

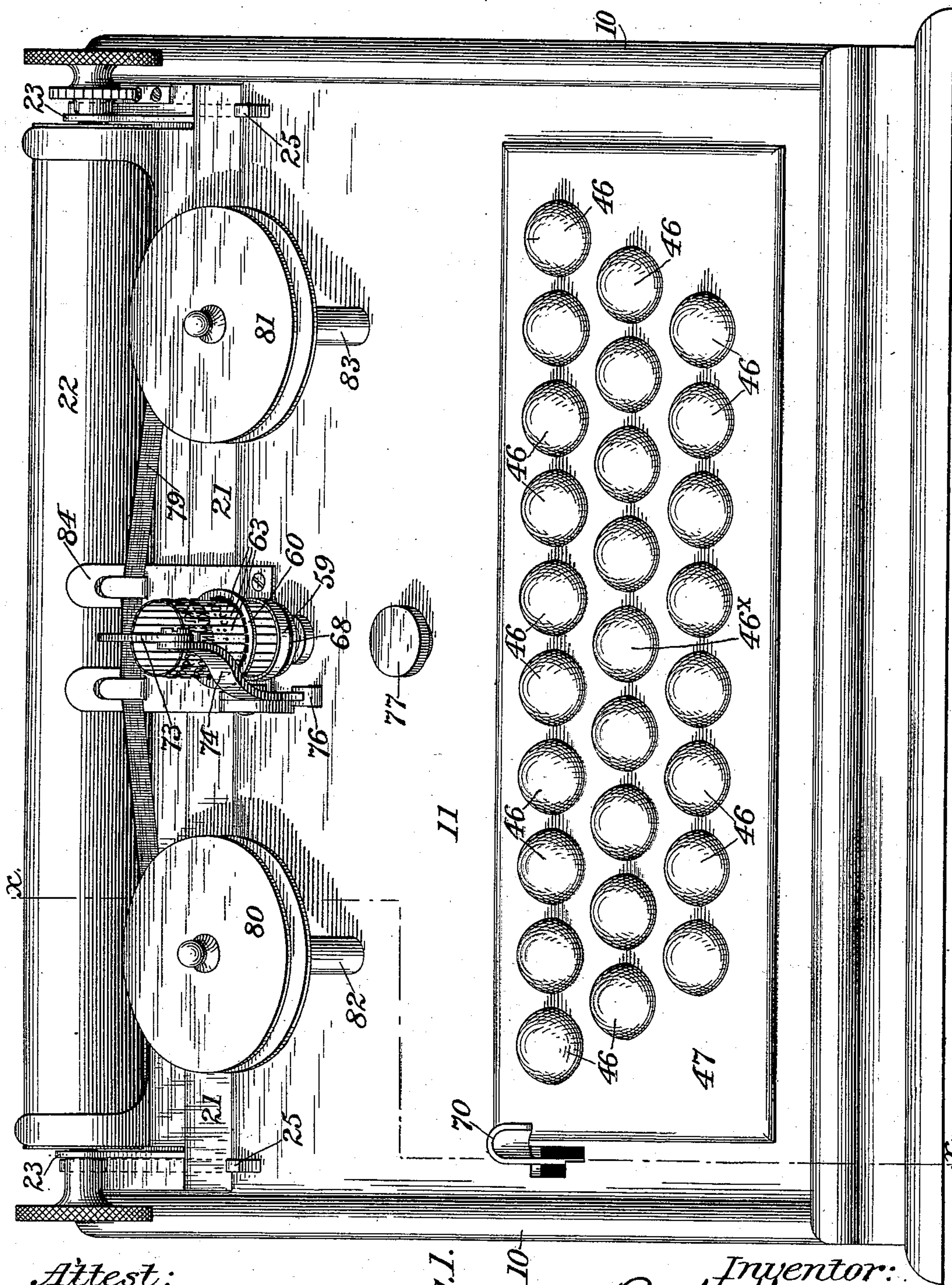
(No Model.)

3 Sheets—Sheet 1.

C. W. WEISS.
TYPE WRITING MACHINE.

No. 543,164.

Patented July 23, 1895.



Attest:
A. H. Jespersen.
A. H. Hutter.

Fig. 1.

Inventor:
Carl W. Weiss
by William B. Greener
Atty.

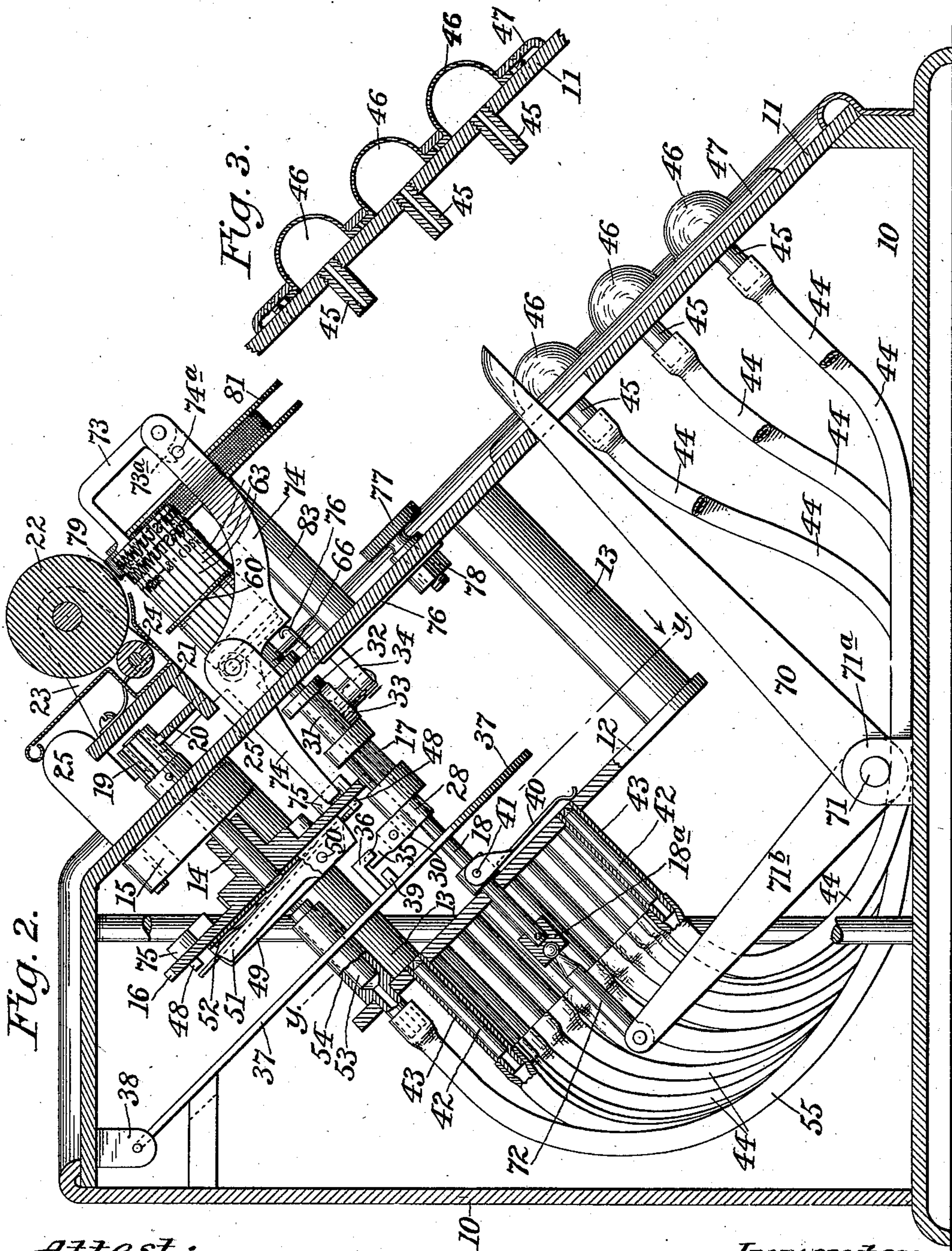
(No Model.)

3 Sheets—Sheet 2.

C. W. WEISS.
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Attest:
A. N. Jesbera.
A. H. H. H.

Inventor:
Carl W. Weiss
by William B. Greener
Atty.

(No Model.)

3 Sheets—Sheet 3.

C. W. WEISS.
TYPE WRITING MACHINE.

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Fig. 5.

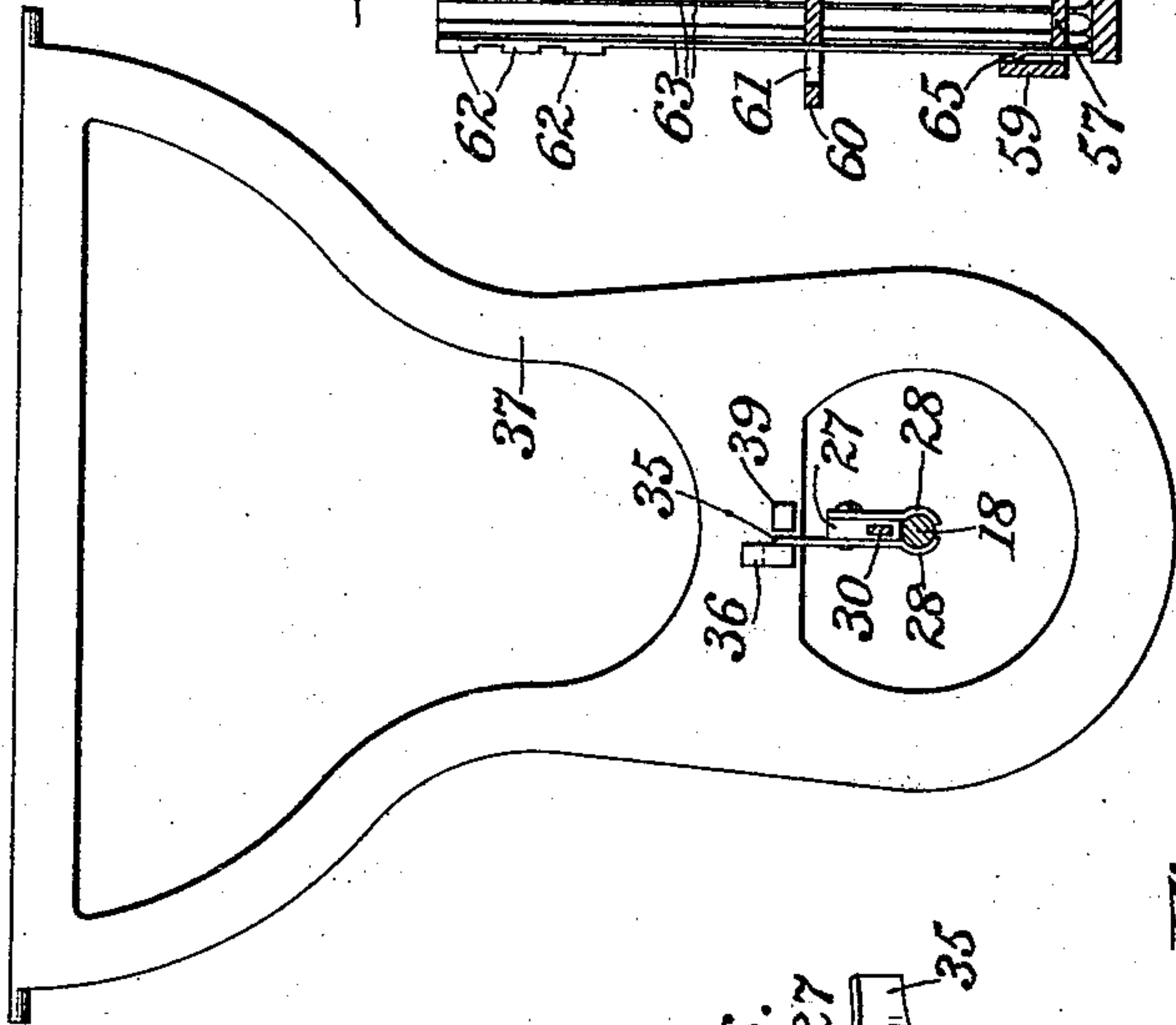
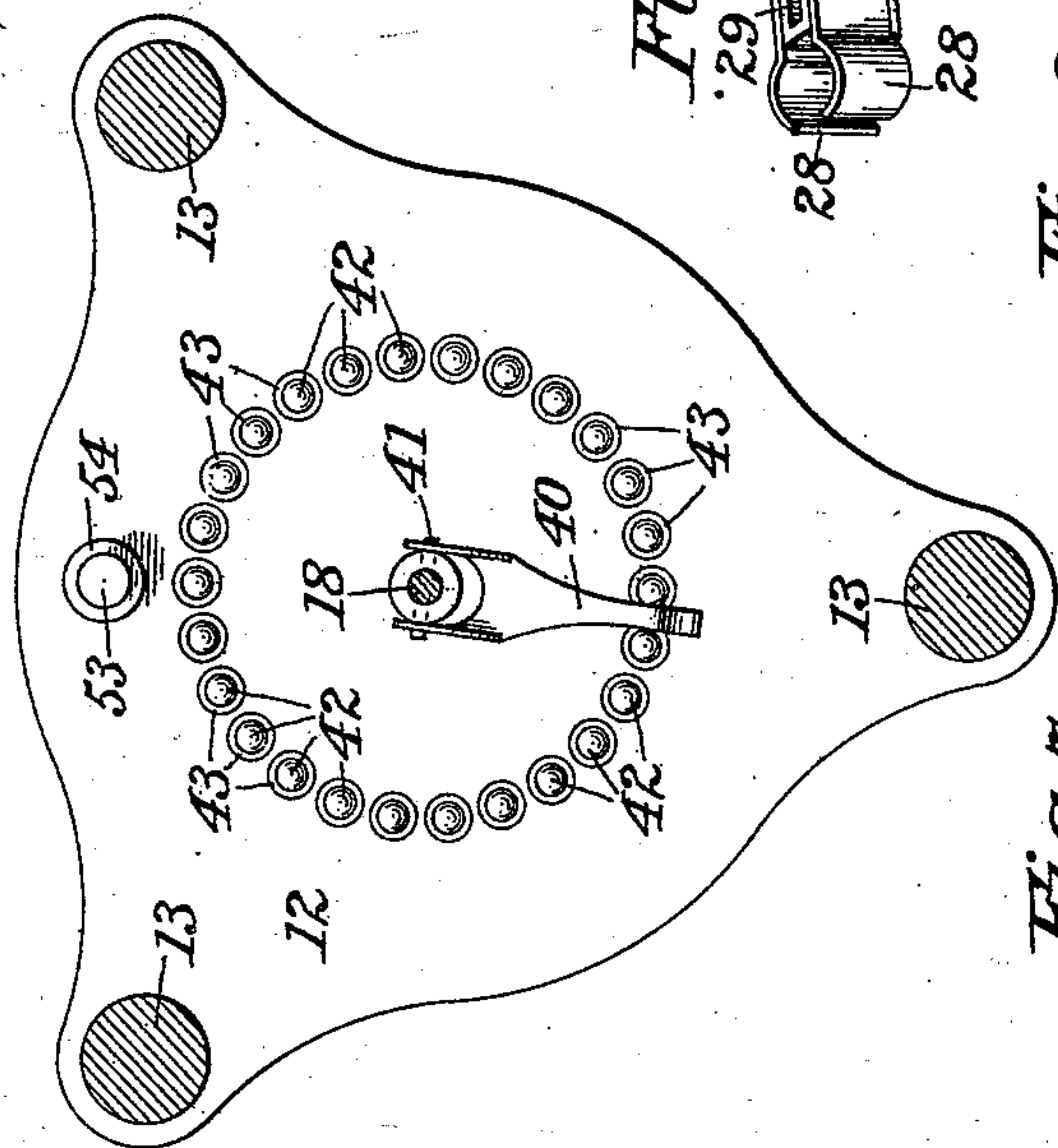


Fig. 4.



Attest:
A. N. Jespersen.
A. Rhoder

Fig. 9.

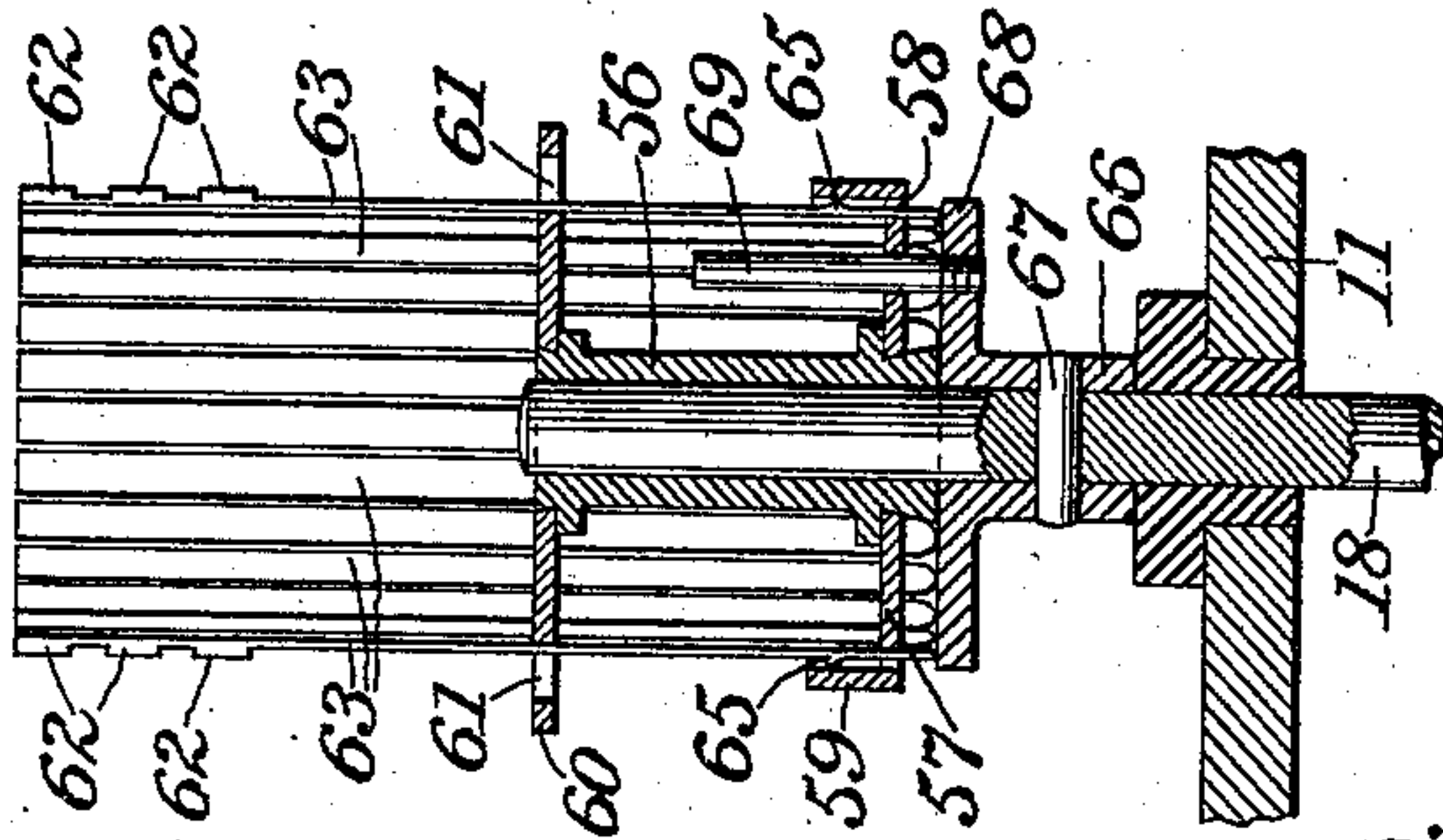


Fig. 10.

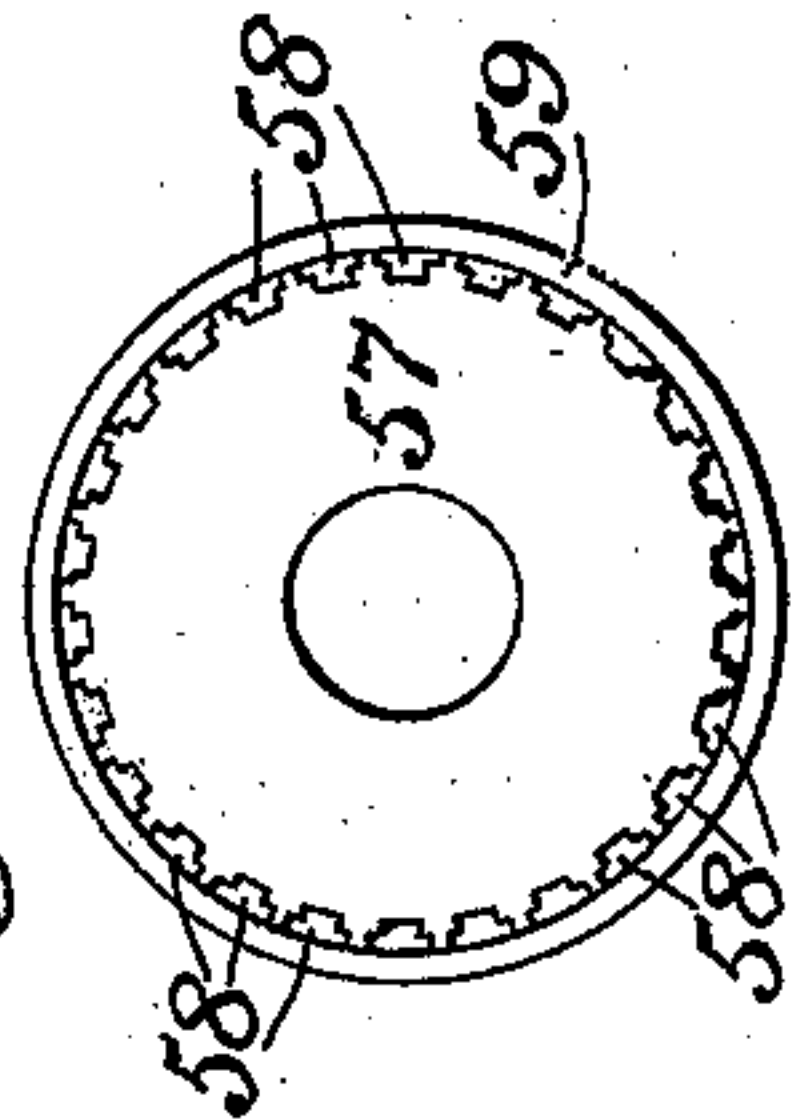


Fig. 11.

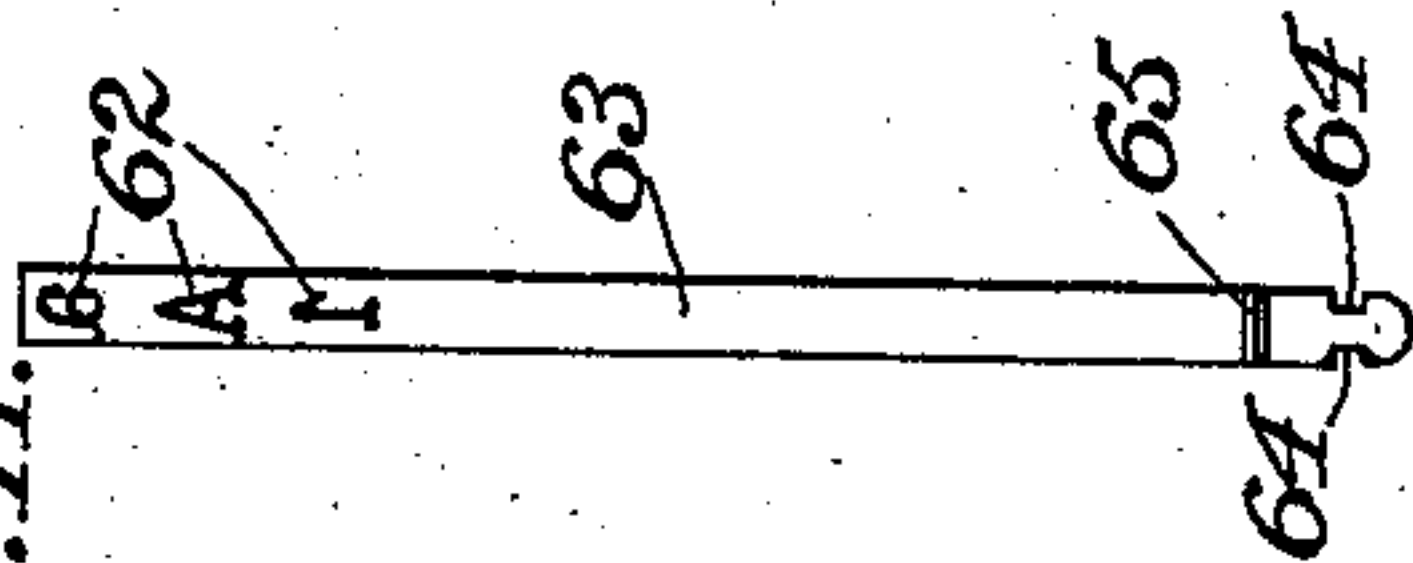


Fig. 8.

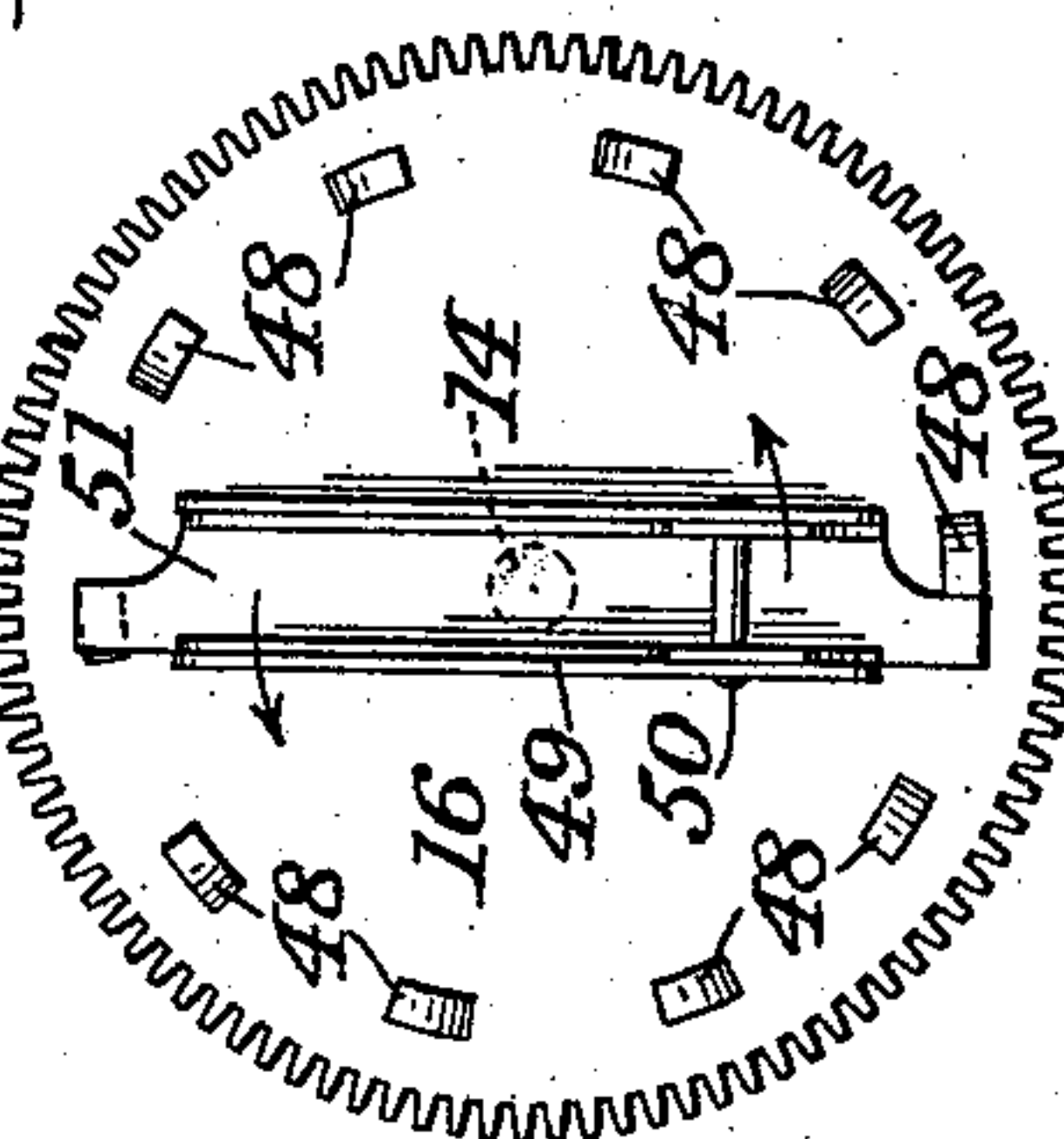
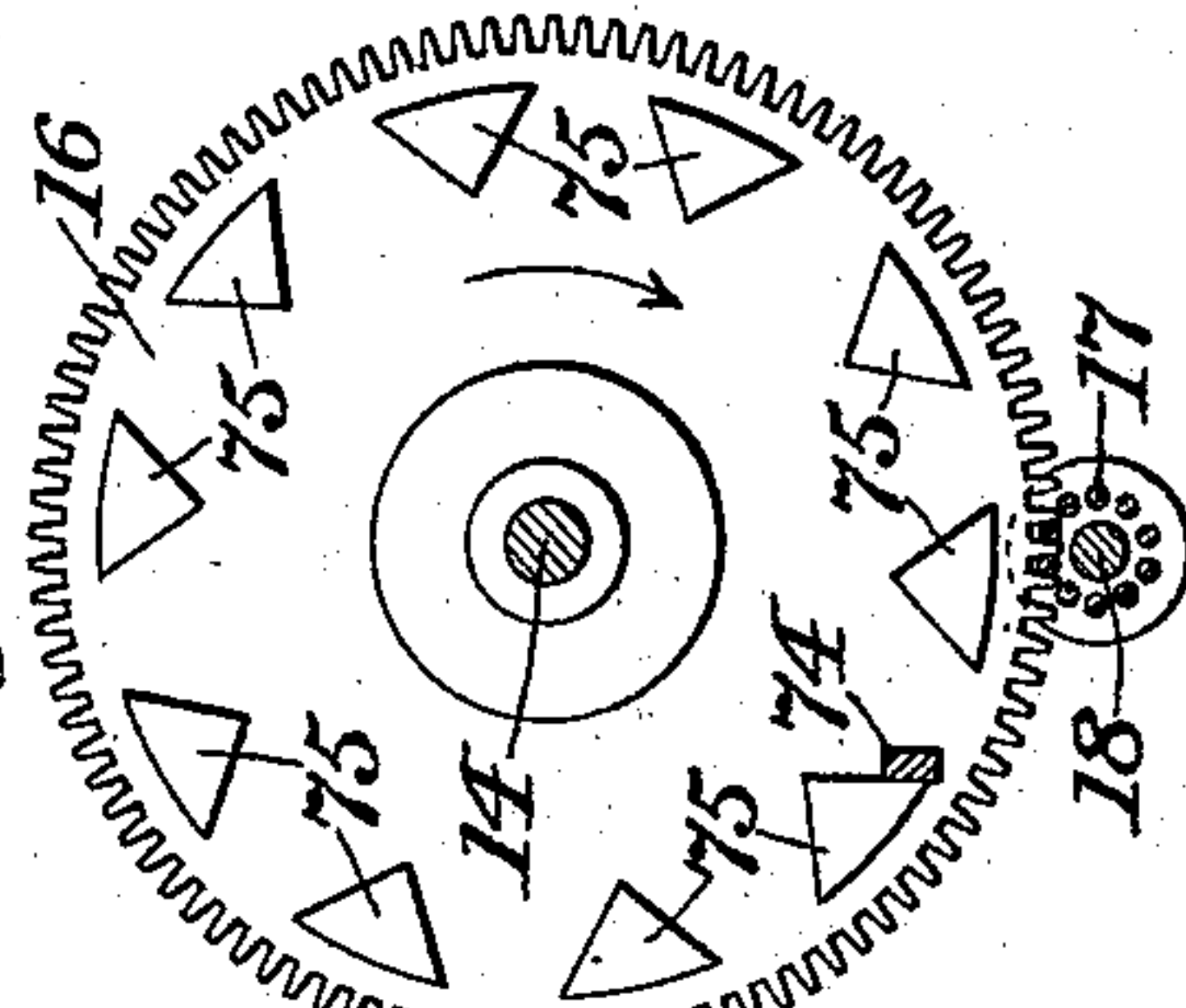


Fig. 7.



Inventor:
Carl W. Weiss
by William B. Greeley
Atty.

UNITED STATES PATENT OFFICE.

CARL W. WEISS, OF BROOKLYN, ASSIGNOR TO HIMSELF, AND AUGUST MIETZ, OF NEW YORK, N. Y.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 543,164, dated July 23, 1895.

Application filed April 26, 1894. Serial No. 509,060. (No model.)

To all whom it may concern:

Be it known that I, CARL W. WEISS, of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Type-Writers; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the numerals of reference marked thereon, making a part of this specification.

This invention relates in general to that class of type-writing machines in which the type characters are supported by a carrier which is rotated or oscillated or vibrated to bring one or another of such type characters to the line of print; but as the description of the preferred embodiment of the invention proceeds it will be seen that various features of the invention are applicable to other forms of machines.

The object of the invention is to produce a type-writing machine of low cost of manufacture, of easy and rapid action, and of great durability and efficiency. The bringing of the type characters to the line of print is controlled by pneumatic devices whereby the use of levers intermediate the keys and the type characters or type-carrier is dispensed with and the action of the machine made correspondingly lighter, and the construction simpler, cheaper, and less likely to be disarranged. The type characters are mounted upon a suitable carrier, and instead of requiring the paper to be brought against the type (with an interposed ink-ribbon) as is usual in machines of this general character, the type characters are adapted to be moved individually against the paper.

In the particular machine for illustration of the several features of the invention the type characters are secured to light springs which are mounted about a hub. The latter is impelled to rotate by a clock-spring or other suitable motor acting through simple gearing and the keys of the machine are adapted to operate corresponding plungers, which release the type-carrier for movement and determine the extent of such movement. It will be understood, however, that the several mechanical devices and their combination and

arrangement may be varied without departing from the spirit of the invention.

In the accompanying drawings, Figure 1 is a front view of a type-writing machine which embodies the invention. Fig. 2 is a section on the irregular plane indicated by the line $x x$ of Fig. 1. Fig. 3 is a detail section through the keyboard. Fig. 4 is a partial section on the line $y y$ of Fig. 2, looking in the direction of the arrow. Fig. 5 is a plan view of the escapement-plate, showing also the friction-dog with the driven shaft in section. Fig. 6 is a detail perspective view of the friction-dog shown in Fig. 5. Fig. 7 is a detail view showing the upper face of the main gear with its hammer-actuating cams, the stem of the hammer-lever and the driven pinion and its shaft being shown in section. Fig. 8 is a detail view of the under side of the same gear, showing the spacing-clutch or escapement. Fig. 9 is an enlarged detail view in section through the type-carrier and its appurtenances. Fig. 10 is a plan view of the hub of the type-carrier on the same scale as Fig. 9, and Fig. 11 is a detail view of one of the spring type-bars removed from the carrier, also on the same scale as Fig. 9.

In the machine represented in the drawings the various working parts are supported by a frame or casing 10, which may be of any desirable form, but is preferably so constructed and arranged as to support in an inclined position the front plate 11. A second plate 12 is held parallel with the front plate 11 by studs 13, and by these two plates most of the working parts are directly supported.

In a suitable bearing carried by the plate 11 is journaled a short shaft 14, which is impelled to rotate in one direction by any suitable motor, such as a clock-spring 15, and to which is connected a large gear 16. The latter engages a pinion 17, mounted on and adapted to drive a shaft 18 to which the type-carrier is connected, the ratio of the gear and pinion being preferably as ten to one, whereby the pinion receives a complete rotation for every one-tenth of a rotation of the gear. The shaft 14 also has fixed thereto a ten-toothed pinion 19, which meshes with a rack 20 fixed to the paper-carriage 21. The latter

is substantially of ordinary construction, having a roller 22, mounted in suitable bearings 23, and a presser-roll 24, and being adapted to slide to and fro in guides 25 (preferably three in number) which are secured to the plate 11.

It is obvious that as the pinion 19 rotates under the influence of the spring 15 the carriage will be moved in the proper direction for printing the successive letters and words of a line, and that when the carriage is moved in the opposite direction by the hand of the operator the spring will be rewound. The pinion 17, of course, does not rotate continually, but its rotation is controlled by an escapement device which permits only a single rotation of the pinion for each operation of the escapement. A block 27 is held frictionally upon the shaft 18 by spring-clamps 28 (see Figs. 2, 5, and 6) and has an aperture 29 parallel with the axis of the shaft, which is engaged by a pin 30 fixed to the hub of the pinion 17, the latter being mounted loosely on the shaft 18, and having a sleeve 31 with a flange 32 for engagement with a roller 33 carried by a bracket 34 fixed to the plate 11, whereby the pinion is permitted to rotate independently of the shaft under certain circumstances and is held from longitudinal movement thereon. The block 27 also is provided with a finger 35 which is adapted to be engaged by a stop-pin 36 fixed to a swinging plate 37. The latter is hung upon suitable brackets 38 secured to the upper portion of the plate 11, and is arranged to be moved very easily. A guard-pin 39 is also fixed to the plate 37 to insure the proper action of the escapement device.

From the foregoing it will be understood that at each operation of the escapement device the pinion 17 makes a complete rotation while the shaft 18, being carried frictionally with the pinion 17, may also make a complete rotation or may be stopped at any point in such rotation.

The means whereby the rotation of the shaft 18 is checked at any point which may be necessary to bring the type-carrier to rest with the desired type character thereon at the line of print will presently be described. Such means comprise, in the machine represented in the drawings, a series of movable stops which are arranged in a circle about the axis of the shaft 18 and are adapted to be moved, at the election of the operator, to strike the plate 37 for the purpose of releasing the escapement, and also to stand in the path of an arm 40 which is carried by the shaft 18, whereby the rotation of the shaft will be checked at a point determined by the particular stop which is operated.

As represented in Figs. 2 and 4, the arm 40 is forked to embrace the shaft 18 and is held thereto by a pin 41 which passes through the shaft, whereby the arm is free to swing more or less in a plane passing through the axis of the shaft.

As hereinbefore stated, the movements of the type-carrier are controlled by pneumatic devices, whereby the usual finger-keys and the several type bearers or levers are dispensed with. Accordingly the movable stops before referred to are formed as pistons 42, which are arranged to move through cylinders 43, secured to the plate 12. Each cylinder is connected by a suitable tube 44 to its respective air-compressor, which constitutes the finger-key. As represented in the drawings, each tube 44 is connected to a corresponding nipple 45, which is secured to the under side of the plate 11, while a small rubber bulb 46 is secured upon the outer side of the plate 11 over the orifice through each nipple 45. As shown clearly in Figs. 1 and 3, all of the air-compressing bulbs or finger-keys may be conveniently secured in place by a single plate 47, which has apertures for the several bulbs and is adapted to be screwed down to clamp the flanges of the bulbs firmly to the plate 11. Whenever any one of the bulbs 46 is struck by the finger of the operator the air, or whatever other fluid may be employed, is compressed sufficiently to drive out the corresponding plunger 42, and to cause it to strike the plate 37, thereby releasing the escapement and permitting the pinion 17 and shaft 18 to rotate together. The pinion will complete its rotation at every operation, being stopped only by the contact of the finger 35 with the stop-pin 36 at the end of its revolution. The shaft 18, however, will be checked by the contact of the arm 40 with the particular plunger which has been thrown out, the plate 37 being set at some distance from the plate 12, so that the plunger thrown out, whatever may be its position in the circle with reference to the former position of the arm 40, shall not have time to fall back out of the path of the arm before it is struck by the same. The elasticity of the fluid medium employed, together with the elasticity of the containers, will be sufficient to allow the plunger to be held out by the contact of the arm 40 therewith until the printing operation has been completed, or at least until the pinion 17 has been brought to rest by the escapement device.

It will be seen that whenever one of the plungers 42 is thrown out the type-carrier will be moved, and, as will appear more clearly hereinafter, the printing-hammer will also be actuated.

It further becomes necessary, or at least desirable, to provide independent means for permitting movement of the paper-carriage independently of the mechanism just referred to for the purpose of spacing. Accordingly the gear 16 is not fixed to the shaft 14, but is connected thereto through a clutch or escapement device which can be operated by the spacing-key to permit a movement of the shaft 14 sufficient to advance the paper-carriage one space. The gear 16 is mounted loosely upon the shaft 14 and bears upon its

rear or under face 10 cam-shaped lugs 48, as shown in Fig. 8. Upon the inner end of the shaft 14, adjacent to the under face of the gear 16, is fixed a trough-like support 49, between the side walls of which and preferably near one end is pivoted, as at 50, a bent escapement-bar 51, which may also be trough-shaped in order to combine rigidity with lightness. Between one end of the escapement-bar 51 and its support is fixed a light spring 52, which is sufficient to keep the longer arm of the bar normally away from the gear 16 and beyond the path of the cam-lugs 48, while the other end of the bar rests against the vertical face of one of the cam-lugs. In line with the shaft 14 a piston 53 moves in a cylinder 54, which is secured to the plate 12 and is connected by a tube 55 with the spacing key or compressor indicated at 46^x in Fig. 1. The operation of the spacing-key causes the piston 53 to be thrown up to strike the escapement-bar 51 with sufficient force to disengage its shorter arm from the lug 48 with which it was in engagement, and accordingly to release the shaft 14 from the gear 16, which is held from rotation by the escapement devices 35 36, as described. The longer arm of the escapement-bar 51 will strike upon the inclined side of the lug 48 adjacent to it, and consequently will not interfere with the movement of the shaft and the spring 52 will immediately restore the escapement to its normal position so that the shorter arm will engage with the next lug 28 on the rear face of the gear and will stop the shaft 14 at the end of a forward rotation sufficient to move the paper-carriage one step.

It will be readily understood that so far as concerns the mechanism already described the type-carrier might be of any usual form and arrangement, and that the paper might be moved against the type to produce the impression by a hammer, or that the impression might be produced in any other usual and well-known way. The particular form of type-carrier which I prefer to employ, however, is that shown in Figs. 1 and 2, and on a larger scale and in detail in Figs. 9, 10, and 11. This type-carrier comprises a hub or sleeve 56, having at one end a disk 57 with stepped notches 58 about its circumference and a flange 59 outside of the notches 58, and a second disk 60 with a series of radial notches 61 near the circumference thereof and corresponding to the notches 58.

The type characters (indicated at 62 in Fig. 9) are formed upon or secured to narrow strips of spring metal 63, each strip bearing in a longitudinal series a lower-case letter, an upper-case letter, and a numeral or punctuation-mark, or other desired character. The other extremity of the strip is notched, as at 64, and is provided near the notch with a bead or rib 65. In assembling the parts of the type-carrier each strip 63 is slipped through the proper slot 61 and into the stepped notch 58 corresponding therewith, the head or rib 65 bear-

ing upon the inner side of the flange 59 and forcing the notched portion of the strip into engagement with the narrow portion of the notch 58. The strips will then rest normally against the inner ends of the slots 61 in the upper disk 60, and may be moved from within outwardly toward the paper by a suitable hammer which moves within the circle of strips. The type-carrier stands normally in such position as to bring the lower-case letters opposite the line of print, and in order that the upper-case letters or the numerals and punctuation-marks may be brought to the line of print the carrier is made to move longitudinally with the shaft 18 as well as to turn therewith. For this purpose a sleeve 66 is fixed to the shaft 18 by a pin 67. At the outer end of the sleeve 66 is an arm or preferably a disk 68, to which is fixed a pin 69 which passes through a hole in the disk 57 of the type-carrier. The sleeve 66 rotates always with the shaft 18 and moves longitudinally therewith and is therefore adapted to lift the type-carrier or to move the same outwardly. The type-carrier might be fixed to the shaft 18; but in order to permit of its removal whenever required it is mounted loosely upon the shaft, while its rotation is insured by its engagement with the sleeve 66 and disk 68 through the pin 69. For the purpose of shifting the shaft 18 longitudinally a lever 70 is secured to a rock-shaft 71 supported in brackets 71^a, fixed to the casing and projects through the plate 11 in a stepped notch, and another lever 71^b, also secured to the shaft 71, is connected by a link 72 to a block 18^a which is carried by the shaft 18, provision being made to permit of rotation of the block and shaft with respect to the link 72.

The means for producing an imprint, after the type-carrier has been set, comprise a hammer and devices for actuating the same after the type-carrier has come to rest. The hammer proper 73 is bent substantially as represented in Fig. 2 and is pivotally mounted upon the outer end of a hammer-lever 74, pivoted on the front plate 11, the hammer having a lug 73^a which rests upon a stop-pin 74^a fixed to the lever 74, whereby the hammer is carried toward the paper by the movement of the hammer-lever, but may be turned back out of the way whenever the type-carrier is to be removed, the spring 63 yielding sufficiently to permit the head of the hammer to be slipped out of the circle when it can be turned back entirely out of the way.

The inner end of the hammer-lever 74 stands close to the upper or outer face of the gear 16 and in the path of a series of cam-lugs 75, which are formed thereon. The cam-lugs 75 are ten in number and are so formed and arranged that they will successively lift the end of the hammer-lever against the pressure of a spring 76, which is arranged to bear upon said lever and to allow it to slip off just as the gear and pinion come to rest, thereby causing the hammer-head to be moved sharply

against the inside of the particular letter-strip which may be in line with it, and to cause the same to strike the paper or the interposed ribbon. The spring 76 is held in place by a thumb-screw 77 and nut 78, whereby the pressure of said spring upon the hammer-lever may be adjusted to regulate the force of the blow of the hammer as required.

In order that the machine may be represented in a complete form, the drawings show in Figs. 1 and 2 an ink-ribbon 79, which is carried by spools 80 and 81 mounted upon standards 82 and 83, and is guided between the type-carrier and the paper-roller 22 by a suitable plate 84.

It is obvious that the features of the invention might be embodied either severally or conjointly in other arrangements than the particular one shown and it is to be understood accordingly that the structure herein shown and described is not essential to the application of the invention, but is merely one embodiment thereof.

What I claim is—

1. A typewriting machine having a type-carrier movable to bring one or another of the type characters to the line of print, a series of compressors adapted to be actuated by the operator means actuated thereby to determine the extent of movement of said type carriers and a motor independent of the compressors to impart movement to the type carrier.

2. A typewriting machine having a series of compressors adapted to be operated by the fingers, a type carrier movable to bring one or another of the type characters to the line of print, an arm moving with said type carrier, and stops adapted to be moved into the path of said arm by the operation of said compressors.

3. The combination of a type carrier movable to bring one or another of the type characters to the line of print, a motor to impel the same in one direction, an escapement device to hold or release said type carrier, a series of compressors adapted to be operated by the fingers, and means actuated thereby to operate said escapement device.

4. The combination of a type carrier movable to bring one or another of the type characters to the line of print, an arm moving with said type carrier, a series of cylinders, a series of plungers movable in said cylinders, and a series of compressors connected with said cylinders, whereby any one of said plungers can be moved into the path of said arm.

5. The combination of a type carrier movable to bring one or another of the type characters to the line of print, a motor to impel the same in one direction, an arm moving with said type carrier, a series of cylinders, a series of compressors connected to said cylinders, a series of plungers movable by the operation of said compressors into the path of said arm, and an escapement device to hold or release said type carrier and adapted to be

operated by the movement of any one of said plungers.

6. The combination of a shaft, a motor to impel said shaft, a type carrier borne by said shaft, an arm carried by said shaft, a series of cylinders arranged about the axis of said shaft, a series of compressors connected to said cylinders and a series of plungers any one of which is movable by the operation of a corresponding compressor into the path of said arm.

7. The combination of a shaft, a motor to impel said shaft, a type carrier borne by said shaft, a finger rotating with said shaft, an escapement plate having a stop to engage said finger, a series of cylinders, a series of compressors connected to said cylinders and a series of plungers any one of which is movable by the operation of the corresponding compressor to strike said plate and open the escapement.

8. The combination of a shaft, a type carrier borne by said shaft, a pinion frictionally mounted on said shaft, motor and intermediate gearing for driving said pinion, and means to check positively the rotation of said shaft while permitting the pinion to continue its rotation.

9. The combination of a shaft, a type carrier borne by said shaft, a pinion frictionally mounted on said shaft, a motor and intermediate gearing for driving said pinion, an escapement finger carried with said pinion, an escapement stop movably supported and means to shift said stop, whereby the pinion is permitted to have a complete rotation at each operation of the escapement regardless of the movement of the shaft.

10. In a typewriter having a movable paper carriage and a motor therefor and means to hold the carriage temporarily from movement, an air compressor and means operated thereby to release the carriage for movement by the motor.

11. The combination of a paper carriage, a shaft geared thereto, a motor to impel said shaft, a gear mounted loosely on said shaft, a clutch to couple said gear to said shaft, and means to operate said clutch to permit movement of the shaft independently of said gear.

12. The combination of a paper carriage, a shaft geared thereto, a motor to impel said shaft, a gear mounted loosely on said shaft, a clutch to couple said gear to said shaft, a compressor and means actuated by the operation of said compressor to open said clutch.

13. The combination of a paper carriage, a shaft geared thereto, a motor to impel said shaft, a gear mounted loosely on said shaft, and having a series of lugs upon one face thereof, an escapement lever carried by said shaft and adapted to engage said lugs and means to shift said lever to release said shaft from said gear.

14. The combination of a paper carriage, a shaft geared thereto, a motor to impel said shaft, a gear mounted loosely on said shaft,

and having a series of lugs upon one face thereof, an escapement lever carried by said shaft and adapted to engage said lugs, a spring to force said lever into engagement with said lugs, a cylinder fixed in line with said shaft, a plunger in said cylinder and a compressor connected with said cylinder and adapted to operate said plunger to shift said lever and to release the shaft from the gear.

15. A type carrier for typewriting machines composed of a hub having a notched periphery with an outer flange and a series of spring

strips notched at one end to engage the notches of said hub and bearing type characters at their free ends, each strip having a rib on its outer face near its notched end to rest against said flange.

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

CARL W. WEISS.

Witnesses:

A. N. JESBERA,
A. WIDDER.