

No. 709,152.

Patented Sept. 16, 1902.

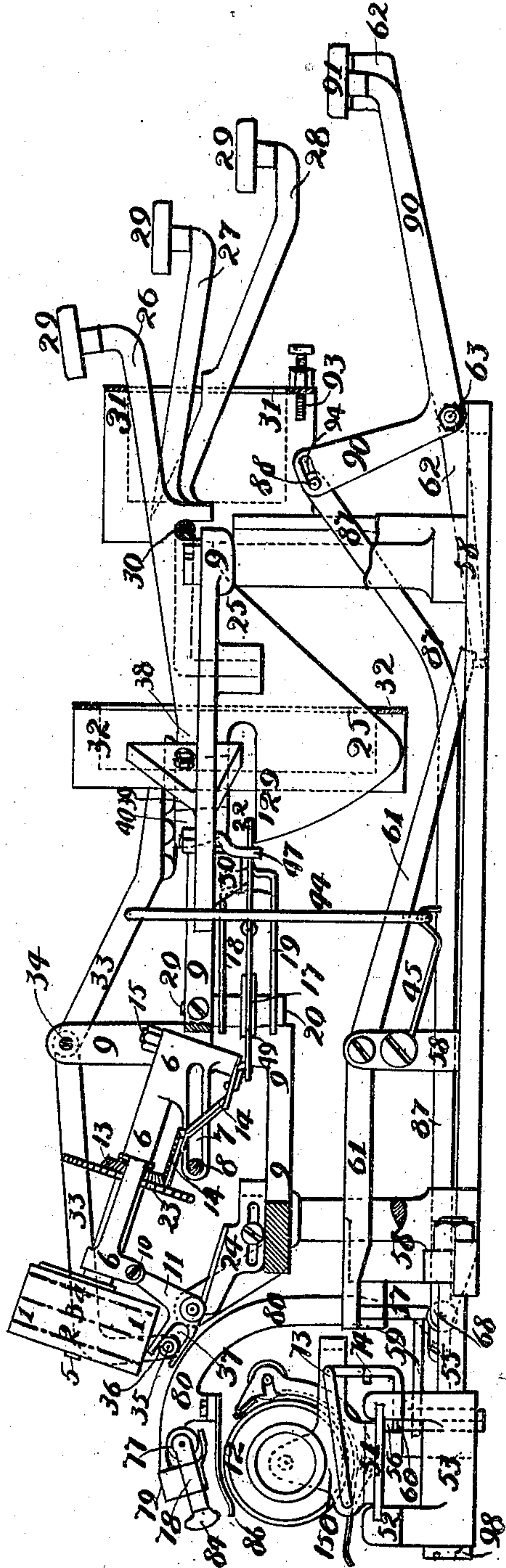
W. HUNT.
TYPE WRITER.

(Application filed June 10, 1901.)

(No Model.)

3 Sheets—Sheet 1.

FIG. 1.



WITNESSES:

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3 Sheets—Sheet 2.

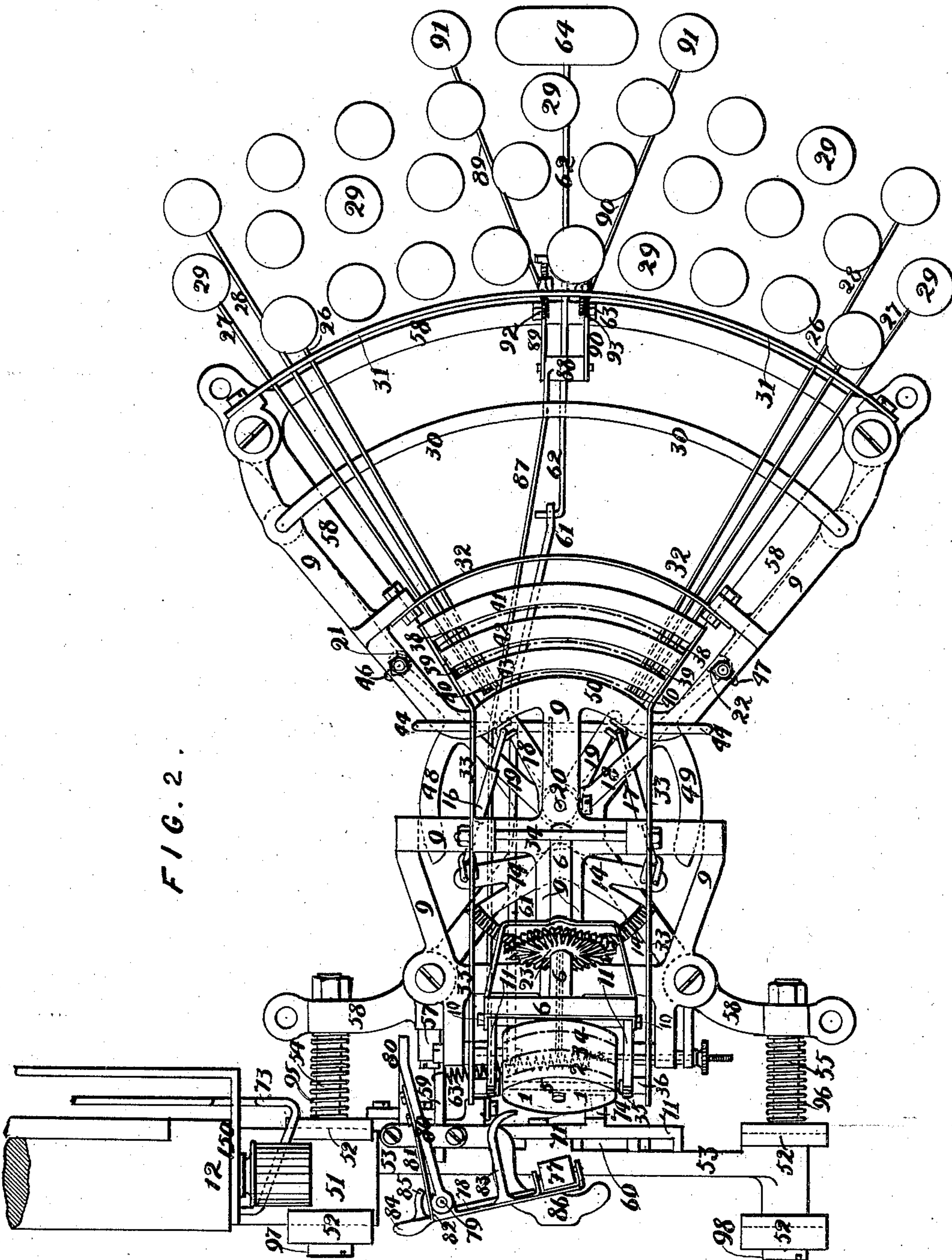


FIG. 2.

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3 Sheets—Sheet 3.

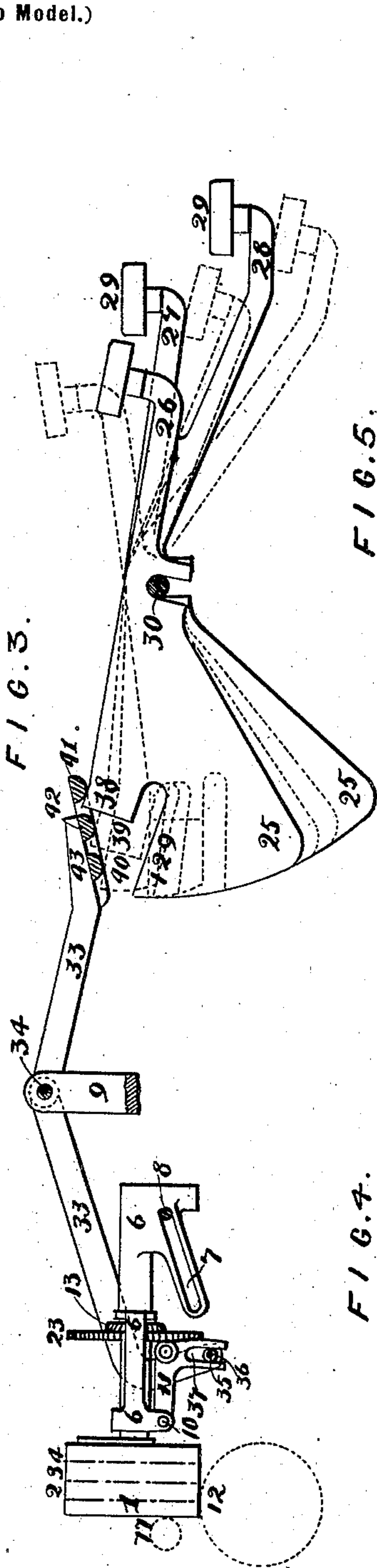


FIG. 5.

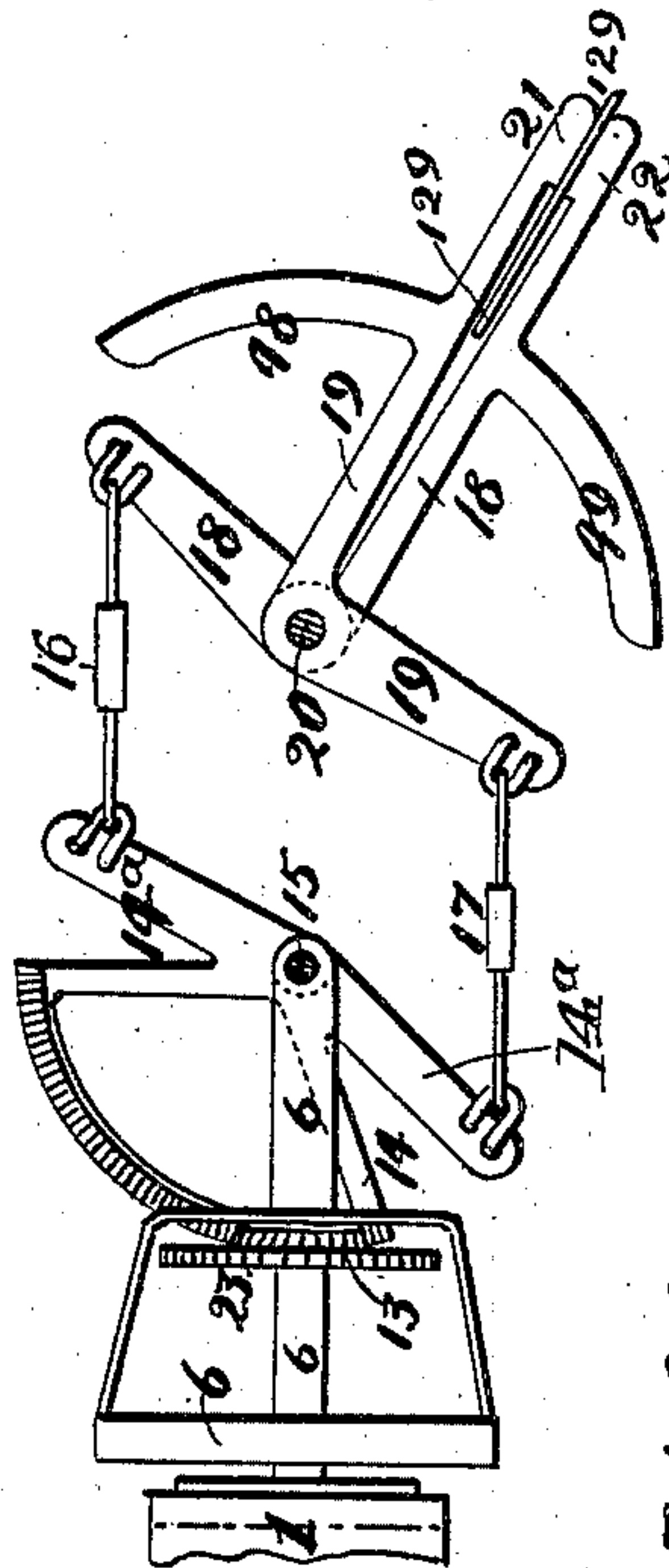


FIG. 4.

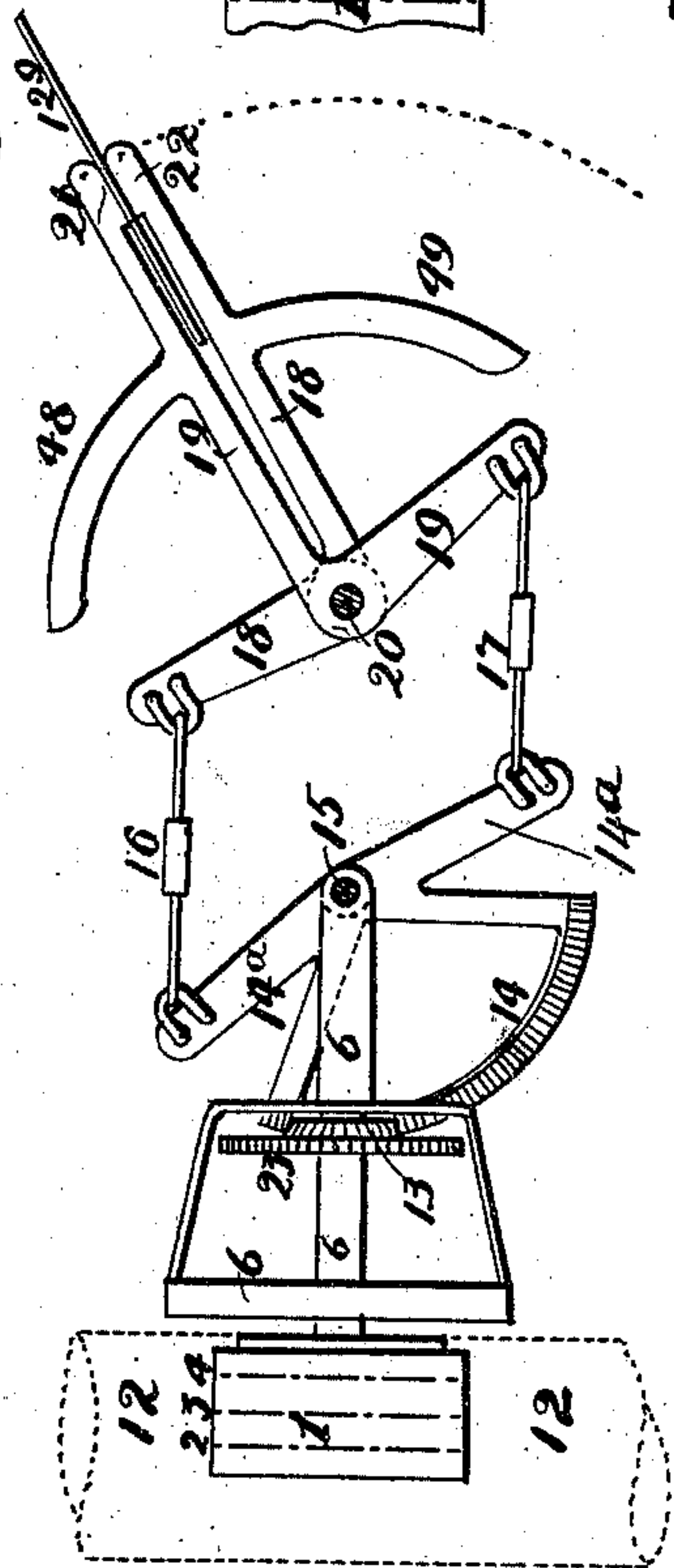
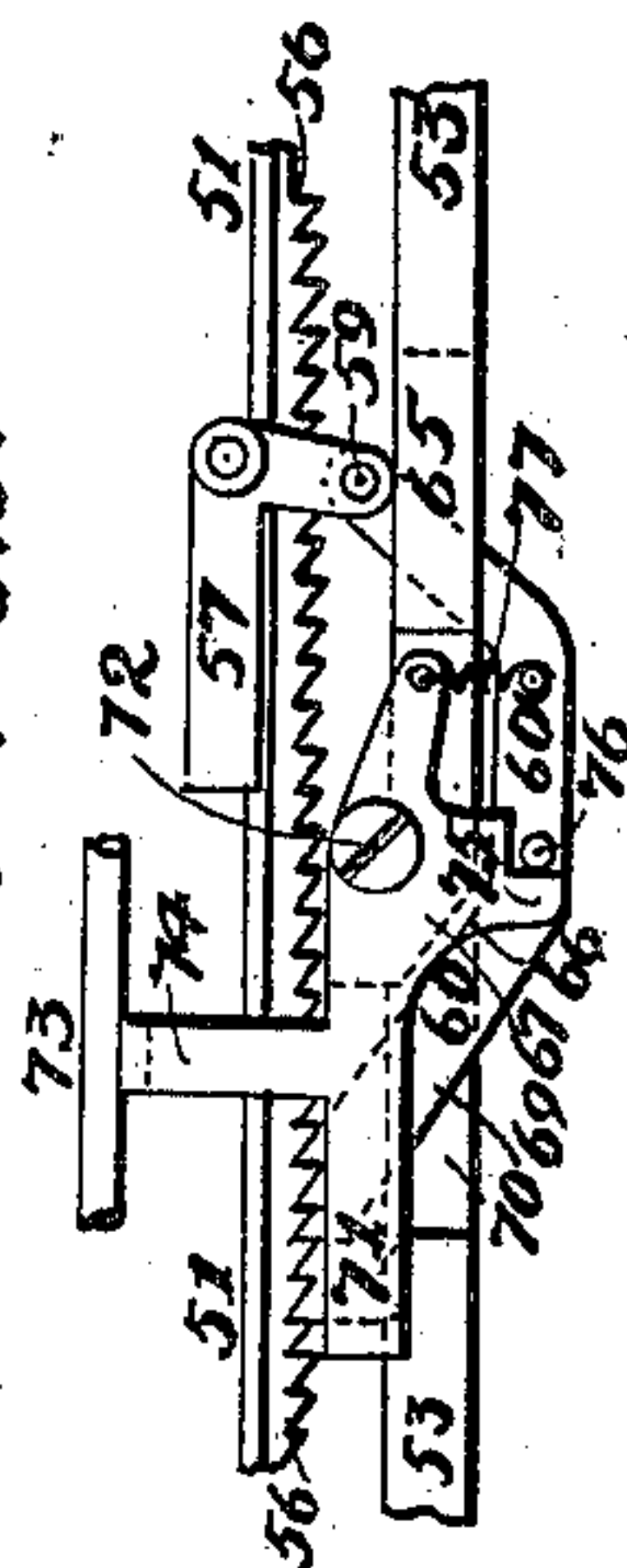


FIG. 6.



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UNITED STATES PATENT OFFICE.

WILFRED HUNT, OF BOTHWELL, SCOTLAND.

TYPE-WRITER.

SPECIFICATION forming part of Letters Patent No. 709,152, dated September 16, 1902.

Application filed June 10, 1901. Serial No. 63,929. (No model.)

To all whom it may concern:

Be it known that I, WILFRED HUNT, a subject of the King of Great Britain and Ireland, and a resident of Bothwell, in the county of Lanark, Scotland, (whose postal address is Huntly Lodge, Bothwell, Scotland,) have invented certain Improvements in Type-Writers, (for which I have applied for a British patent, No. 21,422, dated November 27, 1900,) of which the following is a specification.

My invention relates to type-writers of a kind using a "type-wheel"—that is, a wheel or cylinder (or it might be part of a wheel or cylinder) upon whose periphery the characters used are formed in one or more rows—and has for its objects the equalizing of key "touch" and "stroke," the reduction of weight of, of size of, and of the number of parts of such machines and their simplification generally.

In order that my invention and the manner of performing the same may be properly understood, I have hereunto appended three sheets of explanatory drawings, in all of which the same reference-numerals indicate similar parts, and in which—

Figure 1, Sheet 1, and Fig. 2, Sheet 2, are respectively a sectional side elevation and a plan of a machine made according to my invention, while Figs. 3, 4, 5, and 6, Sheet 3, are diagrammatic and detail views.

In a type-writer made according to my invention and shown in Figs. 1 and 2 of the drawings a type-wheel 1, having the characters used formed on it in three rows 2 3 4, (indicated by broken lines in the drawings,) is mounted on a shaft 5 in a bracket-piece 6, the latter being guided at the one end by a slot 7 in it engaging a pin 8 in the upper frame 9 of the machine and being carried at the other end upon the crank-pin 10 of a bell-crank 11.

In order to print a character, the type-wheel 1 is advanced to the printing-point upon the vertical diameter of a paper roller or platen 12 (for the sake of clearness shown in part and as at one side in Fig. 2) by a partial revolution of the bell-crank 11, as hereinafter described.

In order to rotate the type-wheel 1 to a predetermined character, there is fixed upon the type-wheel shaft 5 a bevel-wheel 13, which gears with a bevel-sector 14, carried upon a

pin 15 in the bracket-piece 6. The bevel-sector 14 is connected by links 16 17, which may be adjustable in length to the arms of two bell-crank levers 18 19, hereinafter termed "stop-levers," mounted upon a vertical axis 20 in the upper frame 9 of the machine. When the type-wheel 1 and bracket-piece 6 are moved to the printing-point by the rotation of the bell-crank 11, the bevel-sector 14 is moved more or less horizontally with the latter, and it through the links 16 17 moves the stop-levers 18 19 about their axis 20 with a scissors-like motion. The motions of the parts are so proportioned that the outer ends 21 22 of the stop-levers 18 19 approach close to one another as the type-wheel approaches the printing-point, preventing one another from rebounding and holding the type-wheel firmly while the guiding device, hereinafter described, enters into gear. If a stop be interposed in the path of the part 21 or 22 of one of these stop-levers 18 19, that lever will be stopped, and the bevel-sector 14 still continuing to be moved with the bracket-piece 6 the motion of the lever so stopped will be transferred to the other stop-lever, (through the bevel-sector and connections,) and at the same time the bevel-sector 14 and its arms 14^a and 14^b will be rotated about its axis by an amount corresponding to where in its path either stop-lever is stopped. This motion of the bevel-sector 14 is, through the bevel-wheel 13 on the type-wheel shaft 5, transmitted to the type-wheel, and it therefore depends upon where in the combined paths of the parts 21 22 of the stop-levers 18 19 a stop is interposed how much the type-wheel is rotated during its advance to the printing-point, and so what character upon it is printed there. These motions will be the more readily understood by reference to the diagrammatic figures, 4 and 5, Sheet 3, which show the parts moved to the positions they will occupy when, as in Fig. 4, a stop is interposed toward the right-hand side or, as in Fig. 5, toward the left-hand side, the type-wheel in the first case being rotated to the right and in the second to the left. The machine as shown is adapted for twenty-eight characters in one row upon the type-wheel, and consequently there are fourteen "stops" toward the right-hand and fourteen toward

the left, as indicated by dots in Fig. 4, the type-wheel rotating the more in either direction the farther out the stop is encountered, the extreme right and extreme left hand stops being arranged in the present instance to cause the type-wheel to rotate one half-revolution (less half the space between two adjacent characters) in either direction, respectively. The relative positions of the parts are so arranged that the type-wheel performs its specified rotatory movement before it reaches the printing-point, and it is thereafter guided by a star-wheel 23 upon the type-wheel shaft 5, which has radial slots extending inward from the bases of the teeth, the slots gearing, when the type-wheel has ceased rotation, with a blade or tooth 24, adjustably fixed to the upper frame 9 of the machine. The key-levers are so arranged that their inner ends act, when keys are depressed, as the hereinbefore-mentioned stops and are gripped between the parts 21 22 of the stop-levers 18 19 and hold the latter firmly (while each stop-lever while approaching counteracts the other's tendency to rebound from the stop) and through them the bevel-sector 14 and type-wheel at that part of the type-wheel's travel at which the guiding device comes into action. To this end the key-levers are arranged radially, and while their inner ends 25 are similar throughout the keyboard their outer ends are divided into three "banks" 26 27 28 and provided with key-tips 29 in a well-known manner. (In the drawings for the sake of clearness only a few of the keys are shown, the positions of the others being indicated in Fig. 2 by those of key-tips 29.) The inner ends 25 of the key-levers are formed with parts 129, adapted, when key-tips are depressed, to rise into the paths of the stop-lever parts 21 22, and so act as the stops. Preferably the key-levers are arranged radially upon a single fulcrum 30 and are guided by two vertically-slotted screens 31 32. The key-levers transmit motion from their tips 129 to the type-wheel mechanism by engaging a single bifurcated driving-lever 33, which is centered upon a pin 34 in the upper frame 9 of the machine and carries at its end remote from the key-levers a cross-pin 35, which may be provided with small antifriction-rollers 36 and which gears with jaws 37, formed in the bell-crank 11. Since the key-levers are mounted upon one fulcrum 30 and all engage one driving-lever 33, the stroke of the keys would vary throughout the keyboard unless some means of correcting it were used. The means of correction I use consists in making the ends 38 39 40 of the key-levers 25 of different lengths, which engage different bars 41 42 43, formed upon or fixed to the driving-lever 33, the lengths of the key-lever ends 38 39 40 and the positions of the bars 41 42 43 upon the driving-lever being such that notwithstanding the varied angular movement of the key-tips, due to their comparative near-

ness to or remoteness from the fulcrum 30, the same angular movement is transmitted to the driving-lever 33 for the same movement (stroke) of key throughout the keyboard, the ends 38 of the upper and shortest "bank" 26 of keys gearing with the farthest-out bar 41 on the driving-lever 33, the ends 39 of the middle bank 27 gearing with the middle bar 42 and the ends 40 of the lower and longest bank 28 with the innermost bar 43. Since the key-levers are readily arranged, the stroke would also vary from center to sides of the keyboard if the bars 41 42 43 upon the driving-lever 33 were straight, and in order to correct this I make these bars curved to a suitable radius in plan, as shown in Fig. 2.

Fig. 3, Sheet 3, shows the type-wheel and its parts advanced to the printing-point by the action of the pin 35 in the end of the driving-lever 33 upon the jaw 37 of the bell-crank 11. The lever 33 is shown with its outer end (upon which are the bars 41 42 43) raised by the inner end 38 of a key-lever of the upper bank 26, and the depressed position, of the other banks 27 28 are indicated by dotted lines in order that the action of the bars 41 42 43 may be seen. The inner end of the lever 33 is shown in its depressed position and as having carried the bell-crank 11 around to its horizontal position, the type-wheel 1 having at the same time been advanced to the printing-point upon the vertical diameter of the platen 12. A link 44 connects the driving-lever 33 with the paper-carriage-driving spring, as hereinafter described, in order to return the driving-lever (and so also the bracket-piece 6 and its parts) to the normal position when pressure is removed from a key-tip, and under some circumstances an auxiliary spring 45 may be provided to the same end.

In order to return the type-wheel-rotating mechanism to its normal position upon the return of the bracket and type-wheel to their normal positions, I attach to the frame adjustable buffers or stop-pins 46 47. As the shaft 15 is moved back into its normal position it lays a stress, say, on the rod 17, Fig. 4, which in turn swings its lever 19 on its pivot 20 until the end 21 of the lever abuts against the stop-pin 46, when it can move no farther. Since this lever and rod 17 can move no farther, it follows that the sector 14 must turn on its axis 15 in order to allow the bracket-piece carrying the sector to further continue its movement toward its initial position. In swinging on its axis the sector lays a stress on the rod 16, in turn throwing the end 22 of the lever 18 against the stop-pin 47. When this has occurred, the bracket will have reached its initial position, with the sector 14 bisected by the shaft of the type-wheel. The pins 46 are made with their lower ends cranked, so as to be capable of adjustment by being rotated, and are provided with locking-nuts to hold them in position.

In order to prevent jamming by key-lever parts 129 being inadvertently raised behind

the stop-lever parts 21 22, and so preventing their return, wing-pieces 48 49 are formed upon the stop-levers 18 19, which, passing under a rib 50 (formed on the upper frame 9 of the machine) and over the ends of the parts 129 of the key-levers, prevent the latter being raised in the wake of the stop-levers, as if a key-lever end 129 be so raised it encounters the wing-piece 48 or 49 and, raising it against the rib, locks itself against further movement in that direction.

The movement hereinbefore described for rotating the type-wheel the predetermined amounts has great advantage over other movements of like purpose, for no matter what key be struck the stop-levers and their parts have always the same "added" movement—that is, if the movement of one lever be small that of the other will be great, and vice versa, and the total angular movement of both added together be constant—and the only difference in key-pressure between a key giving the slightest and one giving the greatest rotatory movement to the type-wheel being the extra friction entailed in the greater movement of the type-wheel shaft and the bevel-wheel and bevel-sector in the latter case, and which, since these parts are quite free to move, is very slight, there being no springs in connection with the turning movement, making the key touch practically even throughout the board.

The paper-carriage is of an ordinary type, as shown in Fig. 1 and partially (being at one side to show the parts below) in Fig. 2, and consists of a paper roller or platen 12, carried in end brackets 150 upon a slide or base 51 and having means of a known kind for inserting and manipulating the paper to be written upon. The base 51 slides in lugs 52 on a frame 53, which, as hereinafter described, is capable of moving transversely to the axis of the platen 12 upon pins or bolts 54 55. The base or slide 51 has upon its under side a rack 56, actuated for feeding the carriage as follows: The mechanism for feeding the paper-carriage while shown in plan in Fig. 2 is more clearly shown in the separate elevation, Fig. 6, Sheet 3, and consists of a two-armed lever 57, centered upon the lower frame 58 of the machine and having projecting from one of its arms a pin 59, upon which a pawl 60, as hereinafter described, can slide. The lever 57 is actuated to "space" by a lever 61, centered upon the lower frame 58 and the forward end of which is engaged by the inner end of a space-lever 62, centered on a bolt 63 at the front end of the lower frame 58 and provided at its outer end with a tip or key 64. The pawl 60 is carried in a jaw 65 in the carriage-frame 53 and engages the rack 56. Upon the key 64 being depressed the inner end of the space-lever 62 is raised, raising with it one end of the lever 61, depressing the other end, which rests upon the horizontal arm of the lever 57, and so moving the latter lever about its center. The lever 57 through

its pin 59 retracts the pawl 60 from the rack, so that it engages the latter a tooth advance when moved back again. The pawl 60 is prevented from engaging more than one tooth in advance by a part 66 on its coming into contact with a projection 67 on the carriage-frame 53. Upon the release of the key 64 a spring 68, Fig. 2, adjustably fixed to the lower frame 58 at one end and at the other end attached to the pin 59, returns the levers 61 62 to their normal positions and at the same time feeds the paper-carriage forward one tooth of the rack 56 through the pawl 60 engaging the latter. The pawl 60 has formed on its end an inclined part 69, which engages with a similarly-inclined part 70 on the frame 53, and so locks the pawl and the rack 56 together and definitely limits their travel, and therefore also the travel of the paper-carriage. A checking-pawl 71, centered upon a pin 72 in the frame 58, is provided to engage the teeth of the rack 56 and prevent backward movement of it due to friction between the rack and the pawl 60. A wire bail 73 on the carriage rests upon an extension 74 of the checking-pawl 71, and a heel 75 on the pawl 71 encounters a pin 76 on the pawl 60. A light spring 77 between the pawls 60 and 71 tends to keep them both in gear with the rack 56. Upon downward pressure being applied by the finger to the wire bail 73 it moves the checking-pawl 71 out of engagement with the rack 56, while the heel 75 upon that pawl forces the pawl 60 (through the pin 76) also out of engagement with the rack 56, and the paper-carriage may then be moved freely in either direction so long as the pressure upon the bail 73 is continued. The link 44 connects the driving-lever 33 with the lever 61, so that the spacing mechanism is actuated for each letter that is printed, the link 44 coming into engagement with the lever 61 after the driving-lever 33 has performed a considerable portion of its stroke. The spring 68 acts to return the type-wheel parts and may be arranged, if desired, to do so unaided or may be assisted by the spring 45.

In order to ink the character to be printed, an ink-roller 77 is clipped upon a lever 78, centered upon an inclined axis 79 in a bracket 80, fixed to the paper-carriage frame 53, the axis 79 being so inclined to the perpendicular that the ink-roller 77 and lever 78 are easily pushed aside by the descending type-wheel, as shown in Fig. 3, Sheet 3. The movement of the lever 78 is controlled by a spring 81, acting upon a heel 82 upon it, so as to hold the ink-roller normally over the printing-point, but at the same time allow it to be easily pushed aside. An arm 83 may be formed upon the lever 78, so as to act as a pointer to indicate (when the lever is held back) the position to be occupied by the next character printed upon the paper, a finger-piece 84 and stop 85 being provided for moving it and to limit its travel. The pointer-arm 83 may also be arranged when in its nor-

mal position to indicate upon a scale the position of the paper-carriage. The type-wheel comes into contact with such an inking device after it has performed its prescribed rotary movement.

Instead of an ink-roller an ink-ribbon may be used and parts suitably arranged to accommodate it.

A guide-plate 86 to hold the paper smoothly and prevent its being soiled by the inker is carried by the bracket 80.

It will be obvious that the top row 2 of characters will normally print. In order to print either of the other rows 3 4, the paper-carriage and its parts must be moved transversely, so as to bring the printing-point under either of those rows. This is accomplished by a link 87, attached at the one end to the carriage-frame 53 and at the other end having a part 88 engaged by two bell-crank levers 89 90, centered on the bolt 63 at the front of the machine and provided with key-tips 91. Stops 92 93 are provided to limit the travel of the levers 89 90, the one, 92, being adjusted so as to bring, when the lever 89 is pressed against it, the printing-point under the second row 3 of characters upon the type-wheel, the other, 93, so as to bring the printing-point under the third row 4, slots 94 being provided in the ends of the levers 89 90, so as to permit of their movement independently of one another, while springs 95 96, Fig. 2, upon the bolts 54 55 pressing the frame 53 against their heads 97 98 tend to return all the parts to their normal positions.

A type-writer made according to my invention is susceptible of very considerable modification in detail. Such a machine may be adapted for using a type-wheel having any convenient number of or number of rows of characters, or a segment of such a wheel may be used. The key-levers may be arranged in any convenient way other than radially, if desired. The driving-lever 33 may be connected to the bell-crank 11 by any suitable gearing, such as toothed, and any convenient forms of paper-carriage and inking devices may be adopted.

What I claim is—

1. A type-writer having a type-wheel, a shaft carrying it, and a bracket-piece carrying the shaft, guides at one end of the bracket in which such end of the bracket is adapted to slide, and a bell-crank connected to the other end of the bracket, adapted to move such end through the radius of movement of the bell-crank, whereby the type-wheel is caused to advance to print a character upon the partial revolution of the bell-crank, substantially as described.

2. A type-writer having a type-wheel, a rotatable shaft therefor, a bell-crank having a shaft at right angles to the type-wheel shaft and connected to and adapted to move said type-wheel and shaft at its outer end, in the radial path of movement of the bell-crank and guides adapted to guide the inner end of

said shaft and so determine the printing position of the type-wheel, substantially as described.

3. In combination with the printing mechanism of a type-writer, a pair of stop-levers on a common center, means to move them in opposite directions, in combination with character-determining stops, said stop-levers adapted to bear on the opposite sides of the character-determining stops and connections between the levers whereby one lever prevents the rebound of the other, substantially as described.

4. In combination with the printing mechanism of a type-writer, a pair of stop-levers adapted to move in opposite directions, in combination with character-determining stops, said stop-levers adapted to bear on the opposite sides of the character-determining stops and connections between the levers whereby one lever prevents the rebound of the other, substantially as described.

5. A type-writer having a pair of stop-levers, adapted to move in opposite directions, and character-determining stops on the opposite sides of which the levers are adapted to bear, in combination with arms controlled by the stop-levers, a rotatable type-wheel and means between the arms and the type-wheel to rotate the wheel, substantially as described.

6. A type-writer having a pair of stop-levers, adapted to move in opposite directions and character-determining stops on the opposite sides of which the levers are adapted to bear, in combination with arms operated by the stop-levers, a bevel-sector on the arms, a rotatable type-wheel and shaft and a bevel-wheel on the shaft engaging the bevel-sector, as described.

7. A type-writer having a pair of stop-levers adapted to move in opposite directions, and character-determining stops, arms connected to the levers, in combination with a bevel-sector on the arms, a type-wheel and shaft, a bracket therefor, guides for the bracket at one end and a bell-crank at the other, and a bevel-wheel on the shaft engaging with the bevel-sector, all substantially as described.

8. A type-writer having a bracket-piece, a rotatable type-wheel and shaft, a bevel-wheel on the shaft, a bevel-sector, all carried by the bracket-piece, means to advance the bracket-piece, and stop-levers to control it, and character-determining stops whereby the type-wheel is rotated to the predetermined character, upon the advance of the bracket-piece, in combination with other means for holding the rotated type-wheel from turning upon the further advance of the type-wheel to impress the predetermined character, substantially as described.

9. A type-writer having a type-wheel, a shaft and a bevel-wheel and a bracket in which they are mounted, said bracket having guides at one end in which it may be

5 moved more or less horizontally and a bell-crank at the other end, in combination with character-determining stops, stop-levers and a bevel-sector controlled thereby and engaging the said bevel-wheel, substantially as described.

10 10. A type-writer having a type-wheel and a shaft, a bracket-piece, guides in which it may be moved at one end, and a bell-crank lever at the other end, a bevel-wheel on the shaft in combination with key-levers, stop-levers and stops, a bevel-sector connected with said levers and adapted to operate the bevel-wheel, said stop-levers being adapted to be arrested
15 by the inner end of the key-levers upon the depression of the keys, substantially as described.

20 11. A type-writer having a type-wheel and a shaft, a bracket-piece, guides in which it may be moved at one end, and a bell-crank at the other end, a bevel-wheel on the shaft, in combination with key-levers, stop-levers and stops, a bevel-sector connected with said levers and adapted to operate the bevel-wheel, said stop-
25 levers being adapted to be arrested by the inner end of the key-levers upon the depression of the keys, said inner ends of the key-levers being of varying lengths, a driving-lever, a number of curved bars thereon and
30 connected to said bell-crank, the varying inner ends of the key-levers engaging the different bars, substantially as described.

35 12. A type-writer having a type-wheel mechanism, a common driving-lever, key-levers, having a common fulcrum, said key-levers having different lengths of ends, and parts so placed on the common lever as to cooperate with such varying ends to accomplish the same angular movement of the common lever
40 whether the key-levers struck have long or short ends, substantially as described.

45 13. A type-writer having type-wheel mechanism, a common driving-lever, key-levers having a common fulcrum, said key-levers having different lengths of ends, and parts

on the common lever so displaced with reference to such varying ends as to accomplish the same angular movement of the common lever whether the key-levers struck have long ends or short ends, said parts on the common lever and said common fulcrum being arranged in curves of suitable radii, substantially as described.

14. A type-writer having a common driving-lever, a type-wheel and rotating mechanism therefor, in combination with a bell-crank to move the type-wheel, having jaws, a pin on the driving-lever engaging the jaws, and key-levers, each one of which is adapted to operate the common driving-lever, substantially as described.

15. A type-writer having stop-levers, a type-wheel and rotating mechanism, and means for forwardly moving the type-wheel, adjustable pins adapted to engage the ends of the stop-levers upon the return movement of the type-wheel to restore the type-wheel to its normal position, substantially as described.

16. A type-writer having stop-levers adapted to be arrested by key-controlled projections, said levers having wings adapted to prevent the raising of a second key-lever projection in the wake of the stop-levers, substantially as described.

17. A type-writer having a type-wheel, an inking-roller, a lever therefor having its axis inclined to the vertical and at one side of the type-wheel, whereby the roller is adapted to be pushed aside by the descending type-wheel, a spring to normally hold the lever in position for inking and a pointer-arm on the lever, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILFRED HUNT.

Witnesses:

DAVID FERGUSON,
GEORGE PATTERSON.