No. 862,255. PATENTED AUG. 6, 1907.

F. G. KELL.

TYPE WRITER TABULATOR.

APPLICATION FILED JULY 13, 1906.

3 SHEETS—SHEET 1.

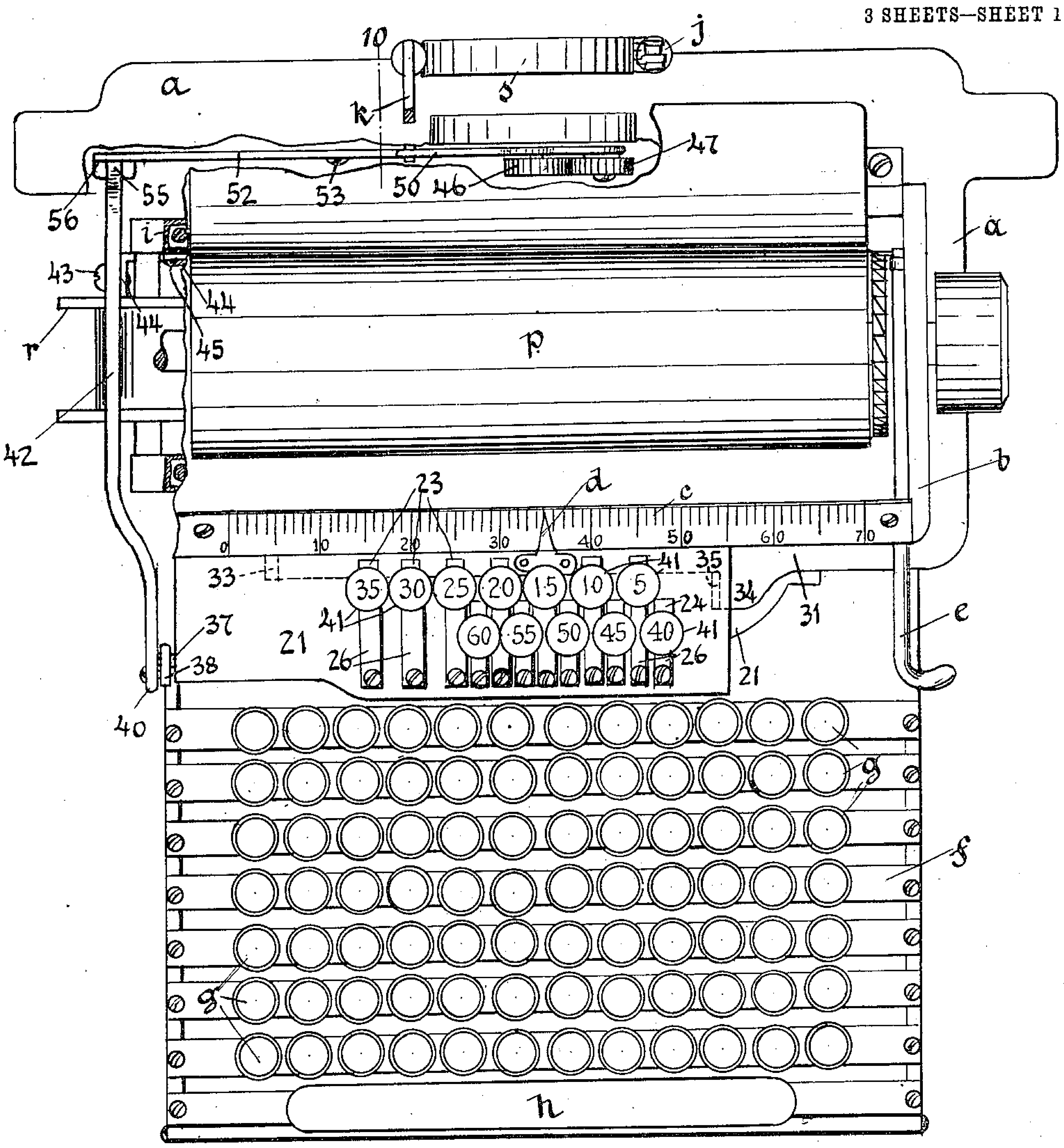

Fig. 1

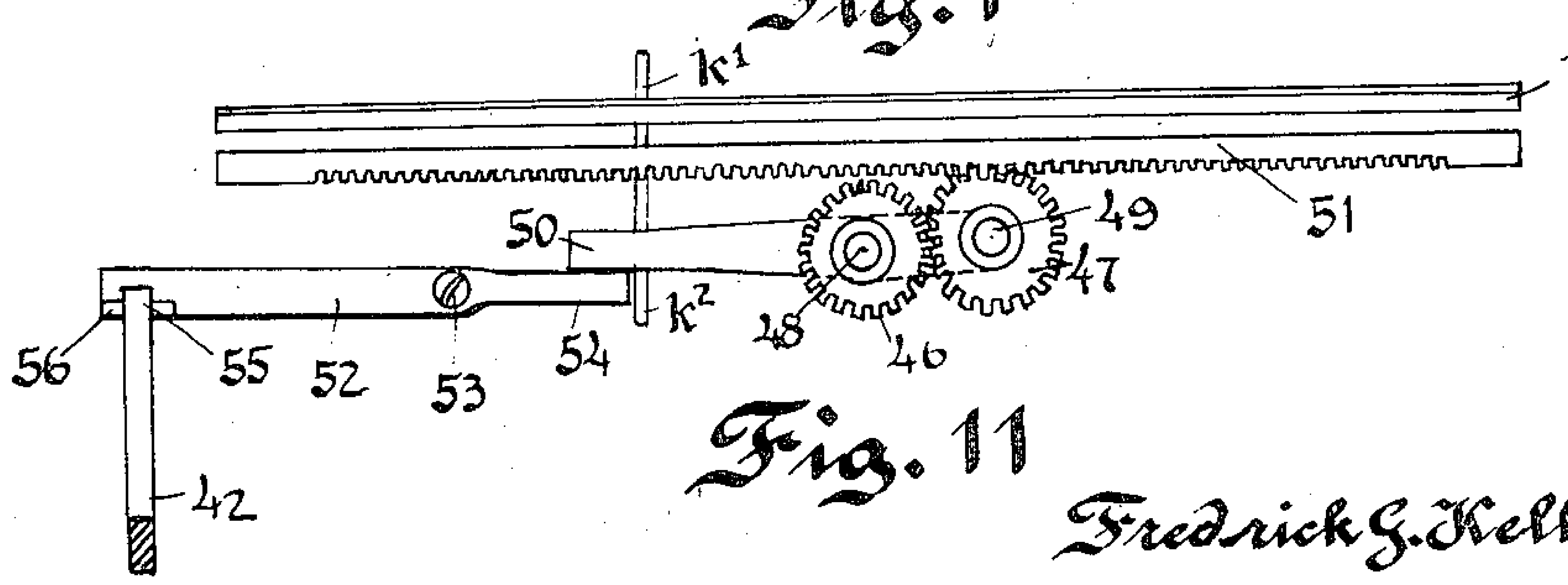

Fig. 11

Fredrick G. Kell, Inventor

Witnesses

Walter D. Machlsith

Gertrude H. Boink

By George Wetmore Colles Attorney

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3 SHEETS—SHEET 2.

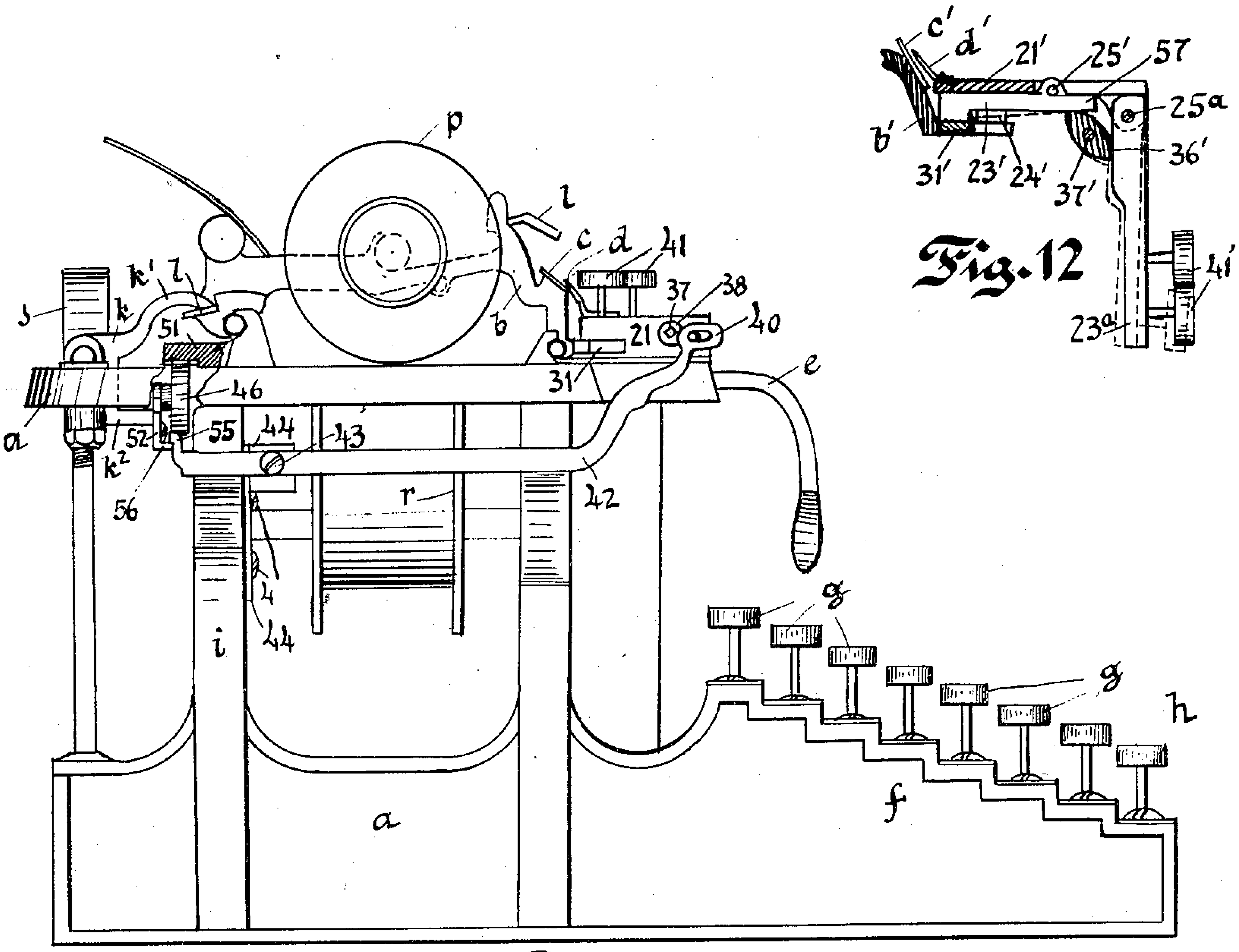

Fig. 2

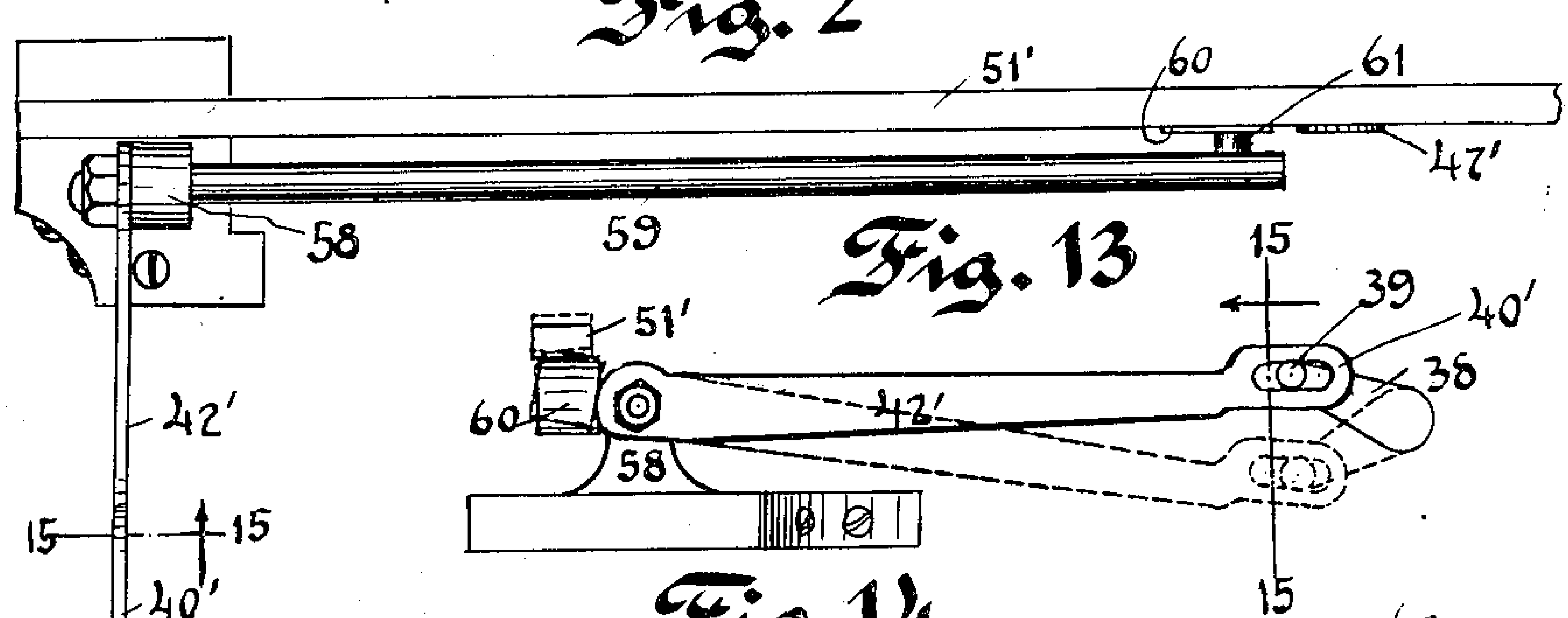

Fig. 14

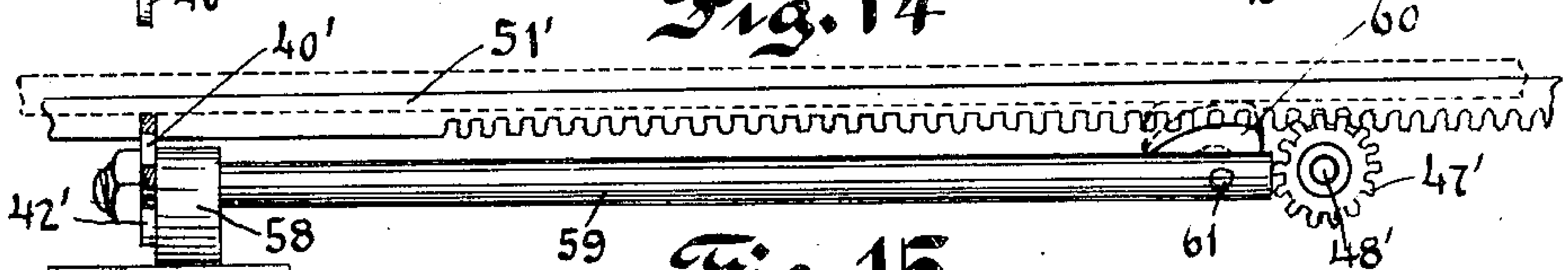

Fig. 15

Fredrick G. Kell, Inventor

Witnesses

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3 SHEETS—SHEET 3.

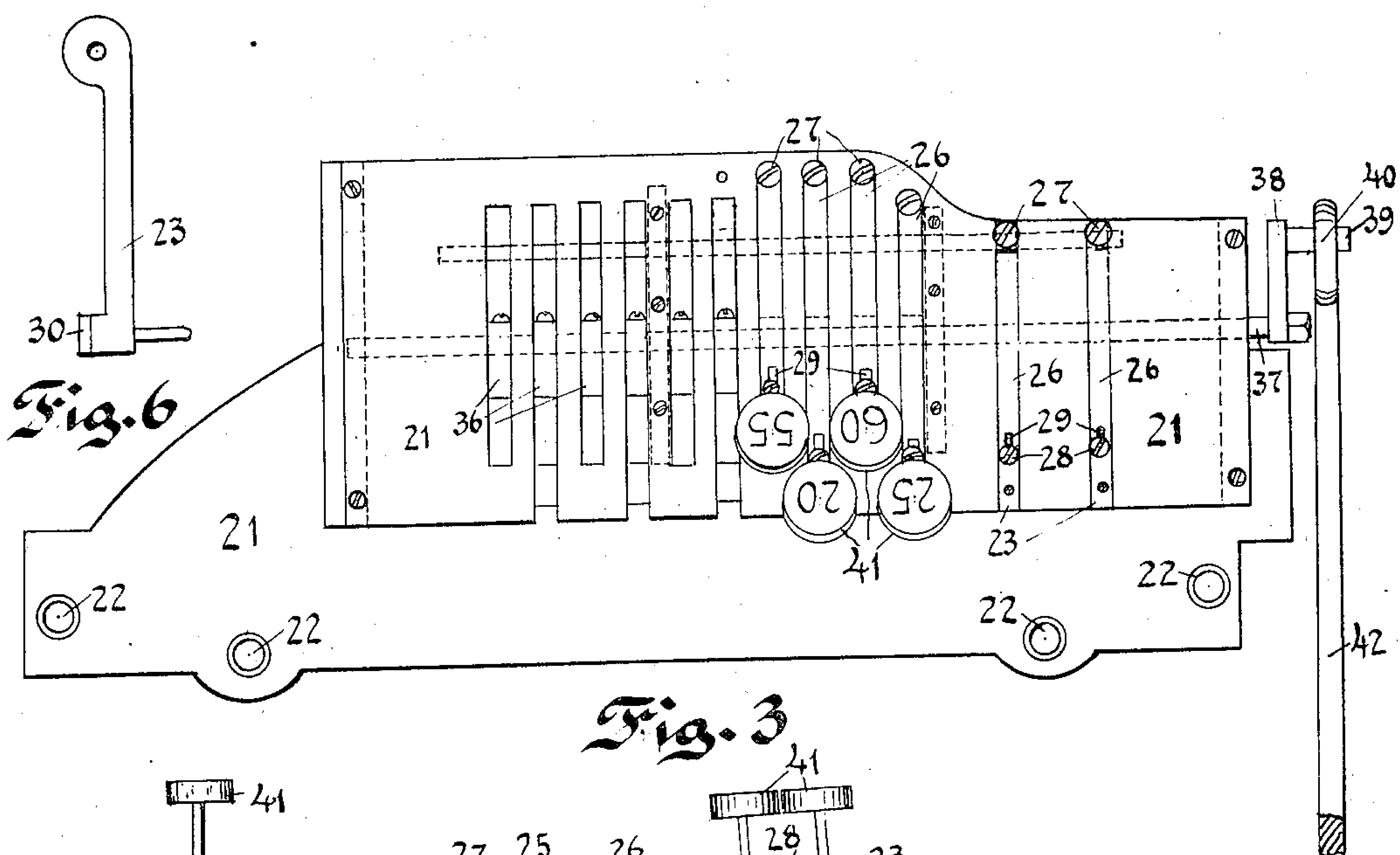

Fig. 3

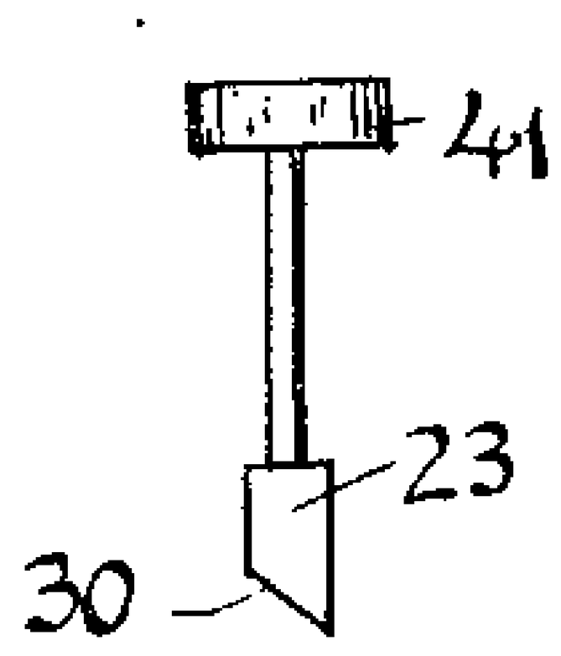

Fig. 5

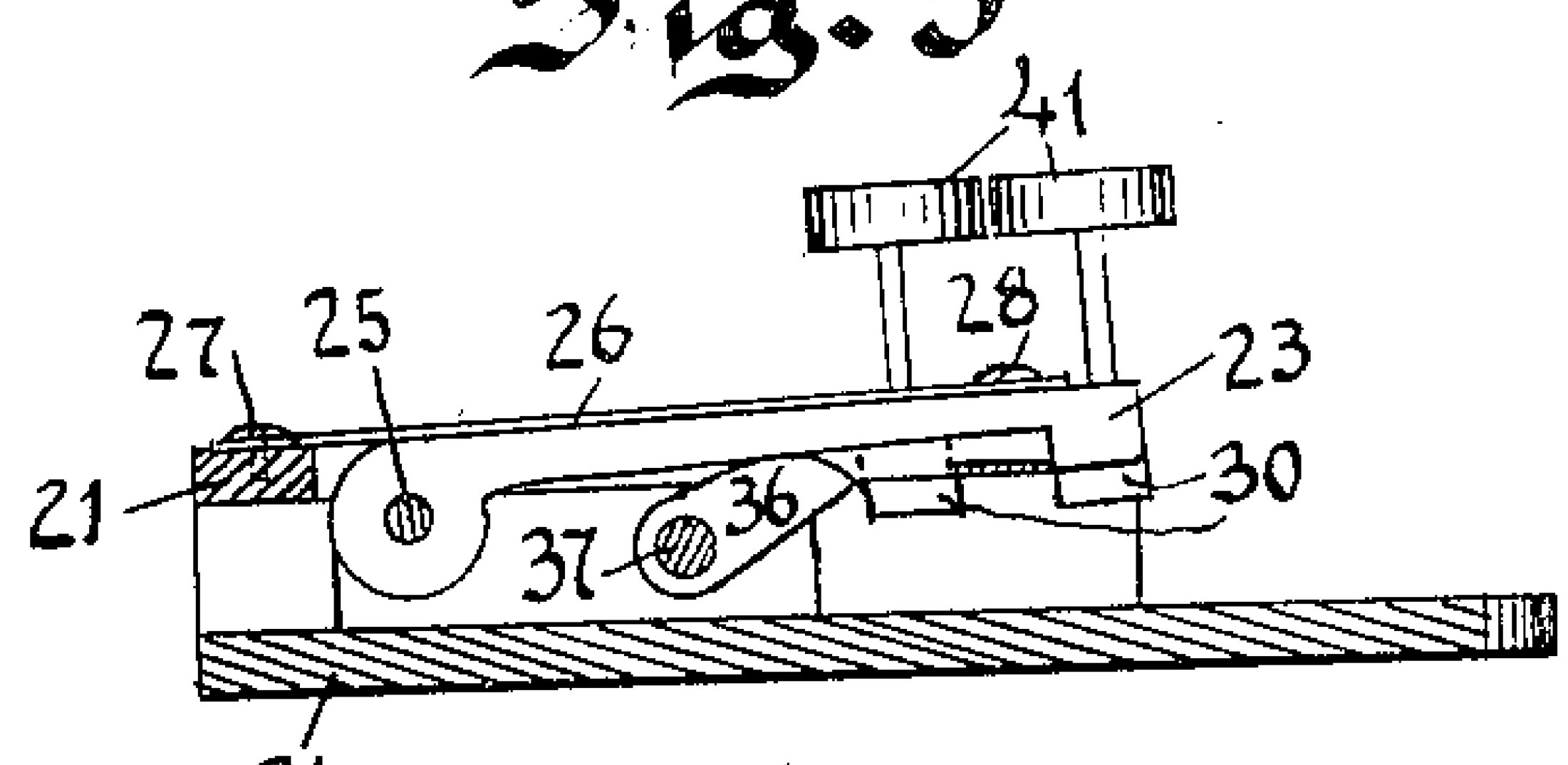

Fig. 4

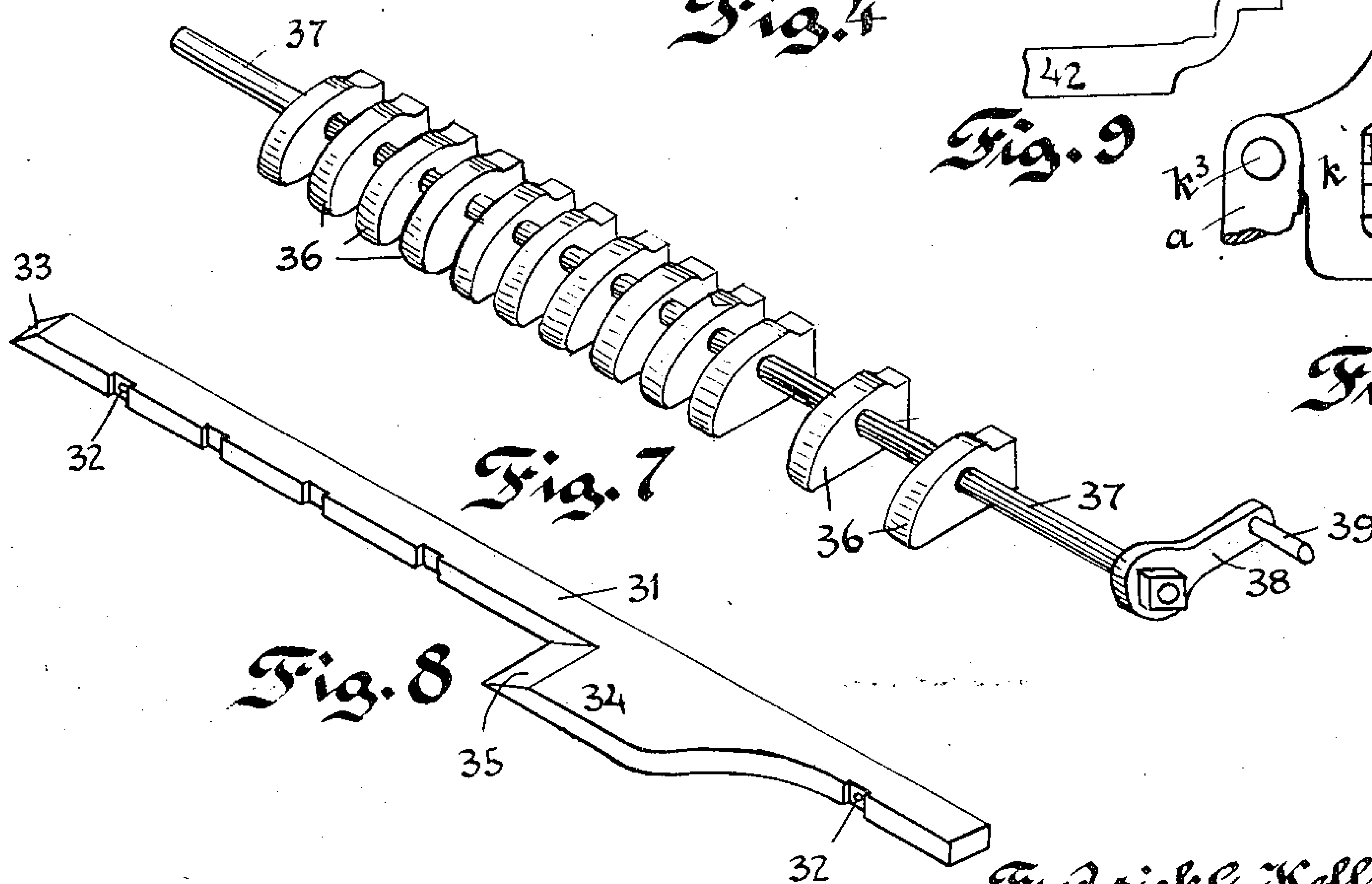

Fig. 8

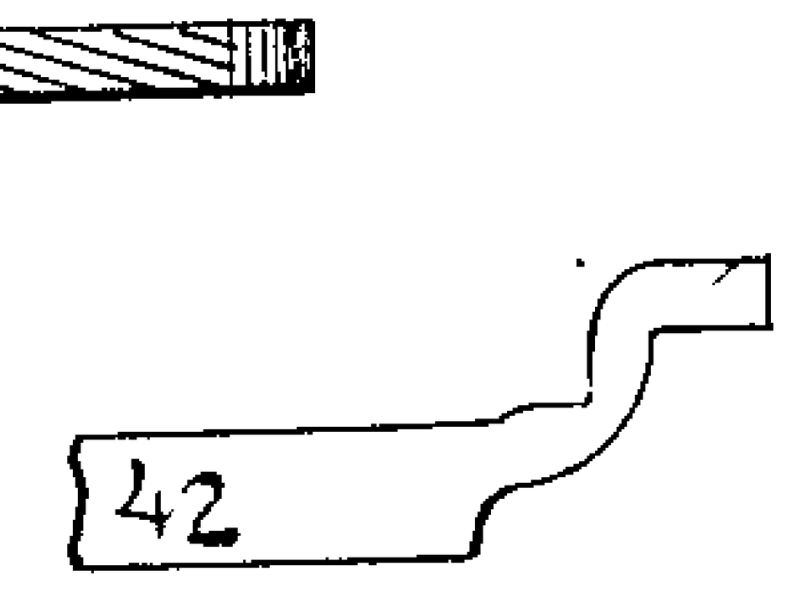

Fig. 9

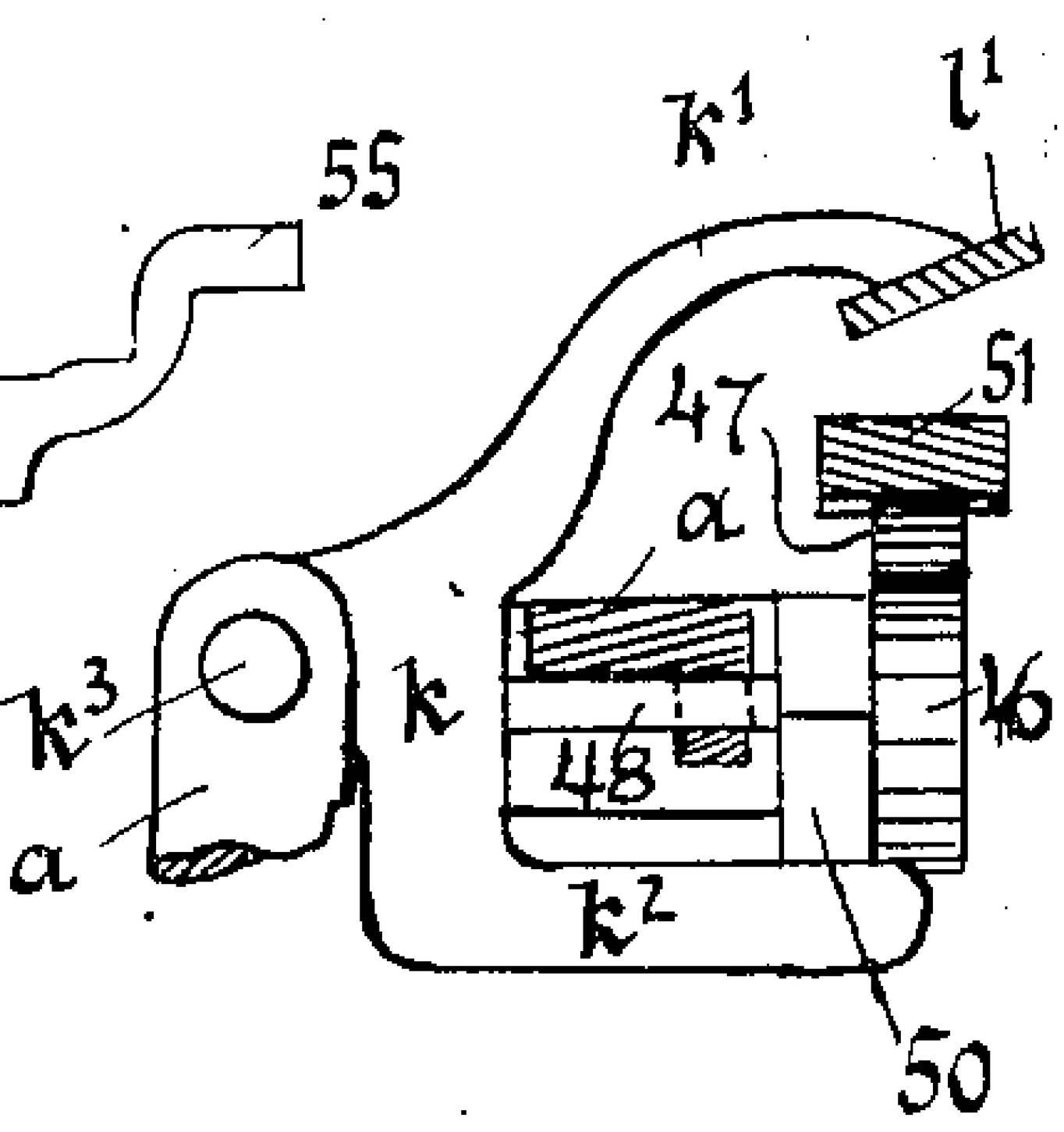

Fig. 10

Fredrick G. Kell, Inventor

Witnesses

Walter D. Machleith

Gertrude H. Doink

By George W. Seltman Cole, Attorney

UNITED STATES PATENT OFFICE.

FREDRICK G. KELL, OF MILWAUKEE, WISCONSIN.

TYPE-WRITER TABULATOR.

No. 862,255. Specification of Letters Patent. Patented Aug. 6, 1907.

Application filed July 13, 1906. Serial No. 326,033.

To all whom it may concern:

Be it known that I, FREDRICK G. KELL, of Milwaukee, Wisconsin, have invented a Type-Writer Tabulator, of which the following is a specification.

This invention relates to attachments to typewriter machines for tabulating purposes, that is to say, for the purpose of enabling the carriage to be automatically stopped at certain spaces when released, as is needed in such work as copying statistical tables.

The particular object which I have in view is to form a device in the nature of an attachment manufactured independently of the typewriter itself and intended to be readily mounted on any existing machine, though of course, for different types of machines slight modifications will be necessary corresponding with the structure and build of any special machine.

My device embodies in its essential features a plurality of keys, each corresponding to a given space on the scale on the machine to which the carriage will move and at which it will stop when the key is depressed. These keys may be of any number and the stops may be positioned for any spaces, but ordinarily it will be convenient to arrange them at regular intervals, as for example, at intervals of five spaces.

The construction and operation of my invention are best understood from the accompanying drawings, taken in connection with the following description thereof.

In these drawings Figure 1 is a plan view of a machine of the type known as the Smith-Premier, having my attachment mounted thereon, parts being cut away to show the mode of operation; Fig. 2 is a side elevation of the same, parts of the frame being here also broken away to show the parts of my mechanism; Fig. 3 is a plan view of the keyboard part of the attachment on an enlarged scale, a number of the stop-bars being removed and some of the keys being detached; Fig. 4 is a transverse section through the same; Fig. 5 is an end view of one of the key-bars; Fig. 6 is a side view thereof; Figs. 7 and 8 are perspective views of the cam-shaft and carriage-bar respectively; Fig. 9 is a side view on an enlarged scale of the end of one of the levers constituting the carriage releasing device; Fig. 10 is a cross-section through the machine, taken on the plane 10 of Fig. 1; Fig. 11 is a front elevation of the release-mechanism at the rear of the machine, the parts of the machine not immediately concerned being omitted; Fig. 12 is a transverse section through a different form of tabulator adapted to other types of typewriter, for example, the type known as the Remington; Figs. 13, 14 and 15 are respectively a plan, a side view and a front view of the release-mechanism adapted to a different form of carriage release from that shown in Fig. 11, this being also in use on some models of the Remington type of machine. In Fig. 15 the rock-arm is shown in section on the line 15.

Every reference character refers always to the same part in these drawings.

The parts of the typewriter, to wit, frame *a*, carriage *b*, platen *p*, space-scale *c*, index *d*, line-spacing lever *e*, keyboard *f*, keys *g*, space-key *h* and ribbon-reel *r* as illustrated in Figs. 1 and 2, are parts of the Smith-Premier typewriter in common use and require no further description. The auxiliary parts and levers of the machine have been omitted as unnecessary for purposes of this specification.

The tabulator which forms my invention comprises a keyboard or frame 21, which is mounted in this type of machine on top of a projecting portion of the type-basket in front of the scale *c*, and secured to the frame-plate in any suitable manner, as by screws passing through holes 22 (see Fig. 3), and this keyboard has a plurality of key-bars or stop-bars mounted therein, in two series designated respectively 23 and 24. These stop-bars are pivoted on a transverse shaft 25 mounted on the keyboard 21, and are held in raised position by means of leaf-springs 26 secured to the frame by screws 27, and exercising a lifting force upon screws 28 which run in slots 29 in the ends of the springs. Each of the key-bars 23 and 24 carries a key 41. The key-bars 23 are spaced at a distance equal to five spaces on the index *c*, and their keys 41 are numbered from 5 to 35, as shown, while the shorter key-bars 24 alternate with the key-bars 23 and are likewise spaced at distances of five spaces, and their keys 41 are numbered from 40 to 60. The ends of these key-bars are preferably beveled as shown at 30, and these beveled ends of the key-bars act against the beveled ends of a bar 31, which is secured to the front edge of the carriage, as by means of screws passing through holes 32, this bar having its left-hand end 33 beveled and having further a rectangularly forwardly projecting jog 34, whose effective edge 35 is also beveled. This bar is mounted in such a position that the end 33 reciprocates directly under the beveled ends 30 of the key-bars 23, while the jog 34 passes directly under the ends of the key-bars 24; and further, the jog 34 is so placed as to be five spaces distant, that is, to the right of the key-bar numbered 40 when the end 33 is abutting against the end of the key numbered 35, as shown by the dotted lines in Fig. 1.

The keys when depressed act, as will be seen, as stops for the bar 31, and consequently for the carriage to which it is attached, and they further act upon one of a series of cams 36, which are mounted on a transverse shaft 37 journaled in the frame 21. This shaft has at its left-hand end a crank 38 which has a pin 39, and this pin engages in the slotted end 40 of a lever 42, which is pivoted on a screw 43 supported by a bracket-arm 44, which is secured to the rear left-hand frame-post *i* of the typewriter by means of screws 45.

The lever 42 is destined to operate the release-

mechanism so as to release the carriage when the keys 41 are depressed, these acting through the cams 36 to oscillate the shaft 37 and the crank 38, thereby raising the front end of said lever. The mechanism operated by said lever will differ according to the style of machine to which the device is attached, but the end to be accomplished is always to raise or move the same piece in the same way as is done by the regulator carriage-release lever which forms a part of the machine.

The kind in use on some Smith-Premier machines is illustrated in Figs. 1, 10 and 11. In these figures there are shown a pair of intermeshing gear-wheels 46 and 47, the former of which is mounted on a shaft 48 and the latter is pivoted upon a pin 49 carried by the lever 50. The shaft 48 is operated by the spacing-escapement, which is partly shown at *j* in Fig. 1 and partly hidden by the hood *s*. The wheel 47 normally meshes with a rack-bar 51, which is carried by the carriage, but is released therefrom by raising the opposite end of the lever 50, and this in the machine itself is accomplished by a forked two-armed lever *k* having an upper arm k^1 and a lower arm k^2 and pivoted on a pin k^3 at the back of the frame *a*. The finger-lever on the carriage, shown at 1 in Fig. 1, operates to raise a plate l^1, which is just above the rack-bar 51 and on which the arm k^1 of the lever *k* rests, and when the arm k^1 is so raised the arm k^2, which passes under the end of the lever 50, raises and oscillates said lever so as to remove the gear 47 from engagement with the rack. In my attachment the same movement is effected by means of a lever 52 which is pivoted on a screw 53 secured on the frame *a* of the machine, and whose right-hand end 54 abuts against the lower side of said lever 50, while its other end is acted on by the hooked end 55 of the lever 42, which engages the lug 56 on the opposite end of the lever 52.

The mode of operation will be clear from the foregoing description, and it will be seen that the depression of anyone of the keys 41 will be accompanied by the release of the carriage, and the tension of the latter will draw it over until the end 33 or jog 34 strikes the end of the key so depressed, it being assumed, of course, that the key depressed is one corresponding to a space in advance of that at which the carriage stands. This enables the operator of the machine to move the carriage at once to any desired space or within four spaces thereof with but one movement, thus saving the time and labor necessary to repeatedly shift the carriage by one space at a time, or to release the carriage and reset it at the desired point. The object of having the ends of the key-bars 23 and 24 and the corresponding edges 33 and 35 beveled is to ease the shock due to the stopping of the carriage, because such shock will be partly relieved by the slight rising of the key against the pressure of the finger, and the amount of such relief will naturally depend on the angle of bevel.

In order to enable the free movement of the carriage-bar 31, which is secured to the carriage, to take place without interfering with the index or pointer *d*, the regular index of the machine is removed and another index is substituted, which is secured to the upper plate of the frame 21 above the carriage-bar, as clearly shown in Figs. 1 and 2.

The tabulator thus described is arranged more particularly to fit the Smith-Premier type of typewriter, but my tabulator may be also arranged to fit other machines by slightly different shaping and configuration of the parts. In Fig. 12 I have shown in cross-section a form which is adapted especially to the Densmore machine and others where the space on the frame immediately in front of the carriage is very small. In this form the place of the key-bars 23 and 24 is taken by the compound arrangement consisting of key-bars 23^a and stop-bars 23′, 24′, the former being pivoted on a shaft 25^a and the latter on a shaft 25′, both secured in ears to the frame-plate 21′ which is in turn secured at its ends to the typewriter frame in front of the carriage and has mounted thereon the index *d*′. The carriage-bar 31′ is secured to the front edge of the index *d*′ and is acted on by the depending ends of the stop-bars 23′, 24′ as in the previous form. These stop-bars are themselves oscillated through means of a cam-shaft 37′ having a double-edged cam 36′ thereon, one edge of which is acted on by the key-bars 23^a, and the other acts in turn on the front end 57 of the stop-bars. In this case the keys 41′, which are attached to the key-bars 23^a depend in front of the type-basket of the machine and are pressed horizontally, these operating to oscillate the cam 36′ and thereby the shaft 37′, which operates the carriage-releasing mechanism in the manner previously described, and at the same time the corresponding stop-bar 23′ or 24′ is depressed to form a stop for the carriage-bar.

In Figs. 13 to 15 is shown further a combination of parts for acting upon a different style of carriage release for a machine in which the rack-bar 51′ of the carriage is arranged to be raised into the position shown in dotted lines and thus disengaged from the operating wheel 47′ which is mounted on the escapement shaft 48′. In this case I provide a standard 58 mounted on the frame, which forms a pivot for a rock-shaft 59, which has keyed on its outer end a rock-lever 42′ taking the place of the lever 42, and having its front end 40′ slotted to receive the pin 39 of the crank 38, which crank is here set at a different angle, whereby its movement is downward instead of upward. The shaft 59 carries on its opposite end, which extends to nearly the center of the machine, a shoe 60, which is offset upon a pin 61 and is located directly under the rack-bar 51′, so that the oscillation of the shaft 59 raises the shoe 60 and rack 51′, disengaging the latter from the wheel 47′ and releasing the carriage.

Of course it will be understood that my invention may assume numerous different forms and must be differently arranged to accommodate the many different models of typewriter machines which are now on the market, but these forms will readily occur to those skilled in the art, and are comprehended within the limits and principles of my invention. I do not, therefore, limit myself to the particular details of my invention as above described, but reserve the right to vary therefrom as may be indicated by the scope of my claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a typewriter-tabulator, the combination of a keyboard or frame adapted to be secured to a typewriter-frame, a plurality of stop-bars having keys and stop-engaging portions arranged in two parallel rows at different distances from the carriage, two projections carried by the carriage and passing under the respective rows of said

engaging portions whereby the depression of any key causes the stop-bar to move into the path of one of said projections, and mechanism connecting each key with the release-movement of the machine to release the carriage on the depression of the key.

2. A tabulating-device for typewriter-machines comprising, in combination with the frame and carriage of the machine, a plurality of depressible stop-bars mounted on the frame adjacent to the carriage, a projecting-member carried by the said carriage and reciprocating therewith in the path of said stop-bars when depressed, a cam-shaft immediately beneath said stop-bars and carrying cams which are oscillated on the depression of each key, and mechanism connected with said shaft for operating the carriage-release.

3. In a typewriter-machine, a tabulating-device comprising, in combination with the carriage and frame of the machine, a plurality of depressible stop-bars having stop-engaging portions in two parallel rows at different distances from the carriage, two projections on said carriage extending across the path of the respective stop-bars when depressed, and mechanism operated by each key when depressed for releasing the carriage.

4. In a typewriter-machine, a tabulating-device comprising, in combination with the carriage and frame of the machine, a plurality of depressible stop-bars having stop-engaging portions in two parallel rows at different distances from the carriage, two projections on said carriage extending across the path of the respective stop-bars when depressed, a rock-shaft mounted transverse to said stop-bars and carrying cams acted on by said stop-bars to operate said shaft, and lever-mechanism connected with said shaft for operating the carriage-release.

5. A tabulating-attachment for typewriter machines comprising, in combination, a keyboard or frame adapted to be mounted on a typewriter-frame immediately in front of the carriage, a plurality of depressible stop-bars carried thereby, keys connected with said stop-bars to depress the same, a carriage-bar mounted in front of said carriage and reciprocating therewith, said bar having a jog which passes across the ends of said stop-bars, an oscillating shaft mounted transversely to said stop-bars, cams on said shaft acted on by said bars to oscillate said shaft, a crank mounted on one end of said shaft, a lever pivoted on one side of the typewriter-frame and extending from the front to the rear of the machine, said lever having a connection with said crank at the front end, and mechanism connecting with said lever for operating the carriage-release.

6. A tabulating-attachment for typewriter machines comprising, in combination, a keyboard or frame adapted to be mounted on a typewriter-frame immediately in front of the carriage, a plurality of depressible stop-bars carried thereby and arranged in two parallel rows having their ends at different distances from the carriage and alternating with each other, keys connected with said stop-bars to depress the same, the spaces between said bars being equal to a definite number of spaces on the carriage, a carriage-bar mounted in front of said carriage and reciprocating therewith, said bar having two transverse edges passing across the ends of the respective rows of stop-bars, an oscillating-shaft mounted transversely to said stop-bars, cams on said shaft acted on by said bars to oscillate said shaft, a crank mounted on one end of said shaft, a lever pivoted on one side of the typewriter-frame and extending from the front to the rear of the machine, said lever having a connection with said crank at the front end, and mechanism connecting with said lever for operating the carriage-release.

7. In a typewriter-tabulating device, a depressible stop-bar adapted to move in a plane transverse to the direction of movement of the machine and having an active end beveled on a plane oblique to the direction of movement of the key and also to the direction of movement of the carriage, and a bar adapted to be secured to the carriage and intercepted by the beveled end of said stop-bar whereby the momentum of the carriage when said beveled end is struck reacts against the pressure on said key.

8. In a typewriter-tabulating device, a depressible stop-bar adapted to move in a plane transverse to the direction of movement of the carriage and having a forwardly-facing active end beveled on a plane oblique to the direction of movement of the stop-bar and also to the direction of movement of the carriage, and a bar adapted to be secured to the carriage and having a similarly beveled end which is intercepted by the beveled end of said stop-bar, whereby the momentum of the carriage when the beveled end of the stop-bar is struck reacts against the pressure on the stop-bar.

9. In a tabulating-device for typewriting-machines, the combination of a projecting-member adapted to be secured to the carriage of the machine and reciprocating therewith, said member having a forwardly-facing active edge which is beveled off on a plane oblique to the direction of movement of said carriage, and a depressible stop-bar adapted to move into the path of said projecting member and moving in a direction transverse to the movement of the carriage and oblique to said beveled edge, whereby the momentum of said carriage in being stopped by said stop-bar reacts against the pressure on said stop-bar.

10. A tabulator comprising in combination a key-board or frame removably attachable to a typewriter frame adjacent to the reciprocating carriage thereof, a member adapted to be secured to the carriage and having a projecting portion, a plurality of depressible keys on said key-board having ends arranged to intercept a part of said member and equably spaced over a distance corresponding to the first half of the carriage travel, a second set of depressible keys alternating with the first and having ends arranged to intercept said projecting portion, said second set being likewise equably spaced over a distance corresponding to the second half of the carriage travel, and means operated by each key for releasing the carriage on depression of the key.

In witness whereof I have hereunto set my hand this 11th day of July, 1906.

FREDRICK G. KELL.

In presence of—
WALTER D. MACHLEITH,
GEORGE W. COLLES.