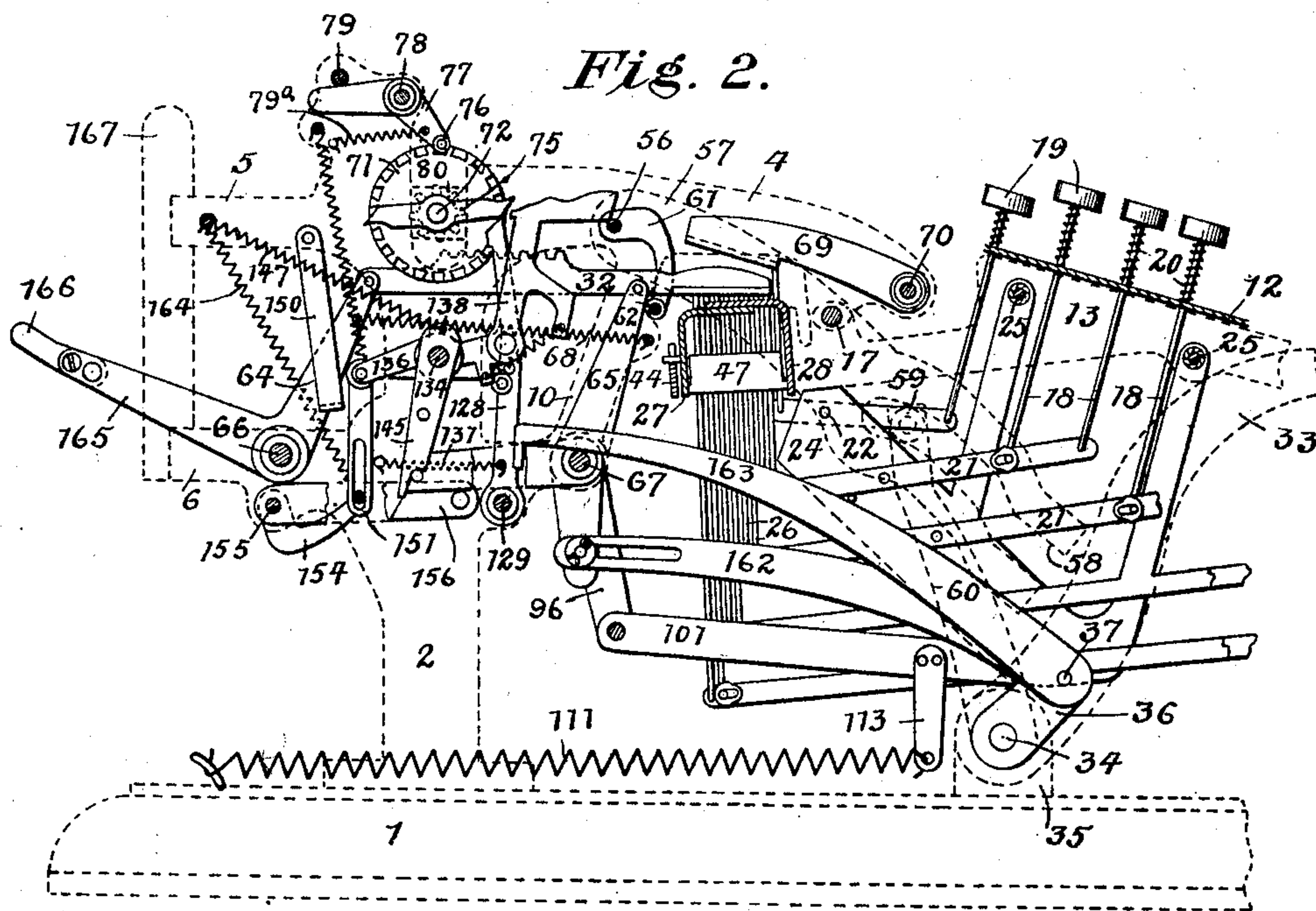
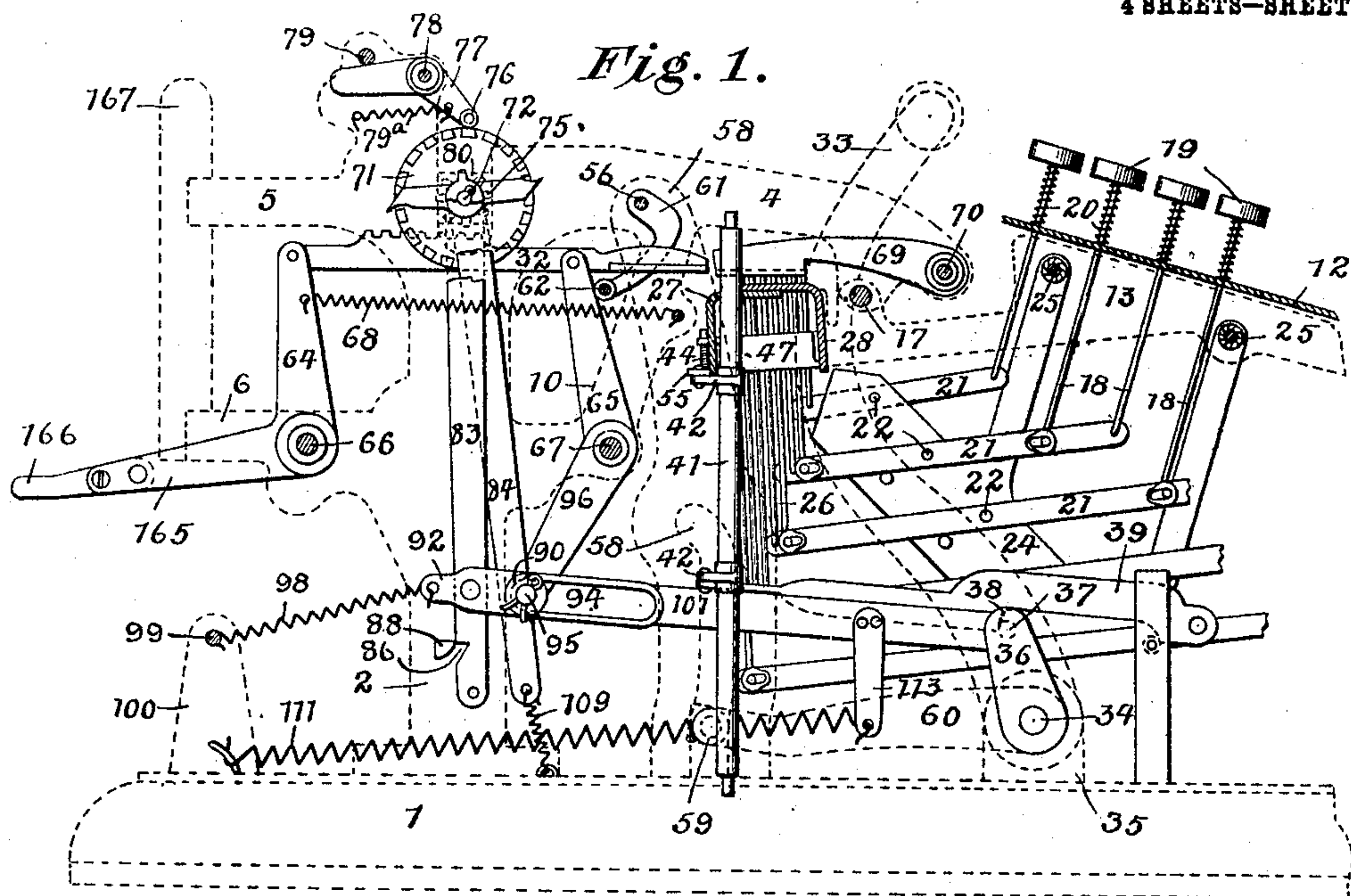


C. WALES.
CARRYING MECHANISM FOR ADDING MACHINES.

APPLICATION FILED DEC. 31, 1903.

4 SHEETS—SHEET 1.



Witnesses
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4 SHEETS—SHEET 2.

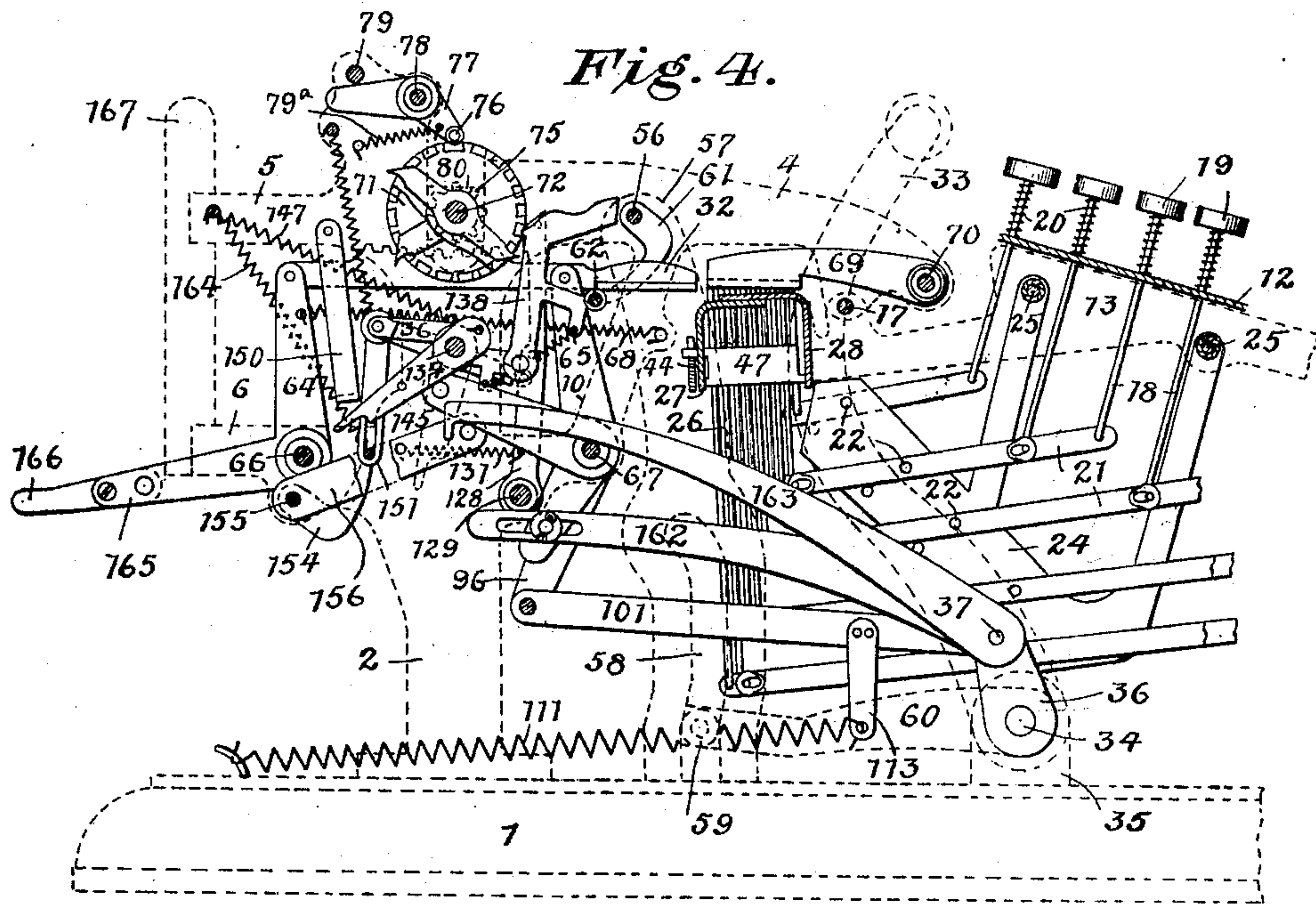
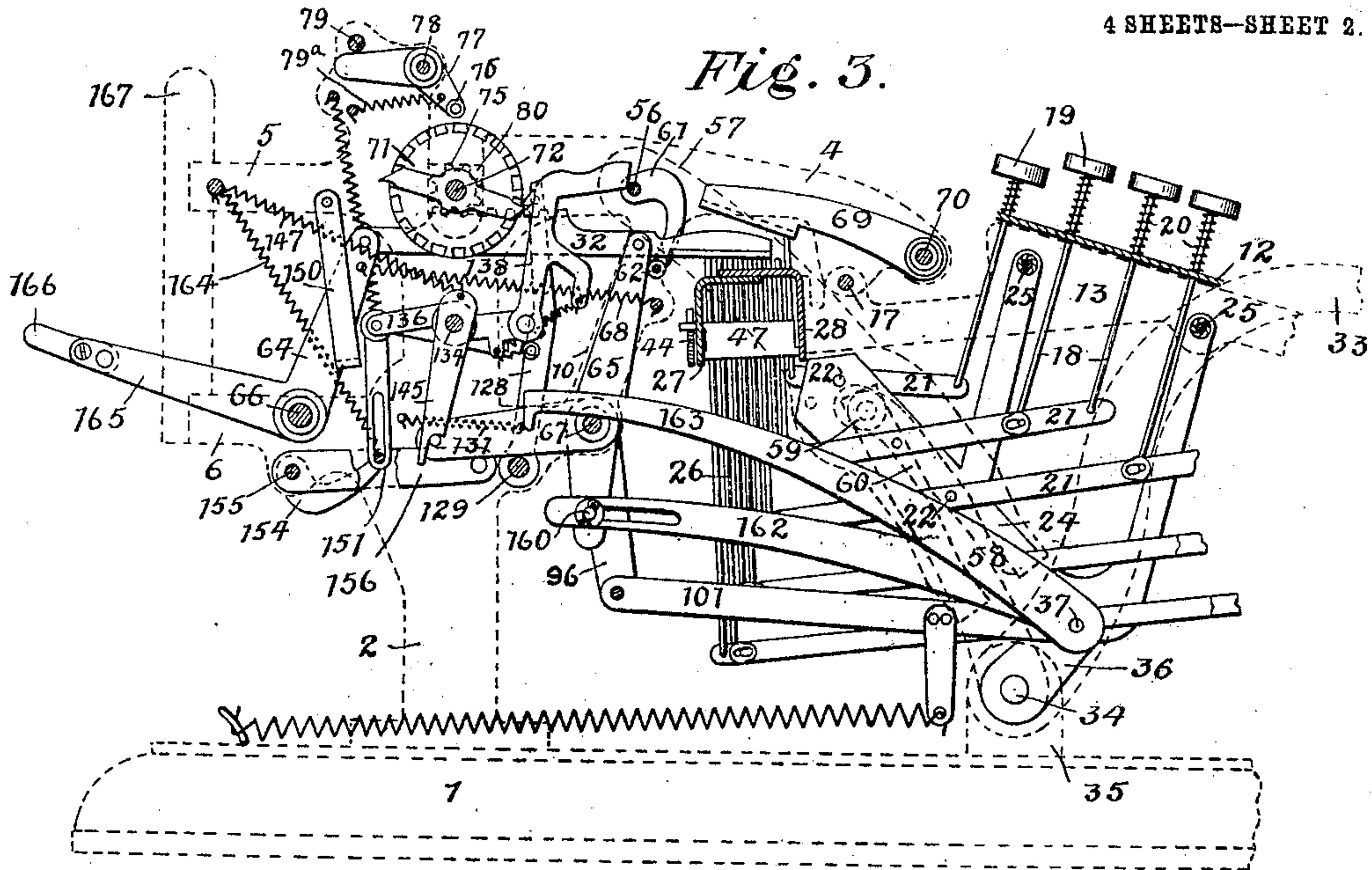
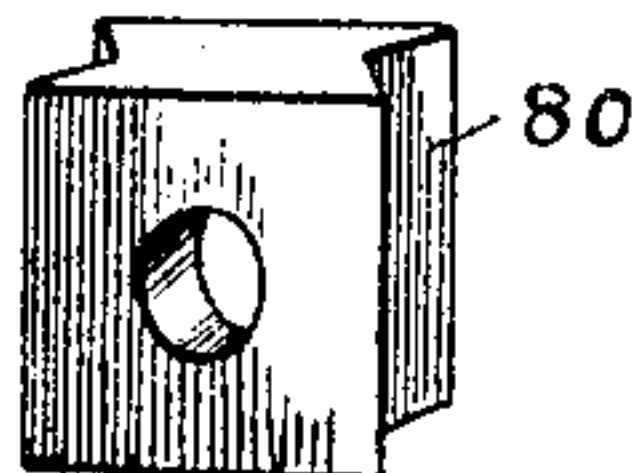


Fig. 12.

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4 SHEETS—SHEET 3.

Fig. 5.

Fig. 10.

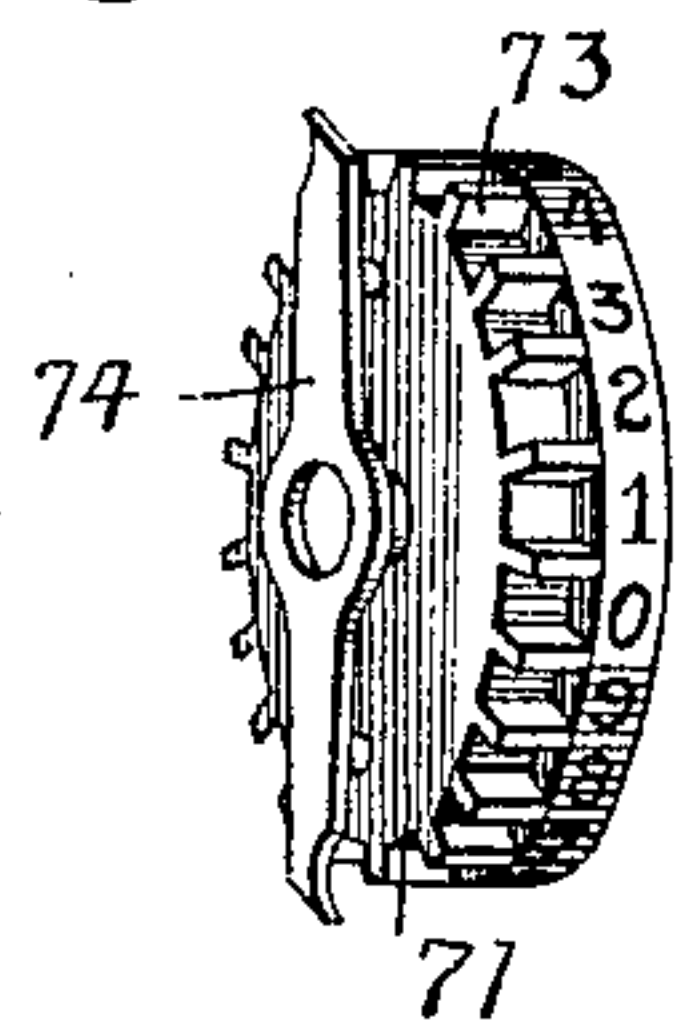


Fig. 6.

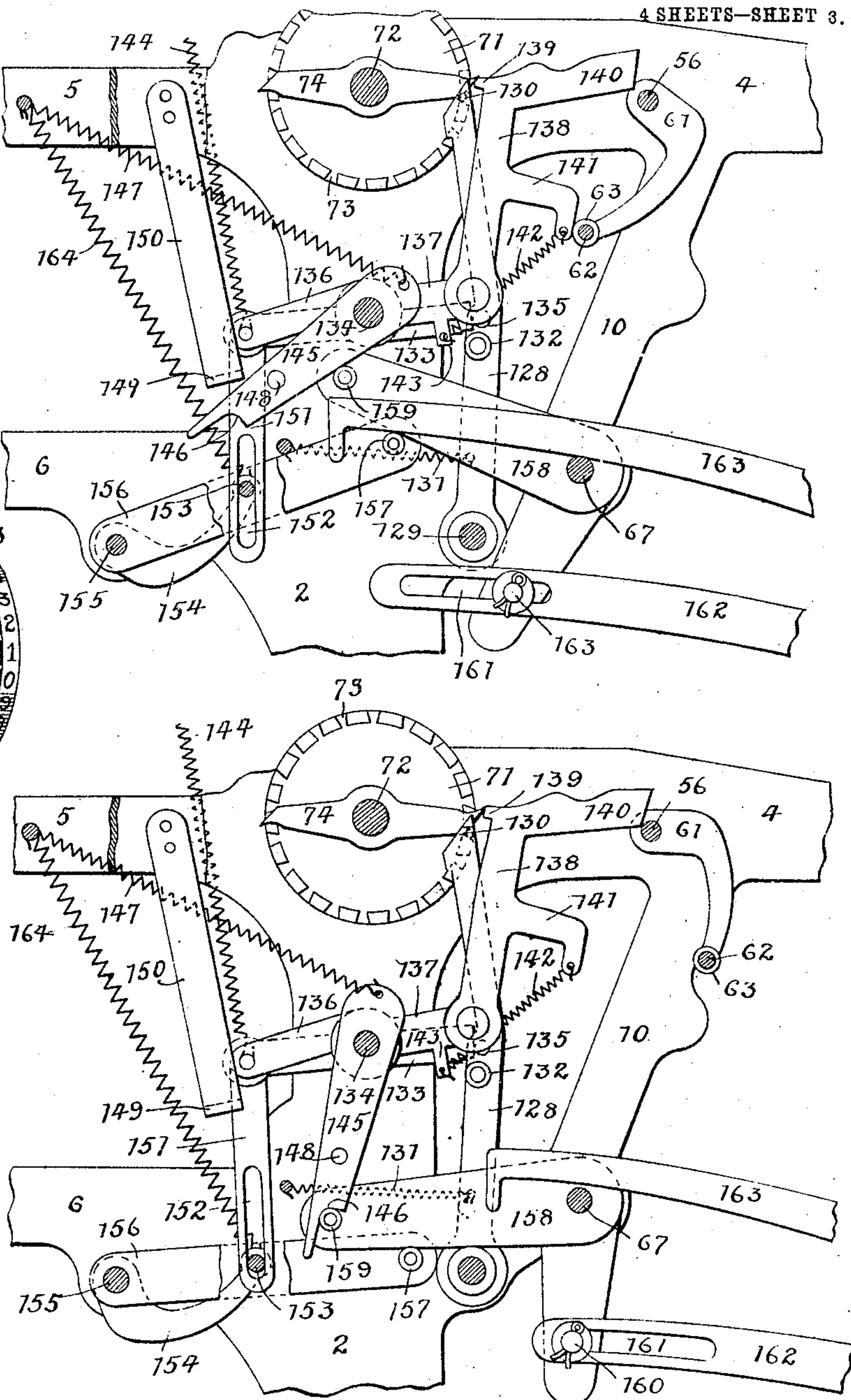
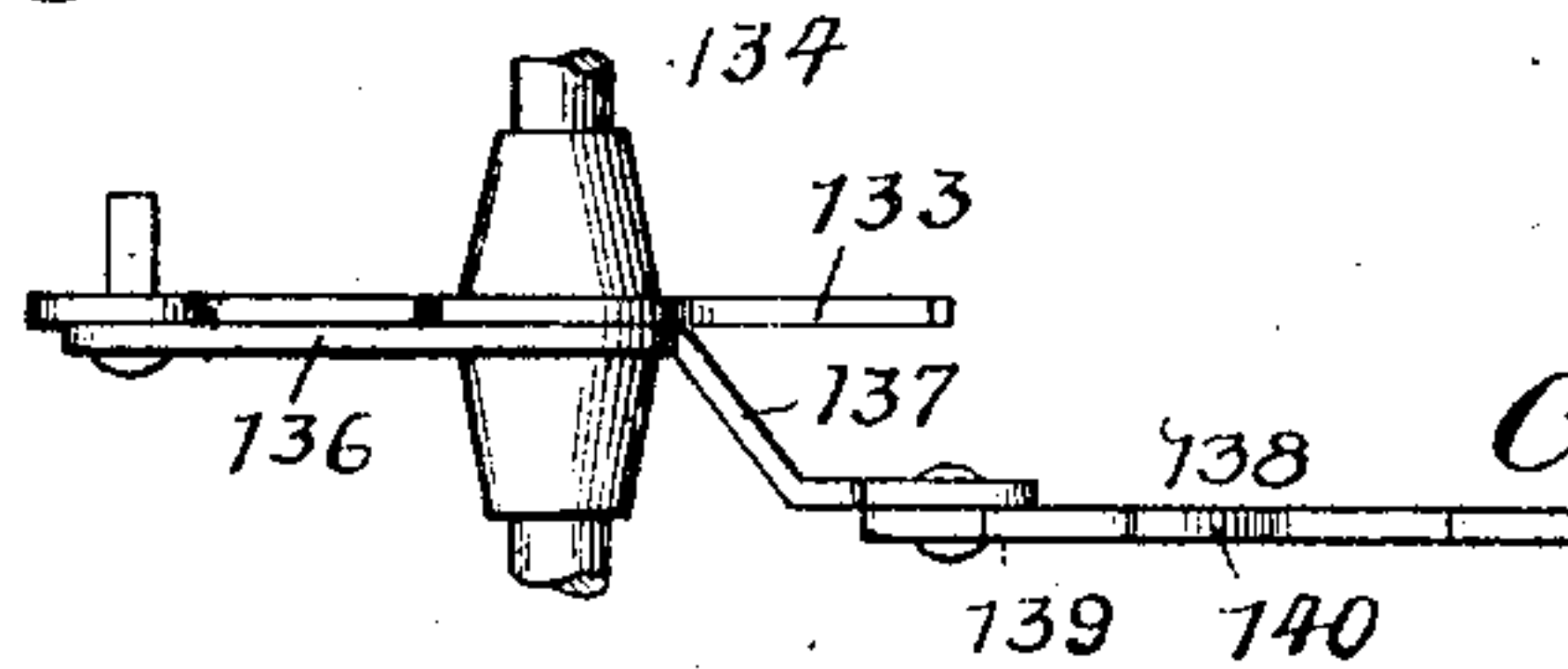


Fig. 6.a



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No. 795,378.

PATENTED JULY 25, 1905.

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CARRYING MECHANISM FOR ADDING MACHINES.

APPLICATION FILED DEC. 31, 1903.

4 SHEETS—SHEET 4.

Fig. 7.

Fig. 11.

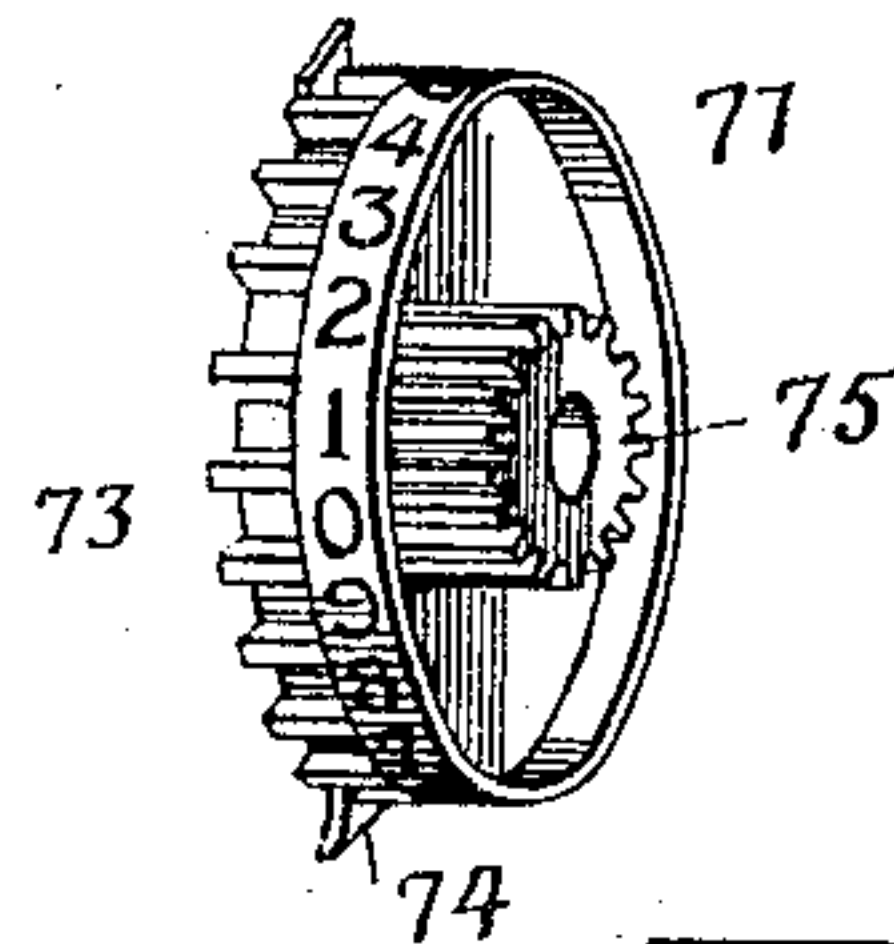


Fig. 8.

Fig. 9.

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UNITED STATES PATENT OFFICE.

CHARLES WALES, OF DETROIT, MICHIGAN.

CARRYING MECHANISM FOR ADDING-MACHINES.

No. 795,378.

Specification of Letters Patent.

Patented July 25, 1905.

Application filed December 31, 1903. Serial No. 187,298.

To all whom it may concern:

Be it known that I, CHARLES WALES, a citizen of the United States, and a resident of Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Carrying Mechanism for Adding-Machines, of which the following is a specification.

My invention relates to adding-machines adapted to be operated by keys bearing numerals and provided with a sight-register for displaying the result of the calculation, and more particularly to that part of the mechanism designed to effect the operation of carrying a total from one column of figures to another when it reaches an amount greater than the highest unit adapted to be recorded in the first column.

I have already described and claimed the general features of the machine, in which the particular mechanism herein described and claimed forms a part, in a copending application filed on the 15th day of September, 1903, Serial No. 173,315, and refer to that application for a more particular description of the general mechanism involved.

In order that the invention may be readily comprehended, I have illustrated herein so much of the general machine subject of the application before referred to as will be necessary to a full understanding of the construction and operation of the carrying mechanism, which forms the subject-matter of the present application, and in the accompanying drawings—

Figure 1 represents in side elevation one of the trains of mechanism in the position assumed when the return stroke of the main operating-handle is nearly but not quite completed, the registering-wheel being set to display the numeral "9." Fig. 2 represents in side elevation substantially the same parts as in Fig. 1 in the position assumed when a second forward stroke of the main operating-handle is nearly but not quite completed, such stroke from the position illustrated in Fig. 1 bringing the carrying mechanism into operation. Fig. 3 represents in side elevation substantially the same parts in positions they assume during a return stroke, which operates the carrying mechanism at what I denominate the "first release" of the jack. Fig. 4 represents in side elevation substantially the same parts in the positions they assume when the operating-lever has nearly but not quite reached the end of the second

return stroke, the jack being sprung and the carrying operation being completed. Fig. 5 represents, on an enlarged scale in side elevation, the carrying mechanism in its normal position or state of rest. Fig. 6 represents in side elevation, on the same scale as in Fig. 5, the same parts in the positions they assume when the forward stroke of the handle is nearly but not quite completed, showing the parts locked to hold the jack. Fig. 7 represents, in similar view and on the same scale as Fig. 6, the same parts in positions assumed during return stroke at the first release of the jack. Fig. 8 represents, in similar view and on the same scale, the same parts in positions assumed during return stroke when the jack is released and the carrying operation completed. Fig. 9 represents the mechanism comprising the jack in plan view. Fig. 10 represents in perspective view one of the registering-wheels looking at the "pawl" side thereof. Fig. 11 represents a similar view looking at the opposition side or pinion thereof. Fig. 12 represents in enlarged perspective detail view the sliding bearing-block for the registering-wheel shafts.

Suitable mechanism is provided for effecting the operation of carrying a total from one column of figures to another when it reaches an amount greater than the highest unit which the first column records, and such mechanism being the subject-matter of the present application will now be particularly described with reference to the drawings by means of numerals.

The main frame, which is mounted upon a preferably rectangular base, (indicated by the numeral 1,) comprises on each side of the machine an upright, as shown at 2 in Figs. 5 to 8 and in dotted-lines in Figs. 1 to 4, from which standards project forward and rearward arms, as at 4, 5, and 6, the forward arms 4 being connected with the uprights 2 by brackets or braces 10.

12 indicates the keyboard, which supports the forward portion of the machine, which I have denominated the "keyboard-section," a frame-piece, as at 13, being secured at each side of the keyboard, which frame-pieces terminate at their forward ends in depending uprights (not shown) which rest upon the base-piece 1 and are connected at their rear ends to the arms 4 of the main frame by means of a cross-rod 17, the whole mechanism being closed in a suitable casing, which I have not illustrated and which may be of any suitable

material and ornamented in any desired manner. Through the keyboard are suitable perforations to admit of the passage therethrough of key-rods 18, upon the tops of which are secured the keys 19, held normally in their raised positions by springs 20, coiled around the key-rods between the keys and the keyboard.

The keys and the trains of mechanism connected therewith are arranged in series side by side, each series comprising keys bearing numerals from "1" to "9," inclusive, the series extending longitudinally of the machine side by side, that series on the right being intended to be operated to add units, the next series to the left tens, and so on, as many series being used as may be desired, the machine illustrated in the general application before referred to having ten series and being of a capacity to add sums up to nine million nine hundred and ninety-nine thousand nine hundred and ninety-nine dollars and ninety-nine cents, the capacity of each machine being governed by the number of series of keys and connecting mechanism.

In the several views illustrating the present invention only a portion of two adjacent series are used, the general mechanism—such as the main operating-handle, the resetting device, &c.—being connected to all the series in the same manner. In each series the key-rods 18 are pivotally connected at their lower ends to key-levers 21, pivoted intermediate their ends, as at 22 in Figs. 1 to 4, to frame-pieces 24, rigidly secured to the frame-pieces 13, respectively, by cross rods or bolts 25, the pivotal points being located with relation to the length of the key-levers to give each lever the proper length forward and rearward of the pivot to move a stop-bar, as at 26, upward, when the key is depressed to bring said stop-bar into its proper operative position, said stop-bars being pivotally connected to the rear ends of the key-levers and passing upward in series through slots (not shown) in angle-plates 27 28, secured to the frame-pieces 13 by bolts, (not shown,) the slots being made adjustable in length to properly accommodate the series of stops.

When a key is depressed, the corresponding stop-bar is raised, as shown in Figs. 2 and 3, and as each series of stops is in the path of movement of a rack, as at 32, the movement of the rack forward is limited by said stop. After the rack is moved (by means of a spring 68 against the stop) the rack is moved rearward to actuate the corresponding registering-wheel by the operation of a main lever or handle 33 through the medium of connections to be hereinafter described, the wheel being actuated during the rearward or return stroke of the handle. This handle 33 is rigidly secured to the main rock-shaft 34, which is journaled in lugs 35, erected on the base 1, which shaft also carries a crank-

arm 36, to which are connected several arms or links to be later described, by means of a bolt or pin 37, which projects inwardly beyond the crank-arm and in the rearward rocking of the main shaft engages a shoulder 38 of a link 39 and presses the said link rearwardly. At its rear end this link is pivotally connected with a longitudinal crank-arm 40 (see Fig. 1) on a vertical shaft 41, journaled in the base and frame of the machine and provided nearer to its upper end with another crank-arm 42, connected by a link 55 to a bar rigidly secured to a horizontal transverse bar 44, mounted slidably upon the angle-plate 27 of the keyboard-section by means of bolts or screws passing through slots in said bar 44 and into said angle-plate. Adjacent to each series of stops a shutter or broad pawl 47 is journaled in the angle-plates 27 and 28 in such a position as to rest normally against the sides of all of the stops of each respective series. Upon each stop, on the side with which the shutter engages, is a lobe or projection, the lobes of each series being in line with each other when all the stops of the series are either raised or lowered, which mechanism serves to drop all raised stops when another is raised, as fully described in my application before referred to.

As hereinbefore noted, each train of mechanism, beginning with the series of keys, is provided with a rack 32, which actuates a numeral or registering wheel by means of the mechanism described in said prior application.

Journaled in the arms 4 and 7 of the main frame is a transverse rock-shaft 56, to which is secured an arm or lever 57, provided in its free end with an open-ended cam-slot 58, in which works a roller 59 on a pin projecting laterally from the free end of an arm 60, secured to the main rock-shaft 34. On the rock-shaft 56 are secured a number of curved arms 61, corresponding to the number of trains of mechanism, and in the free ends of these arms is secured a cross-rod 62, extending from the first to the last of these arms, (see Figs. 1 to 4,) which rod carries a roller 63 for each train or series. Each rack is mounted on the upper ends of arms 64 and 65, pivoted on cross-rods 66 and 67, mounted in the side frames, and is normally drawn forward by a spring 68, secured at its respective ends to arm 64 and to the frame. As the main lever is moved forward the roller 59 throws the lower end of arm 57 forward, rocking the shaft 56 and throwing the cross-rod 62, with the rollers 63, forward and permitting springs 68 to carry forward against the stops all racks corresponding with the depressed keys. The rest of the racks are retained in their normal positions by means of a series of retaining-stops 69, pivoted on a cross-rod 70, secured in the frame, which stops rest normally on top of the stop-rods of each series and are raised out of the way of the racks by the

raised stop-rods. When the forward stroke of the operating-lever is nearly completed, as illustrated in Fig. 3, the rack is in contact with the raised stop, in this instance the stop corresponding with key 9, which is shown depressed, and the completion of the stroke to the position of Fig. 2 has no further effect upon the longitudinal movement of the rack, which up to this time has been unconnected in any way with the registering-wheel, which is normally set to expose zero. In order to connect the rack with the registering-wheel, it is necessary to either lower the wheel or raise the rack, and in this machine I have provided means for lowering the wheel, described in said prior application.

There is a registering-wheel 71 for each rack, each wheel constructed as shown in detail in Figs. 10 and 11, said wheels being loosely mounted on a shaft 72, journaled in the side frames (see Figs. 1 to 4) and having two series of numerals "1," "2," "3," "4," "5," "6," "7," "8," "9," and "0" on its periphery, a series of cogs or teeth 73 at the left side of the periphery, a double pawl 74, and a pinion 75 on its right-hand side, all of these parts being rigidly secured or formed together. The teeth 73 are engaged by rollers 76, journaled on pins in the forward arms of elbow-levers 77, mounted on a cross-rod 78, secured in the frame, the rear arms of said elbow-levers being normally held against a cross-rod 79 by springs 79^a, secured in the frame, in which normal positions the rollers are yieldingly held in engagement with the teeth of the wheel when the wheel is in its raised position to prevent displacement of the wheels by accidental turning.

The shaft 72 is mounted at each end in a bearing-block 80, (see Fig. 12,) and on the ends of the shaft beyond the bearing-block are suspended four bars (two on each end) which I denominate "latch-bars," two of such bars numbered 83 and 84 being on the left-hand end. (See Fig. 1.) The corresponding bars 83 of each end are of like construction and are provided with notches 86 to engage catches 88, projecting from the frame, while the bars 84 of each end are alike in construction, being provided with shoulders 90 for purposes later described. Pivotaly connected with the latch-bars 83 are bars 92, provided with slots 94, which engage over a cross-rod 95, secured in the lower ends of arms 96, secured to the cross-rod 67, said bars 92 being normally drawn rearward by springs 98, connecting them with a cross-rod 99, mounted on lugs 100 on the base 1 of the frame. Connected to the cross-rod 95 (on the left-hand side of the machine, as seen in Fig. 1) is a link or bar 101, which is connected at its forward end to the bolt or pin 37 of the crank-arm 36 on the main rocking shaft 34. Connected to the cross-rod 95 on the right-hand side of the machine (not shown) is another link, the

forward end of which is connected to a crank-arm rigidly secured to the main rock-shaft 34. From this crank-arm projects a stop-arm which by striking the base of the machine limits the forward stroke of the main operating-lever. While that part of the forward stroke of the operating-lever which ends in the position shown in Fig. 3 is made, the latch-bars 83 remain in their normal positions, engaging their latches and holding the shaft of the registering-wheels in its upper position with the wheels out of mesh with the racks, the cross-rod 95 moving to the forward end of slot 94. The continuation of the stroke draws the bars 91 forward, releasing the latch-bars 83 from their catches 88, and permitting the registering-wheels and shaft to drop and bring the pinions 75 (shown in dotted lines in Figs. 1 to 4) to engage with the racks held in position against their raised stops, the dropping of the registering-wheel shafts being assured by the action of springs 109, connecting latch-bars 84 with the base of the frame. With the parts thus positioned the return or rearward stroke of the operating-lever is made, which is assisted by springs 111, connecting arms 113 on the link 101 with the base of the frame. During this stroke the racks are forced rearward by the reversal of the movements before described, causing the registering-wheels to be rotated a number of steps corresponding to the keys depressed (being in the instance illustrated nine steps) and to expose at the proper place of observation the numeral added, (being "9" in this instance, as indicated in Fig. 4.) This movement is accomplished before the return stroke is quite completed, and during this part of the stroke the cross-rod 95 has traveled to the rear end of slot 94. In the latter part of this stroke the cross-rod, pressing against the rear wall of the slot, pushes the bar 92 rearward, and by pressing against shoulders 90 of latch-bars 84 pushes these latch-bars upward, restoring the registering-wheels to their normal positions out of engagement with the racks. The latches 83 are also raised at the same time, causing their notches 86 to engage the catches 88 and retain the registering-wheels in their normal raised positions until the operation is repeated.

At any time during the operation of the machine the registering-wheels may be reset or returned to their normal positions to expose zero at the point of observation by means of the mechanism which is fully illustrated and described in said prior application.

The sum nine being registered by the operations before described, the next operation will require that at least the sum of one be carried from the wheel showing "9" to the next wheel to the left, in this instance from the units-wheel to the tens-wheel, and I will now proceed to describe the mechanism which I have provided for accomplishing this carrying operation, which is specially illustrated

in Figs. 5 to 8, and parts of it incidentally in other figures, and which forms the subject-matter of the present application. The trigger 128 is pivotally mounted substantially in the plane of the units-wheel, upon a cross-rod 129, and is provided with a laterally-projecting pin 130 near its upper end on the plane of rotation of the double pawl 74 of the units-wheel, a spring 131 serving to normally but yieldingly draw the trigger toward the double pawl. A second pin projects laterally from the trigger at about its mid-length, which carries a roller 132 in the plane of a lever 133, pivoted on a cross-rod 134, there being another pin 135, projecting from the trigger above the roller, also in the plane of lever 133. A second lever 136 is pivoted on the cross-rod 134 alongside of lever 133 and is either formed with the lever 133 or rigidly secured thereto and has its forward end, as at 137, in substantially the plane of the tens-wheel, being laterally bent for this purpose. Upon the end 137 is pivotally mounted a metal piece 138, which I denominate the "jack," which is substantially of the shape of the letter **F**, its pivotal connection being at the bottom of the stem. The jack has a tooth 139 at the top of the stem on its rear edge, a forward projection 140 at the top of the stem, and a forward projection 141 at the middle of its stem. A spring 142 connects projection 141 with a plug 143, projecting downward from the lever 136, and tends to draw the jack downward and forward. A spring 144 tends to draw the rear ends of levers 136 upward. On the cross-rod 134 is also pivoted a locking-lever 145, whose lower end is cut away on one side to provide a shoulder 146, said lower end being normally forced downward and forward by a spring 147, connecting its upper end with the frame of the machine. A pin 148 projects laterally from locking-lever 145 above the shoulder, and the lower end of said lever 145 is limited in moving rearward by a flange 149 at the lower end of an arm 150, riveted to the frame. Pivotaly suspended from the rear ends of levers 133 and 136 is a link 151, provided with a slot 152, in which works a cross-rod 153, secured in the ends of curved arms 154, rigidly secured to a rock-shaft 155, which also carries an arm 156, provided on a laterally-projecting pin with a roller 157. On the cross-rod 67 is pivotally mounted a bell-crank or elbow lever 158, on the rearward arm of which is a roller 159 on a laterally-projecting pin, while on the vertical arm is a laterally-projecting pin 160, working in a shaft 161 in a link 162, connected with pin 37 on crank-arm 36 of the main rock-shaft 34. (See Figs. 11 and 13.) A link 163, which rests on the cross-rod 67 and is supported thereby, is also connected to pin 37 of crank-arm 36. The cross-rod 153 is connected with the frame of the machine by a spring 164, which normally but yieldingly draws the cross-rod, with the curved arms 154 and arm

156, upward. These parts are shown in Fig. 5 with the point of lever 133, resting on roller 132, holding the jack up, while the end of the same lever is against pin 135, holding the trigger from movement to the rear. The middle forward projection 141 of the jack is held by spring 142 against roller 63 of rod 62, while the tooth 139 is free of the wheel. The locking-lever 145 is supported on roller 159 of elbow-lever 158, and the elbow-lever is supported on roller 157 of arm 156, the locking-lever being stopped from further rearward movement by flange 149 of stop-arm 150. The forward projections of the jack are so positioned with relation to rock-shaft 56 and rollers 63 that one of said projections will always be in contact with either the rock-shaft or rollers, thereby always holding the jack against falling forward.

When the forward stroke of the operating-lever is made in the operation of adding nine to the nine already registered on the units-wheel, the link 162 draws the vertical arm of the elbow-lever forward and its horizontal arm downward, permitting the locking-arm 145 to be drawn by spring 147 to the position of Fig. 6, the roller 159 sliding along its edge until it drops below the shoulder 146, the elbow-lever being held in this position by the upward pressure of roller 157 on arm, due to the pull of spring 164 through the medium of cross-rod 153, curved arms 154, and arm 156, thus locking the jack in inoperative position until tripped during the return or wheel-rotating stroke of the main operating-lever. During the forward stroke the movement of curved arms 61 has moved the roller 83 out of contact with projection 141 of the jack and the projection 140 has come into contact with the rock-shaft 56. The first part of the return stroke of the main lever produces no effect on this mechanism except through the rotation of the units-registering wheel, the links 162 and 163 moving forward without effect. As the units-wheel is rotated from the nines position and brings the zero into view the pawl 74 presses against pin 130 of the trigger 128 and moves the trigger forward slightly, permitting the spring 144 to force the point of lever 133 with a cam-like action down on roller 132 on the trigger, moving the trigger a little farther forward to the position of Figs. 7 and 8, this movement of the lever 133 downward being stopped when the end wall of slot 152 reaches the cross-rod 153, which is still held locked by arm 145. As the forward stroke further progresses the link 163 strikes pin 148 of the locking-lever 145 and trips it by pushing the shoulder 146 off the roller 159. In the meantime the action of curved arms 61 has pushed roller 63 against projection 141 of the jack 138 and projected tooth 139 of the jack between two of the teeth 73 of the tens-wheel. The tripping of the locking-lever 145 permits

spring 164 to act, drawing up cross-rod 153 and curved arm 154, rocking the shaft 155, carrying up arm 156, causing roller 157 to raise the horizontal arm of the bell-crank lever 158, and pressing the roller 159 against stop-flange 149, as shown in Fig. 16. The tooth 139 of jack 138 being in engagement with teeth 73 of the tens-wheel and the locking mechanism being tripped, as described, the spring 144 now acts, drawing up the rear end of arm 136 and pulling down its forward end, carrying down the jack with it and moving the tens-wheel one step, so that the number exposed on the two wheels is "18," the sum of nine and nine. The movement of the wheel is limited to one step by the lower end wall of slot 152 reaching the cross-rod 153, which is itself held against rising by reason of the trigger 145 resting against stop-flange 149. The last trigger 128 on the left of the machine is held from too great movement inward under stress of its spring by a disk 127 on the numeral-wheel shaft, which takes the place of the lever 133 in this respect.

The operation of carrying, as described, takes the mechanism from the position shown in Fig. 5, which is usually the position in which the parts are set when the machine leaves the factory, and the completion of the carrying operation leaves the parts in the positions shown in Fig. 8. It is necessary that the parts be again raised to the positions of Fig. 5 during each carrying operation, and this is accomplished at the end of each forward stroke, just beyond that part of the stroke which brings the parts to the positions shown in Fig. 6. In this latter part of the forward stroke the curved arm is carried downward by the rocking of shaft 155 through the medium of the action of elbow crank-lever 158 on roller 157 of arm 158, thus pulling down the link 151 and the rear ends of levers 133 and 136 and raising their forward ends, carrying up the jack 138 and permitting spring 131 to draw trigger 128 rearward, causing the point of lever 133 to rest on roller 132 and hold the jack up and the end of said lever 133 to rest against pin 135 and limit the movement of the trigger rearward. After each rotation of a registering-wheel the wheel, as before stated, is held yieldingly against accidental displacement, backlash, or overmovement by the engagement of the rollers 76 of elbow-lever pawls 77 between the teeth 73 of the wheels by spring-pressure, as shown clearly in Fig. 8.

From the foregoing description the construction and operation will be readily understood by those skilled in the art, and it will be obvious to them that the parts as shown and described are simple in construction and economical to manufacture, the arms, levers, and many other parts being readily and cheaply stamped up from sheet metal, thus dispensing to a large extent with skilled labor

and its accompanying expenditure of time and money.

I propose to attach to the machine improved mechanism for printing or recording the results of its operation, which mechanism is made the subject-matter of another application, Serial No. 173,319, filed September 15, 1903, and I have deemed it necessary in properly illustrating the present invention to illustrate some of the parts connecting the described mechanism with the said printing mechanism, but which form no part of the present invention. Such parts occur in Figs. 1, 2, 3, and 4 and are indicated by the numerals 165, 166, and 167, no description of their construction or operation being deemed necessary herein.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In an adding-machine, the combination of two wheels side by side bearing numerals "0" to "9," means for rotating the right-hand wheel forward, a pivoted trigger adjacent to the right-hand wheel, a radial pawl on the right-hand wheel adapted to engage the trigger, a pivoted lever below the left-hand wheel a jack in the plane of the left-hand wheel pivoted to the free end of said lever and having a tooth adapted to engage said wheel, means for locking the jack out of contact, and releasing means to permit the jack to move the left-hand wheel one step when the right-hand wheel passes the zero-point.

2. In an adding-machine the combination of two wheels side by side bearing numerals "0" to "9," means for rotating the right-hand wheel forward, a pivoted trigger adjacent to the right-hand wheel, a radial pawl on the right-hand wheel adapted to engage the trigger, a pivoted lever below the left-hand wheel, a jack in the plane of the left-hand wheel pivoted to the free end of said lever and having a tooth adapted to engage said wheel, means for locking the jack out of contact, releasing means to permit the jack to move the left-hand wheel one step when the right-hand wheel passes the zero-point, a rock-shaft, a crank-arm thereon carrying rollers, and a spring holding the jack yieldingly against the crank-arm and rollers.

3. In an adding-machine, the combination of two numeral-wheels side by side bearing numerals from "0" to "9," means for rotating the right-hand wheel, a pivoted lever in the plane of the right-hand wheel, a pivoted trigger in the same plane adapted to lock the lever against dropping, a second pivoted lever secured to the first and bent to the plane of the left-hand wheel, a jack pivoted to the second lever, means for releasing the first lever and operating the jack a rock-shaft, a crank-arm thereon, rollers carried by said crank-arm, and a spring for holding the jack yieldingly against the crank-arm and rollers.

4. In an adding-machine, the combination of two numeral-wheels side by side, radial pawls thereon, triggers pivoted in the planes of the pawls each carrying a pin and a roller below the pin, two levers side by side one in the plane of each numeral-wheel, a jack pivoted at the end of one lever, a slotted link and a locking-arm depending from said lever.

5. In an adding-machine the combination of two numeral-wheels side by side, radial pawls thereon, triggers pivoted in the planes of the pawls each carrying a pin and a roller below the pin, two levers side by side one in the plane of each numeral-wheel, an F-shaped jack pivoted by the base of its stem to one lever, a slotted link and a locking-arm depending from said lever, a rock-shaft, crank-arms thereon, rollers carried by the crank-arms, and means for yielding the horizontal arms of the F-shaped jack alternately in contact with the crank-arms of the shaft and the rollers.

6. In an adding-machine, the combination

of two numeral-wheels side by side, a trigger in the plane of the left wheel carrying a pin near the top, and a pin and roller near the middle, a pawl on the left-hand wheel engaging the upper pin, a horizontal lever pivoted intermediate its ends and engaging the intermediate pin and the roller, a second horizontal lever on the same pivot and secured to the first, a spring tending to press the forward end of the levers downward, a locking-arm depending from the pivot of the levers normally spring-pressed into position to lock the arms in raised position, a jack pivoted to the end of the second horizontal lever, and means for releasing the locking-arm.

Witness my hand this 19th day of December, 1903, at the city of Detroit, in the county of Wayne and State of Michigan.

CHARLES WALES.

Witnesses:

JASON C. LOTTERHAND,
WILLIAM R. BAIRD.