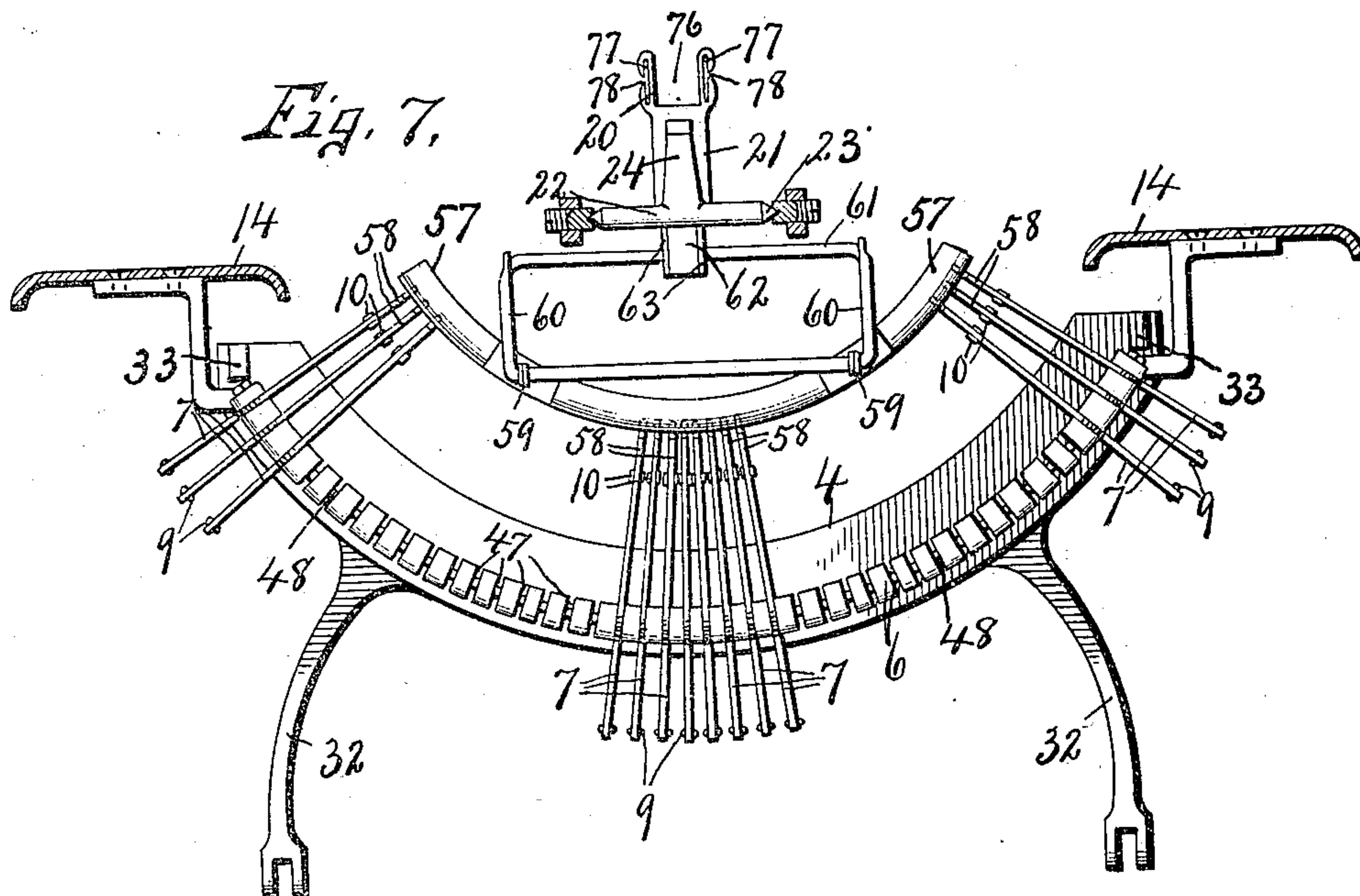
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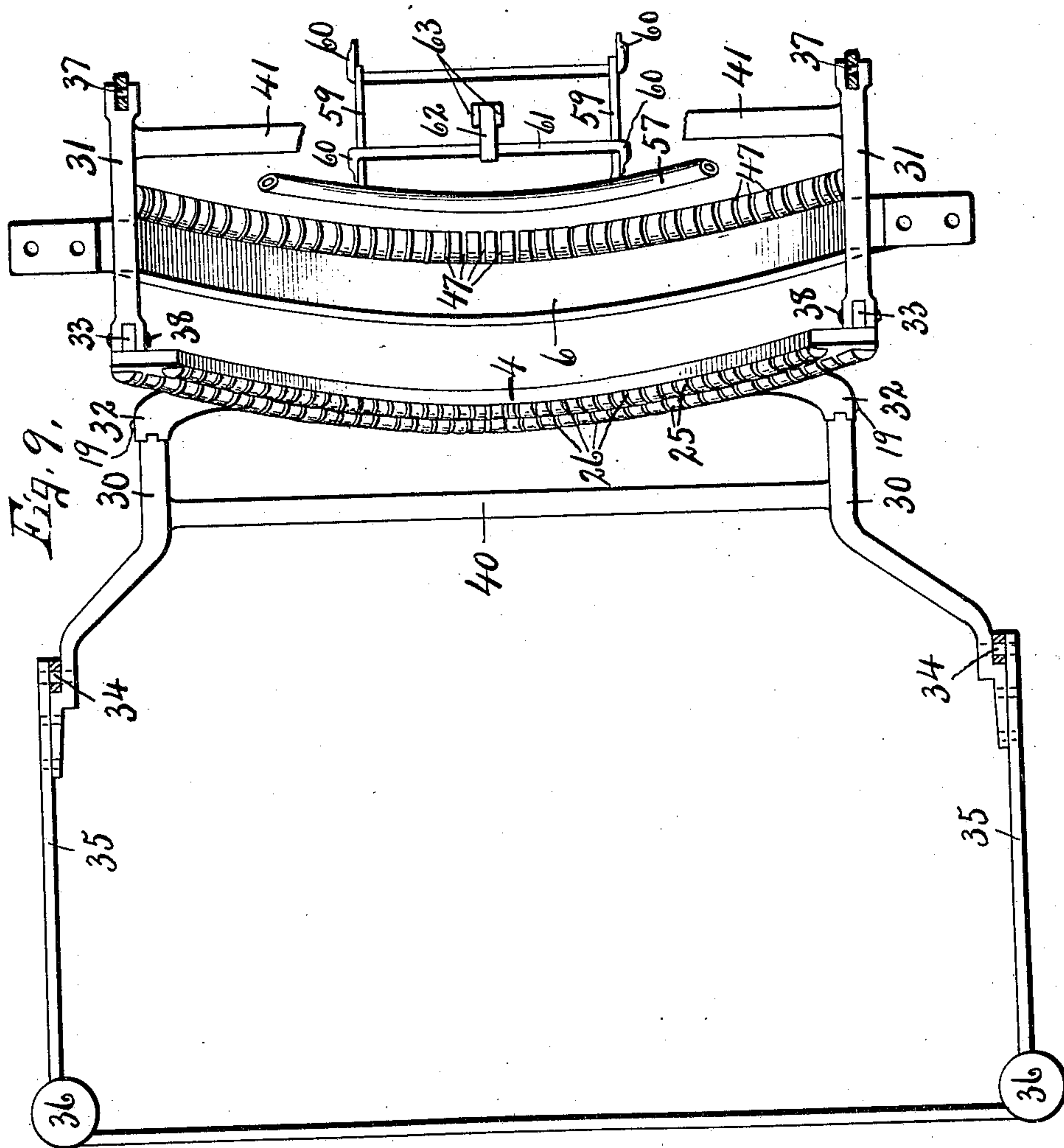
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UNITED STATES PATENT OFFICE.

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TYPE-WRITING MACHINE.

No. 819,782.

Specification of Letters Patent.

Patented May 8, 1906.

Application filed April 18, 1905. Serial No. 256,203.

To all whom it may concern:

Be it known that we, HARVEY A. MOYER and EMMIT G. LATTA, of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Type-Writing Machines, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to improvements in type-writing machines of the class commonly known as "visible" or "front-strike" machines, and refers more particularly to the type-bar action and its associated mechanism, including the platen-shifting and ribbon-vibrating mechanisms.

In this class of machines the type-bars are pivoted in a circular arc below the platen so as to strike at one and the same printing-point, and in the employment of a single keyboard each type-bar is provided with a plurality of type, and its supporting-segment is shiftable, so as to bring either type of the same bar to one and the same printing-point when operated.

One of the primary objects of this invention is to bring all of the parts into compact arrangement and still leave ample clearance for the free action and adjustment of any one of the parts without interference with the others.

Another object is to provide a type-bar action which may be operated under an extremely light pressure and movement of the key and in which the type-bar is thrown to the printing-point under an accelerated movement and is locked in its position of rest against rebound.

A further object is to provide special mechanism to prevent the entrance of dust or dirt to the type-bar and link-bearings and at the same time to afford a simple and durable bearing for each type-bar which is independent of the others and enables any one type-bar to be removed without disturbing the bearings for the other bars.

A still further object is to provide a comparatively light universal bar within the range of action of the upper ends of the intermediary levers which actuate the type-bars, whereby vibratory movement is transmitted to the ribbon-supporting frame as each type is thrown to its printing position, the purpose being to secure the instantaneous vibration of the ribbon just before the type reaches the printing-point, so as to avoid any load upon

the initial movement of the key in throwing its type to the printing-point.

Another object is to support the type-bar segment free from the main frame so as to avoid the use of guides or similar power-consuming friction devices and still maintain the segment in operative position against end-wise or lateral movement or vibration.

Other objects relating to the specific mechanisms hereinbefore mentioned will be brought out in the following description.

In the drawings, Figure 1 is a top plan of the greater portion of our improved type-writing machine below the platen, portions of the frame being broken away and some of the type-bars and their actuating mechanism being omitted to show more clearly the construction and operation of the several mechanisms. Fig. 2 is a longitudinal vertical section through the machine seen in Fig. 1, showing in addition thereto the platen. Figs. 3 and 4 are detail views of a portion of one of the type-bars and its hanger and dust-guards. Fig. 5 is a plan of the spring dust-guard seen in Fig. 3. Fig. 6 is a side elevation of a portion of one of the type-bar-actuating mechanisms, including the key and its supporting-bracket. Fig. 7 is a rear elevation of the type-bar-supporting segment and other mechanisms at the rear of said segment, including some of the intermediary levers and their supporting-segments and also the universal bar and ribbon-vibrating mechanism. Fig. 8 is a front elevation of the type-bar-supporting segment, showing some of the individual type-bar hangers and one of the type-bars as thrown to the printing position. Fig. 9 is a top plan of the type-bar-supporting segment and its supporting and shifting means, showing also the support for the intermediary levers and the universal bar and parts attached thereto.

This machine comprises, essentially, a rectangular frame 1, a platen 2, and ribbon 3; a type-bar-supporting segment 4, upon which is pivoted a series of type-bars 5; a second circular segment 6, upon which is pivoted a series of intermediary levers 7, and a series of keys 8, which are connected by draw-rods 9 to the intermediary levers 7, the latter levers being connected to their respective type-bars by means of the links 10.

The main frame 1 is especially adapted to conform to the compact arrangement of the various mechanisms and is preferably rectangular in top plan and provided with suit-

able corner-posts 11, the front inclined extension 12, in which the keys 8 are located, and a top 13, having its rear portion depressed at 14 to receive the platen 2, while the front portion is substantially flat and receives suitable casings 15 for the ribbon reels or spools. The corner-posts 11 are provided with suitable rubber feet 16 for a purpose well known, while the front end of the top is provided with a depending shield 17 and a suitable type-bar rest 18, which is located just at the rear of the shield, said shield being disposed in an arc concentric with the type-bar rest 18 and is of sufficient depth to conceal the front ends of the type-bars.

The platen 2 may be mounted upon any suitable carriage, not necessary to herein illustrate or describe and is only shown to indicate its position with reference to the frame and type-bars and also to show the association between the platen and supporting-frame, particularly with reference to the depression 14, by means of which the platen may be materially lowered.

The ends of the ribbon 3 are wound upon suitable spools or reels, (not shown,) but which are located within the casings 15 at opposite sides of the center of the top 13, and the intermediate portion of said ribbon is supported close to the platen in a suitable guide 20, which is mounted upon the free end of a vibratory frame or support 21, extending downwardly and rearwardly under the platen 2 and secured at its rear end to a rocking frame 22. This frame 22 is pivoted at 23 to the top of the main frame and is provided with an upwardly-projecting escapement-pawl 24, which is adapted to coact with any suitable escapement mechanism. (Not necessary to herein illustrate or describe.)

The type-bar-supporting segment 4 is disposed below and slightly in front of the platen 2 and consists of a circular segment of a metal ring inclining upwardly and rearwardly from its lower central portion and having its upper and lower edges formed with beads 25, which are slotted at intervals at 26 to receive a number of individual hangers 27 for the type-bars 5. These slots 26 are disposed in radial lines extending from the printing-point at the front face of the platen and are cut back to the base of the beads to receive the individual hangers 27 and hold them separated one from the other. It therefore follows that these several hangers 27 are also disposed in radial lines from the printing-point. Each of said hangers consists of a comparatively thin strip of metal fitting closely in its slot 26 and thickened centrally for receiving an individual clamping-screw 28, as best seen in Fig. 2 and 8, the upper ends of said hangers extending beyond the upper bead 25 and terminating in an arc concentric with the segment 4. It is

now clear that by seating the hangers 27 in their respective grooves in the manner just described each is held in place by a single screw against lateral or endwise movement and may be removed and a new one replaced without disturbing any of the other hangers or the type-bars which are supported thereby. Another advantage in mounting the hangers in the manner described upon the front face of the segment 4 is that the screw-heads face the open front of the machine in alinement with the space between the bottom of the shield 17 and upper row of keys 8, so that a screw-driver or similar implement may be readily inserted through such space to remove any one of the screws, and thereby permit the removal of any one of the hangers and its type-bar without in any way disturbing the position of the other type-bars or hangers.

In this class of machines having a single keyboard and in which the type-bars are provided with two or more type it is necessary to shift either the platen or the segment to enable either of the type to be brought to one and the same printing-point, and in this instance we have shown the segment 4 as shiftable and as mounted upon front and rear supporting-levers 30 and 31, and in order that these levers may not interfere with the operation of the other mechanisms of the machine the opposite ends of the segment 4 are provided with depending arms 32 and with rearwardly-projecting lugs or ears 33, the depending arms 32 being spaced apart a sufficient distance to permit the interposition of the draw-rods 9 and still leave ample clearance for the free operation of the several draw-rods and movement of the segment 4 without friction or interference one with the other. This segment-shifting mechanism is best seen in Figs. 1, 2, and 8, and it will be observed that we provide two of the lower levers 30, one at each side of the frame and a corresponding number of the upper supporting-levers 31, which are similarly located at opposite sides of the main frame, or rather at the opposite ends of the segment 4. The lower levers 30 are pivoted at 34 to the main frame 1 in front of the segment 4, and their rear ends are pivoted at 19 to the lower ends of the arms 32; the front ends of the said levers 30 being connected to a forwardly-extending U-shape frame 35, having suitable finger-keys 36, whereby the frame 35 and levers 30 may be rocked upon their fulcrums 34 to elevate the segment 4. The upper pair of levers 31 are pivoted at their rear ends at 37 to the main frame 1, and their front ends are pivoted at 38 to the rearwardly-projecting lugs or ears 33 on the ends of the segment 4, the distance between the fulcrum 37 and pivot 38 of the levers 31 being substantially equal to the distance between the fulcrums 34 and pivot 35 of the levers 30, and both

of these levers 30 and 31 therefore move through equal arcs in the operation of shifting the segment and through equal distances above and beneath radial lines drawn at right angles to the plane of the segment 4 through their fulcrums, so that the segment stands in the same plane in both its upper and lower positions. The type-bar segment is therefore supported solely by the levers 30 and 31 between the sides of the main frame, so as to have a free up-and-down movement without the use of end guides or bearings, thereby reducing the resistance by friction and consequent loss of power incidental to the use of guideways or end bearings. Each pair of levers 30 and 31 is connected by transverse bars 40 and 41 to stiffen or brace them against torsional or lateral strains, and thereby more firmly sustain the segment against endwise vibration or displacement.

The upwardly-projecting ends of the hangers 27 above the segment 4 are preferably circular, and the rear ends of the type-bars 5 are each provided with a sheet-metal hood 42, which is folded upon and secured to opposite faces of the rear end of the type-bar proper to form opposed side plates 43 and an intervening space substantially equal to the thickness of the type-bar and upper circular end of the hanger, said side plates being provided with depending circular ears 44, which are of slightly-greater diameter than that of the circular head of the hanger and are pivoted to opposite faces of said hanger concentric with its circular head. The object in making the ears 44 of slightly-greater diameter than the circular head of the hanger is to permit the use of a semicircular dust-guard 45, constituting a split spring-band which is inserted between the opposed plates 43 of the type-bar above the hanger 27 and is seated by its own tension against the periphery of the ears 44. The portion of this dust-guard between its ends is reduced in width at 46 to substantially the width of the intervening space between the opposed side plates 43 and of a length substantially equal to the width of the portions of said plates between their pivots and type-bar, while the opposite ends of the dust-guard have a width substantially equal to the combined width of the head of the hanger and opposite ears 44, so that when the dust-guard is inserted between the opposed plates 43 by turning it edgewise vertically and then tilting its concave face downwardly the reduced portion 46 lies between the plates, while the opposite wider ends cover the joints between the plates and head of the hanger and effectively exclude the dust from such joints. When this split spring dust-guard is placed in operative position, it automatically seats itself against the periphery of the ears 44 by its own tension, and is therefore self-retaining and moves with the type-bar around the circular upper face of the hanger,

but not in contact therewith, by reason of the larger diameter of the ears 44, which hold the spring a slight distance away from the hanger. The forwardly-projecting ends of the side plates 43 are reduced in width to about the width of the adjacent end of the type-bar proper and are rigidly secured to said type-bar by suitable rivets 5'; but the rear end of the type-bar proper is made to terminate a short distance from the rear end of the hood 42, so as to leave a space opening from the rear end of the hood, in which space is pivoted at 10' the front end of the corresponding type-bar-actuating member or link 10. These links 10 extend rearwardly from the heels of their respective type-bars and are pivotally connected to their respective intermediary levers 7 above the fulcrums of the latter, which are in turn pivoted in a circular arc upon the circular segment or comb 6, both of which are arranged concentric with the arc in which the type-bars are pivoted.

The segment or comb 6 is rigidly secured to the main frame of the machine and is provided with a series of radial slots 47, receiving the levers 7, which are fulcrumed intermediate their ends upon a common wire or pivotal support 48, each lever having an open-sided slot or bearing 49 in its front face or side to receive said pivotal wire and to permit each intermediary lever to be readily assembled or removed from said wire without disturbing the others. These intermediary levers 7 are all of the first order and extend some distance below their fulcrums, and their lower ends are connected by the draw-bars 9 to their respective keys 8 through the medium of a pair of parallel key-levers 50 and 51, which are pivoted in planes one above the other upon suitable supporting-brackets 52.

It will be observed that the lower ends of the intermediary levers 7 to which the draw-bars 9 are attached are disposed in a circular arc transversely of the machine, and therefore the levers at the ends of the arc are elevated a considerable distance above those at the center, and we prefer to keep the draw-bars 9 in as nearly a horizontal plane as possible, and for this purpose the draw-bars 9, which are connected to the intermediary levers at or near the center of the arc 6, have their forward ends connected to the lower levers 50, while those which are connected to the intermediate levers nearer the ends of the segment 6 have their front ends connected to the upper levers 51, which are extended rearwardly from their fulcrums for this purpose.

Where the lower levers 50 are connected to the draw-bars, the upper levers terminate at their fulcrums, and, on the other hand, where the upper levers are connected to the draw-bars the lower levers 50 terminate at their fulcrums, and in both cases where the levers are connected to the draw-bars these levers

are of the first order—that is, they extend forwardly and rearwardly from their fulcrums, the rear ends being connected to the draw-bars, while the front ends are pivotally
5 connected to the keys 8.

We have previously stated that the levers 50 and 51 of each pair are substantially parallel and project forwardly equal distances from their fulcrums, and the keys 8 are provided
10 with depending stems 53 and are pivoted to the forward ends of the levers 50 and 51, so that by depressing one of the keys the forward ends of both of its supporting-levers 50 and 51 are depressed, and the rear ends of the
15 levers which are connected to the draw-bars consequently throw upwardly and forwardly, thereby rocking the levers 7 upon their fulcrums and actuating the corresponding type-bars through the medium of the connecting-
20 links 10. Each of the keys 8 and its corresponding type-bar and actuating mechanism is returned to its normal position by means of a spring 54, which has its upper end
25 connected to the upper lever 51 near its fulcrum, while its lower end is connected to the lower lever 50 near its pivotal connection with the key, whereby when the key is depressed the spring is tensioned, and such tension operates to restore the key and its con-
30 nections with the type-bar to their normal positions.

It will be observed of the draw-bar 9 that the pivotal connection with the key-lever 50 is nearly in a direct line between the fulcrum
35 of said lever and connection of the draw-bar with the intermediary lever 7, and therefore when the key is depressed the intermediary lever and its type-bar are thrown to the printing position with an accelerated move-
40 ment and are also locked in their normal position of rest against rebound. This locking of the type-bar in its position of rest is further facilitated by providing the bracket 52
45 with a rearward extension 55, having an inclined front end for engaging the front end of the draw-bar when the operating parts return to the normal position, in which position the inclined cam-face on the rear end of the extension 55 forms an abutment for the adja-
50 cent end of the draw-bar 9 to prevent forward movement of the draw-bar in its pivotal slot in the lever 50, thereby locking the intermediary lever and type-bar against rebound.

The brackets 52 are secured to and depend from transverse bars 56, which in turn are secured to the sides of the main frame of the machine and are spaced apart and stepped one above the other from front to rear of the
55 extension 12.

It will be seen upon reference to the foregoing description that the part 42, which is made of a folded piece of sheet metal secured to the rear end of the bar 5, forms a hood for
65 protecting the pivotal connection 46 between

the type-bar and its actuating-link 10 to prevent the entrance of dust in the bearing and that the spring dust-guard 45 serves a similar purpose of protecting the joint between the heel of the type-bar or ears 44 and hanger 27. 70

By mounting the keys 8 in the manner previously described upon the ends of parallel levers it is evident that a parallel key-motion is provided and that by connecting this key so as to afford an accelerated action of the
75 type-bar from its position of rest to the printing position the key may be depressed under an extremely light touch and at the same time always travels in a vertical plane. Another object of this accelerated movement of
80 the type-bar is that the momentum given to the type-bar in throwing it from its normal to its printing position is utilized through the medium of the intermediary levers to operate a universal bar or bail 57, 85
which in turn is connected to actuate the ribbon-vibrator. In order to accomplish this without adding any appreciable load to the type-bar action, the lever 7 is provided with an upward extension 58, which when the
90 type-bar is thrown to the printing position has a rapid rearward movement and only encounters the universal bar near the limit of such movement, so that the levers 7 move freely through the greater part of their stroke, 95
at which time the type-bar has acquired its maximum momentum, and this operates to further impel the upper ends of the levers 7 rearwardly until they engage and operate the universal bar 57 without any extra pressure 100
upon the keys. In order that this universal bar may operate as easily as possible, it is provided with rearward extensions 59, to which are connected upwardly-extending parallel links 60, and these links are in turn piv- 105
oted to the main frame at the rear of the universal bar. The forward links 60 are mounted upon a rock-shaft 61, to which is secured a rearwardly-projecting arm 62, and this arm 62 is connected by a link 63 to the ribbon-vi- 110
brating frame 22, and it therefore follows that when the upper end of one of the levers 7 is brought into engagement with and operates the universal bar 57 the free end of the arm 62 is rocked upwardly, and thereby rocks the 115
front end of the frame 22 upwardly upon the pivot 23, this movement being sufficient to bring the ribbon-guide 20 close to the front face of the platen 2, thereby forcing the ribbon 3 into the path of the printing-type. 120
This action of the ribbon-vibrator is almost instantaneous and near the limit of the printing stroke of the type-bar, so that as soon as the type-bar recedes from the platen the ribbon-vibrator is at once freed and returns to 125
its normal position.

By pivoting the ribbon-vibrating frame 22 in a plane below and at the rear of the platen it is evident that the printing portion of the ribbon is not only moved upward and down- 130

ward, but is also moved toward and from the front face of the platen, so as not to blur or otherwise soil the paper being printed upon when the type-bars are not in action.

5 In order that the universal bar may be given the same movement by each intermediate lever during the printing action of the type-bar, the upper ends of the extensions 58
10 which contact with the universal bar and also the universal bar are disposed in circular arcs concentric with the arc in which the intermediate levers are pivoted, and the operating ends of said intermediate levers are therefore equidistant from their fulcrums, and the connections
15 between said intermediary levers and the keys are also so arranged as to move all of the levers 7 through equal arcs, and therefore each intermediary lever produces the same action upon the ribbon-vibrator

20 In Fig. 6 of the drawings we have shown a key and its stem in section. The key-stem consists of a light sheet-metal tube which is split longitudinally through one of its sides, and its upper end is expanded or swaged out-
25 wardly to form an annular shoulder or head 75, while the lower portion of said stem is somewhat flattened or U shape in cross-section, so as to leave an open-sided slot 76', in which the adjacent ends of the levers 50 and 51
30 are inserted and pivoted to the sides of the flattened portion, so as to practically conceal the pivots, or rather the open joints, and the closed side at the front of the stem serves a similar purpose and also presents a neat ap-
35 pearance aside from its service in excluding dust and dirt from the joint. The finger-key 8 is made of rubber or may be made of a composite material, and if made of rubber it is placed upon the upper end of the stem, so as
40 to inclose the head 75 and subsequently vulcanized, thereby permanently attaching it to the stem.

Upon reference to Fig. 7 it will be observed that the ribbon-guide 20 has a central open-
45 sided slot 76, forming opposed arms, each of which is provided with a vertical slot 77, and the outer wall of each slot has a central transverse slit 78, through which the ribbon may be inserted edgewise into the slots 77. This
50 formation of ribbon-guide affords an easy means of attaching the central portion of the ribbon to the guide without threading the ribbon endwise therethrough.

The associated parts of the several mechanisms hereinbefore described are particularly light and compact and at the same time are constructed with a view to durability, strength, and permanency of alinement and also with the object of producing an easy
60 action under a light touch or pressure upon the keys. It will be observed that the pivotal point of connection between the draw bar 9 and its actuating-lever 50 is located normally just above a direct line drawn be-
65 tween the fulcrum of said lever and the point

of connection of the draw-bar 9 with the intermediate lever 8. The object of this is to obviate any lost motion of the key, as 8, in the operation of the type-bar, and at the same time to afford approximately a toggle-
70 lock in the flexing joint between the draw-bar 9 and its actuating-lever 50 when the type-bar is at rest to prevent rebound. Another important factor in maintaining ease of action and permanent alinement is the lo-
75 cating of the side plates on the heel of the type-bar so as to lap upon the side faces of the hanger and allow the pivotal pin to play freely in the hanger and at the same time be firmly riveted to the side pieces. It will also
80 be observed that the universal bar 57 is of light tubular structure and is suspended wholly by the swinging links 60, so as to have an easy parallel motion backwardly and forwardly, the engaging face of this tubular
85 universal bar being located some distance below the pivotal bearings for the links 60, thereby affording an easy leverage, which enables the universal bar to be actuated under
90 an extremely light pressure, which makes it practicable to transmit motion from said levers 7 to the ribbon-vibrator. We have previously intimated that the point of connection between the draw-bar 9 and its actuating-lever 50 has a slight lost motion, which is
95 accomplished by providing an elongated bearing or slot in the end of the lever 50, the object of which is to allow the adjacent end of the draw-bar 9 to ride freely over the end or abutment on the extension 55. 100

The operation of our invention is as follows: When it is desired to print with the lower-case type, it is simply necessary to press the desired key 8, which has a parallel
105 vertical motion and operates the lever 50, thereby drawing the lower end of the lever 7 forwardly through the medium of the draw-rod 9, which throws the upper end or extension 58 of the lever 7 rearwardly with an accelerated motion, and this accelerated mo-
110 tion is in turn transmitted to the type-bar through the medium of the link 10, which is connected to the type-bar above its pivot. As the type-bar continues its upward movement toward the platen with an accelerated
115 motion the extension 58 is simultaneously traveling toward the universal bar 57, and the momentum given to the type-bar operates to carry the upper end of the lever 7 against the universal bar, thereby effecting
120 an upward vibration of the central portion of the ribbon in front of the platen and in the path of the printing-type. As soon as the printing operation is effected the type-bar and its actuating mechanism, including the
125 key 8, is returned to its normal position by the spring 54, and these parts are locked in their position of rest by the engagement of the front end of the draw-bar 9 with the abutment on the end of the extension 55, the rib- 130

bon-vibrating frame and universal bar returning to their normal positions by gravity, or such return may be effected by a suitable spring or weight, if desired. When it is desired to print with the upper-case type, it is simply necessary to depress one or the other of the keys 36 at the front corner or corners of the U-shape segment-shifting frame 35, where upon the rear ends of the levers 30 and segment 4 connected thereto are elevated the desired distance to bring the upper-case type to the same printing-point. The shifting mechanism of the segment 4 is limited by suitable stops 4', and as soon as the pressure upon the keys 36 is revolved the segment returns by gravity to its normal position. It will be observed that the segment-supporting arms 30 and 31 move equal distances above and beneath lines drawn at right angles to the segment and passing through the fulcrums 34 and 37, respectively, thereby maintaining the segment in the same plane in both of its extreme upper and lower positions.

25 What we claim is—

1. In a type-writing machine, the combination with a pair of opposed side plates, of a type-bar, an actuating member and a hanger each having one end located between the side plates, and attached thereto, said plates being united above and covering the adjacent end of the actuating member.

2. In a type-writing machine, the combination of a type-bar, its actuating member, and a hood composed of a piece of folded sheet metal rigidly connected to the bar, and pivotally connected to the actuating member, and hanger and embracing between its sides, the adjacent portion of the bar, actuating member, and hanger.

3. In a type-writing machine, the combination of a type-bar, its hanger, and actuating member, each consisting of a single piece of metal, with a sheet-metal hood rigidly connected to the bar, and pivotally connected to the hanger and actuating member said hood having opposite sides, embracing between them the bar, actuating member, and hanger.

4. In a type-writing machine, the combination with a type-bar, its hanger, and a rearwardly-extending actuating member pivoted to the type-bar, of a hood connecting the bar to its hanger, and covering the adjacent pivoted end of the actuating member.

5. In a type-writing machine, the combination with a type-bar, its hanger, and actuating member, of a sheet-metal hood connecting said parts and forming a dust-excluding cover extending over the pivot of the actuating member.

6. In a type-writing machine, the combination with a type-bar and hanger both substantially the same thickness, of a pair of opposed parallel side plates closely fitting

upon the sides of the bar and hanger and pivotally connected to the hanger, and an actuating member for the bar loosely pivoted between the side plates at a point above and in front of the hanger when the parts are in their normal position, said plates being united above the pivot of the actuating member.

7. In a type-writing machine, the combination, of a type-bar, its hanger, and end actuating member pivoted to the type-bar, with a folded sheet-metal hood extending over the inner end of the type-bar and adjacent pivot of the actuating member and pivotally connected to the hanger.

8. In a type-writing machine, the combination with a type-bar and opposed side plates thereon, a hanger, a removable sheet-metal dust-guard self-retained between the side plates and projecting rearwardly over the hanger.

9. In a type-writing machine, the combination of a type-bar and opposed side plates thereon, a central hanger, a curved sheet-metal dust-guard arranged between the plates and constituting a clamp by which it is self-retained between the plates.

10. In a type-writing machine, the combination with a type-bar, of opposed circular bearings attached to the bar, a hanger located between the bearings and having a circular end of smaller diameter than that of the bearings of the bar, and a separate spring-retained sheet-metal dust-guard closely fitting between the bearings and concentric with the circular end of the hanger.

11. In a type-writing machine, the combination with a type-bar, of opposed pivot-bearings having forwardly-projecting portions secured to the bar and of less width than the pivot-bearings, a separate spring-retained sheet-metal dust-guard reduced in width between its ends to fit between the bearings and its ends of sufficient width to rest on the bearings and exclude dust from the pivot.

12. In a type-writing machine, the combination with a type-bar, of a pair of opposed ears, a hanger between the ears and a detachable curved sheet-metal dust-guard of spring temper springing against the periphery of said ears.

13. In a type-writing machine, the combination with the platen of a series of pivoted type-bars arranged to strike toward the front of the platen, a shiftable segment movable independently of the platen supporting the type-bars, opposite arms pivotally connected to the opposite ends of the segment and to the frame of the machine in rear of the segment, and means for shifting the segment.

14. In a type-writing machine, the combination of a series of pivoted type-bars arranged to strike toward the front of the platen, a movable segment supporting the

type-bars, opposite arms pivotally connected to the upper part of the segment and to the frame of the machine in rear of the segment, an arm pivoted to the lower part of the segment and to the frame of the machine in front of the segment, and means for shifting the segment.

15. In a type-writing machine, the combination with a platen, of a series of pivoted type-bars arranged to strike the front of the platen; and a movable segment shiftable separately from the platen and supporting the bars, of a pair of opposite arms pivoted to the ends of the segment and to the frame of the machine in rear of the segment on a line at a right angle to the plane of the segment and midway between the upper and lower positions of the pivotal connection of the arms to the segment, and means for shifting the segment.

16. In a type-writing machine, the combination with a series of type-bars arranged to strike the front of the platen, and a movable segment supporting the bars, of a pair of arms pivoted to the upper part of the segment, and to the machine-frame in rear of the segment, one or more arms being pivoted to the lower side of the segment and to the machine-frame in front of the segment, the frame-pivots being in all cases on a line extending at right angles to the plane of the segment midway between the upper and lower positions of the segment-pivots whereby the segment is in the same plane in either position, and means for shifting the segment.

17. In a type-writing machine, the combination with a platen, of a series of pivoted type-bars arranged to strike the front of the platen, and a movable segment shiftable separately from the platen and supporting the bars, of a pair of rigidly-connected arms pivoted to the ends of the segment in a plane above its central portion and to the machine-frame in rear of the segment, and means for vibrating the segment.

18. In a type-writing machine, the combination with a platen, of a series of pivoted type-bars arranged to strike the front of the platen, and a movable segment shiftable separately from the platen and supporting the bars, of two pairs of arms, those of each pair being rigidly connected to each other and pivoted to the segment and to the machine-frame, and means for shifting the segment.

19. In a type-writing machine, the combination with a platen, of a series of pivoted type-bars arranged to strike the front of the platen, and a movable segment shiftable separately from the platen and supporting the bars, of opposite arms pivoted to the segment and to the machine-frame, a cross-bar of angular cross-section rigidly secured to the arms between their connections with the segment and frame, and means for shifting the segment.

20. In a type-writing machine, a key-stem of tubular form having its upper end expanded to form an enlarged head and its lower end flattened, a key attached directly to the enlarged head, in combination with a type-bar and connections between the key and type-bar, one of which connections is secured to the flat portion of the key-stem.

21. In a front-strike type-writing machine, a type-bar pivoted to strike upwardly and rearwardly, a bell-crank at the front of the type-bar, a manual attached to one end of the bell-crank, a pivoted link parallel with the operating end of the bell-crank, and a helical spring connecting the link and bell-crank and acting to return the bell-crank to its normal position.

22. In a front-strike type-writing machine, a type-bar pivoted to strike upwardly and rearwardly, a bell-crank at the front of the type-bar, an operating-key connected to one end of the bell-crank, a pivoted link parallel with the bell-crank, one of the last-named parts being located above the other, and a helical spring attached to one of said parts near its fulcrum and to the other of said parts farther away from its fulcrum.

23. In a front-strike type-writing machine, a type-bar pivoted to strike upwardly and rearwardly, a key and parallel levers located one above the other at the front of the type-bar and having corresponding ends connected to the keys, one of the levers being extended beyond its fulcrum and connected indirectly to its type-bar, and a helical spring having its opposite ends attached to said levers at different distances from their fulcrums.

24. In a type-writing machine, the combination with a series of type-bars and finger-keys, of separate connections between each type-bar and its key, each connection including a slotted lever and a draw-rod having one end pivoted in a slot of its lever to permit a limited endwise movement of the rod independently of the lever.

25. In a type-writing machine, the combination of a type-bar and finger-key, connections between the type-bar and key including a lever and a connecting-rod joined together with a lost motion whereby the rod may move in the direction of its length independently of the lever.

26. In a type-writing machine, a type-bar action including a lever and a draw-rod connected with a lost motion constituting a flexing joint, and a fixed stop or abutment engaged by the end of the rod to limit the movement of said rod when in its normal position.

27. In a type-writing machine, a type-bar action, including two levers and an interposed connecting-rod having pivotal connection with both levers, and a fixed abutment engaged by one end of the rod when in its normal position.

28. In a type-writing machine, a type-bar action including a key and a lever actuated by the key and having a slot in one end, a draw-rod pivoted in the slot and movable
5 endwise therein, the slot being disposed at an angle with the direction of extension of the rod.

29. In a front-strike type-writing machine, a type-bar having a plurality of type and piv-
10 oted to strike upwardly and rearwardly, a platen and a segment, one of which parts is movable toward and from the other in combination with a vertically-movable key-stem, a lever and pivoted to the key-stem, an indi-
15 vidual hanger for said lever, a second lever connected to the type-bar, and a connecting-rod pivoted to said levers.

30. In a front-strike type-writing machine, a type-bar action comprising a pivoted type-
20 bar having a plurality of type, a lever fulcrumed below and at the rear of the type-bar pivot and connected to said type-bar, a vertically-movable key-stem, a second lever and having one end pivoted to the key-stem, an
25 individual removable hanger for the second lever, a rod pivoted to the other end of the second lever and pivoted directly to the first-named lever, and a third lever pivoted to said hanger and to the key-stem to hold said
30 stem in an upright position.

31. In a front-strike type-writing machine, a series of type-bars pivoted in a circular arc to strike upwardly and rearwardly at one and the same printing-point, in combination with
35 a series of levers also pivoted in a circular arc at the rear of the type-bar pivots, links connected to the levers and type-bars above their fulcrums, means to actuate the levers and a
40 universal bar disposed in a circular arc in a plane above and at the rear of the links, each lever having an extension above the link engaging and operating the universal bar when the lever is actuated.

32. In a front-strike type-writing machine,
45 a type-bar action including a type-bar and a lever of the first order connected to the type-bar, and a universal bar above and at the rear of the fulcrum of the lever and engaged and operated by the upper end of said lever
50 above this connection with the type-bar.

33. In a front-strike type-writing machine, the combination with the type-bar action, including a series of levers pivoted in a circular arc and a universal bar disposed in an arc

concentric with, but of less radius than the
55 arc in which the levers are pivoted, said universal bar being engaged and actuated by the upper ends of said levers.

34. In a type-writing machine, the combination with a series of type-bars pivoted in a
60 circular arc to strike upwardly and rearwardly at one and the same printing-point, of a series of upright levers each connected to one of the type-bars and extending above its connection with the type-bar, a universal bar
65 engaged and operated by the upward extensions of the levers and separate means for actuating the levers.

35. In a type-writing machine, a type-bar and actuating means therefor, in combination with a ribbon-vibrator and escapement-
70 pawl both pivoted on the same axis, a universal bar actuated by said means and connected to operate the vibrator and escapement-pawl.

36. In a type-writing machine, a pair of le-
75 vers fulcrumed on the frame of the machine and extending toward each other from their fulcrums in different planes, one above the other, and a type-bar-supporting segment
80 mounted on the free ends of and supported wholly by the free ends of said levers.

37. In a type-writing machine, two levers fulcrumed on the frame of the machine and
85 extending toward each other in different planes, one above the other, and a type-bar-supporting segment pivotally mounted upon the free ends of said levers, the lever in the lowest plane extending forwardly from its
90 fulcrum and provided with a finger-key whereby it may be rocked to shift the segments vertically.

38. In a type-writing machine, a series of type-bars pivoted in a vertical arc, a series of upright levers pivoted in a similar arc and
95 each connected to one of the type-bars, a system of keys for operating said levers, and a universal bar curved in a vertical arc substantially parallel with that in which the levers are pivoted but above the lever-pivots
100 in the path of the upper ends of the levers.

In witness whereof we have hereunto set our hands this 14th day of April, 1905.

HARVEY A. MOYER.
EMMIT G. LATTA.

Witnesses:

H. E. CHASE,
MILDRED M. NOTT.