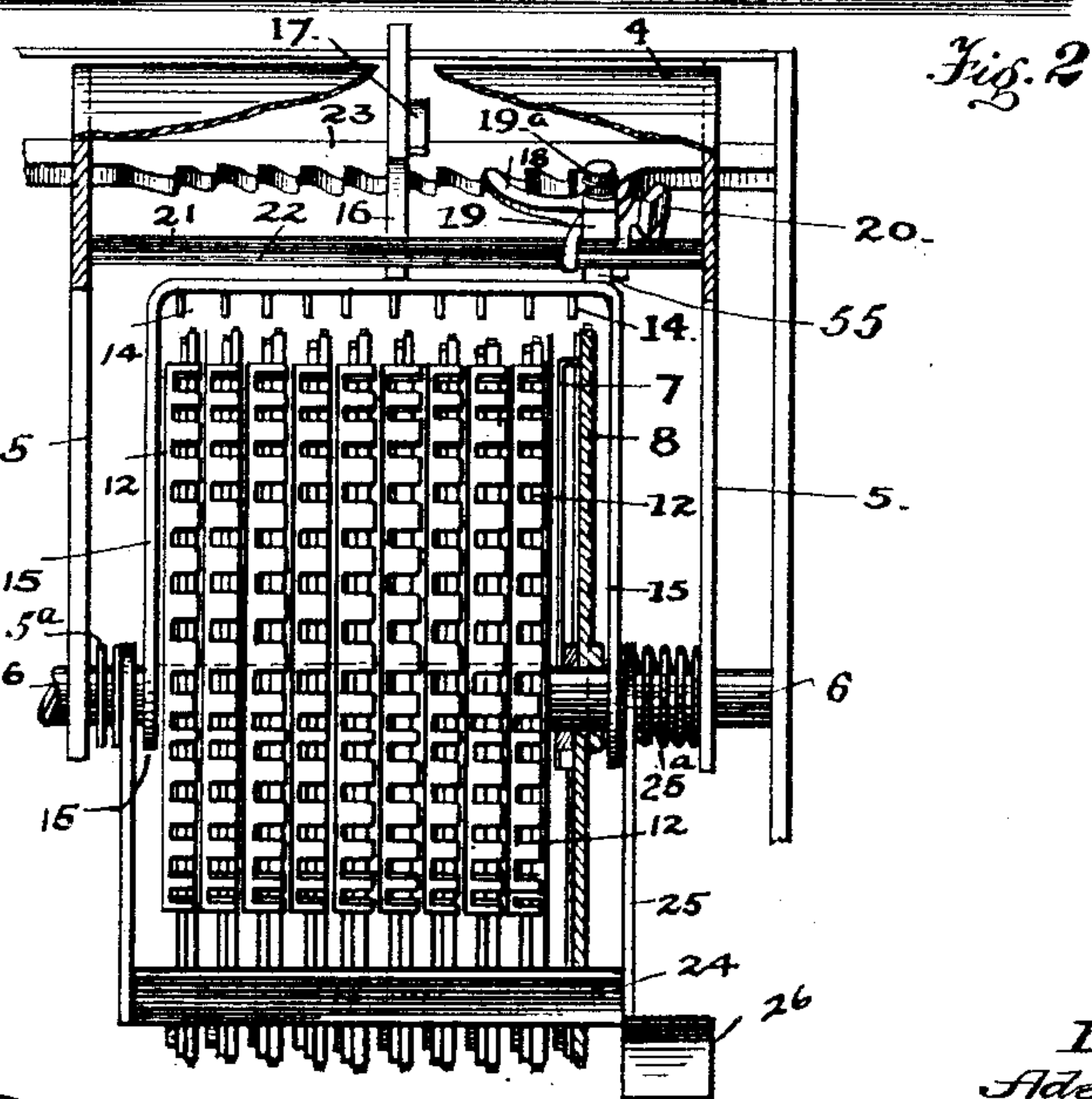
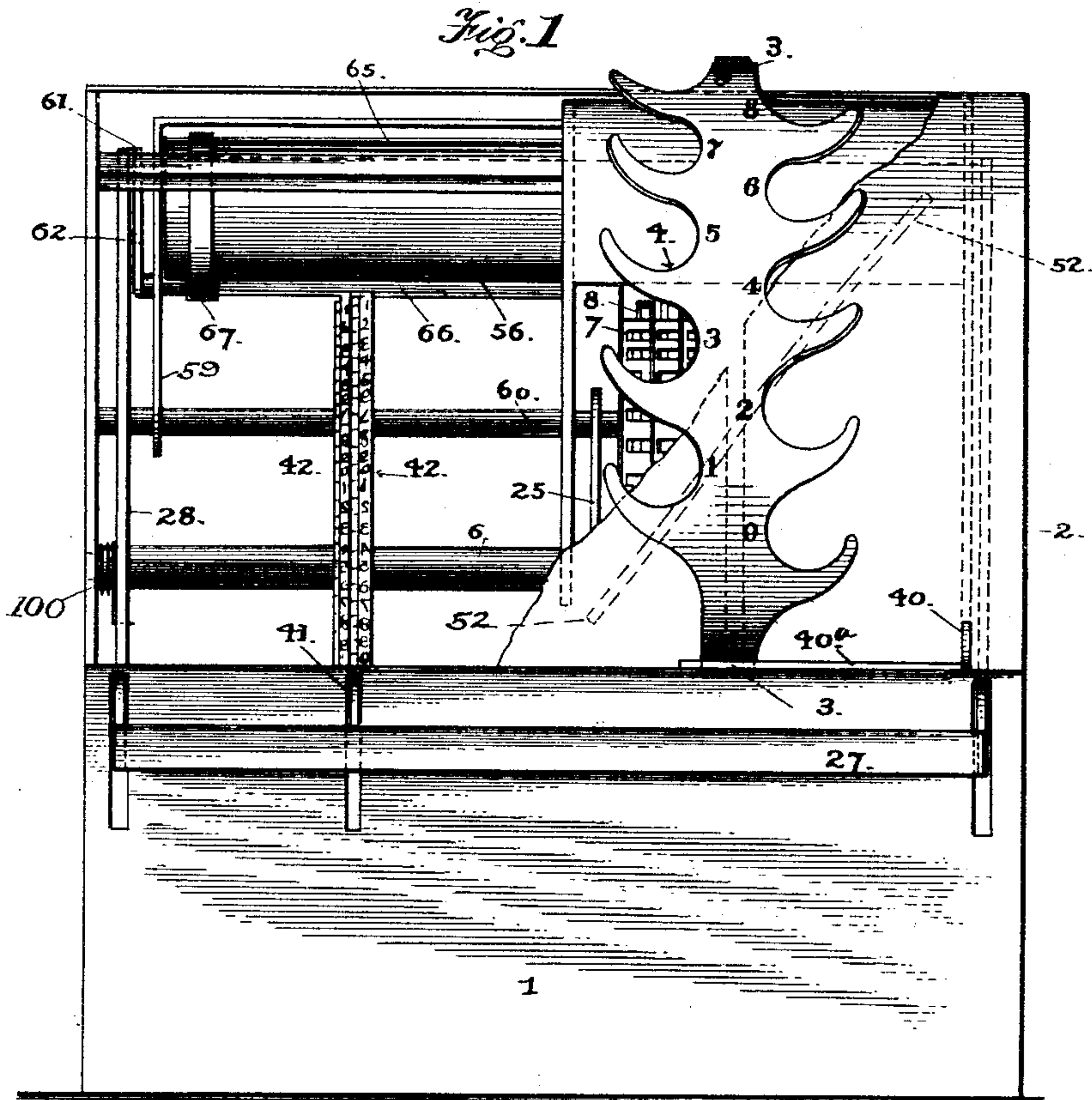


A. HOCH.
ADDING MACHINE.

(Application filed June 21, 1900.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses
Edmund A. Thaus
H. Regner

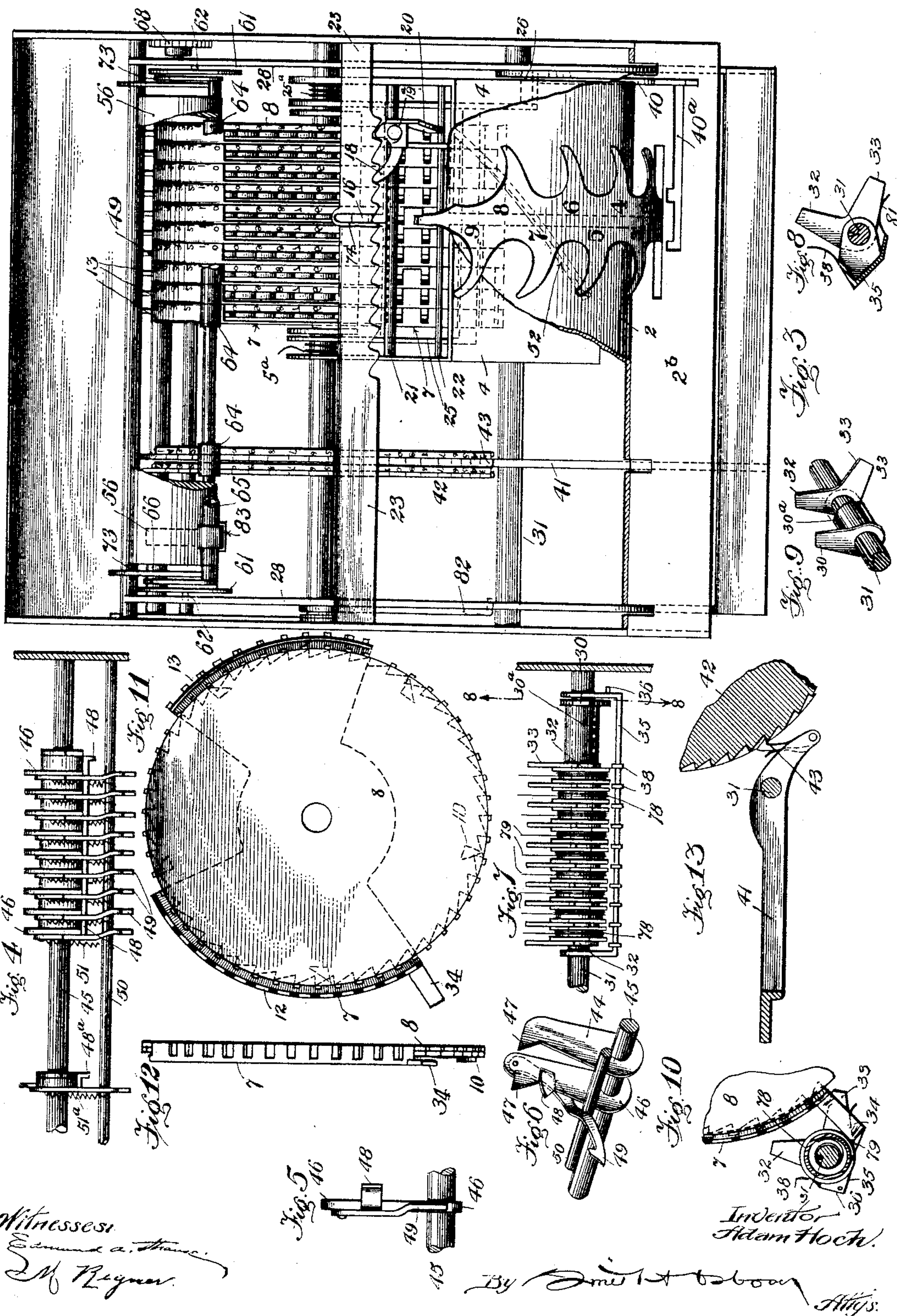
Inventor
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by *[Signature]* Attys

A. HOCH.
ADDING MACHINE.

(Application filed June 21, 1900.)

(No Model.)

3 Sheets—Sheet 2.



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M. Regner

By *Smith & Babcock* Attys.

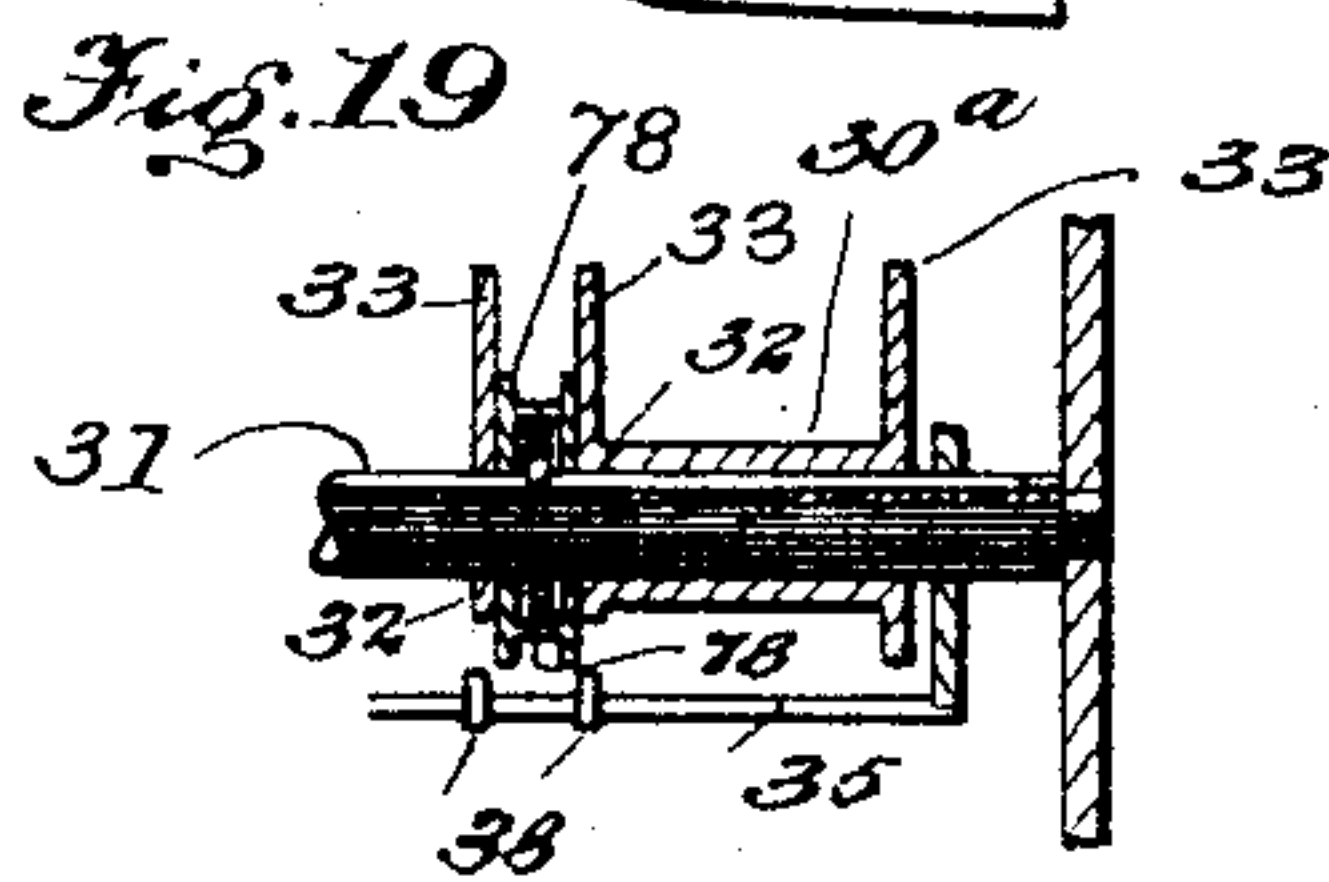
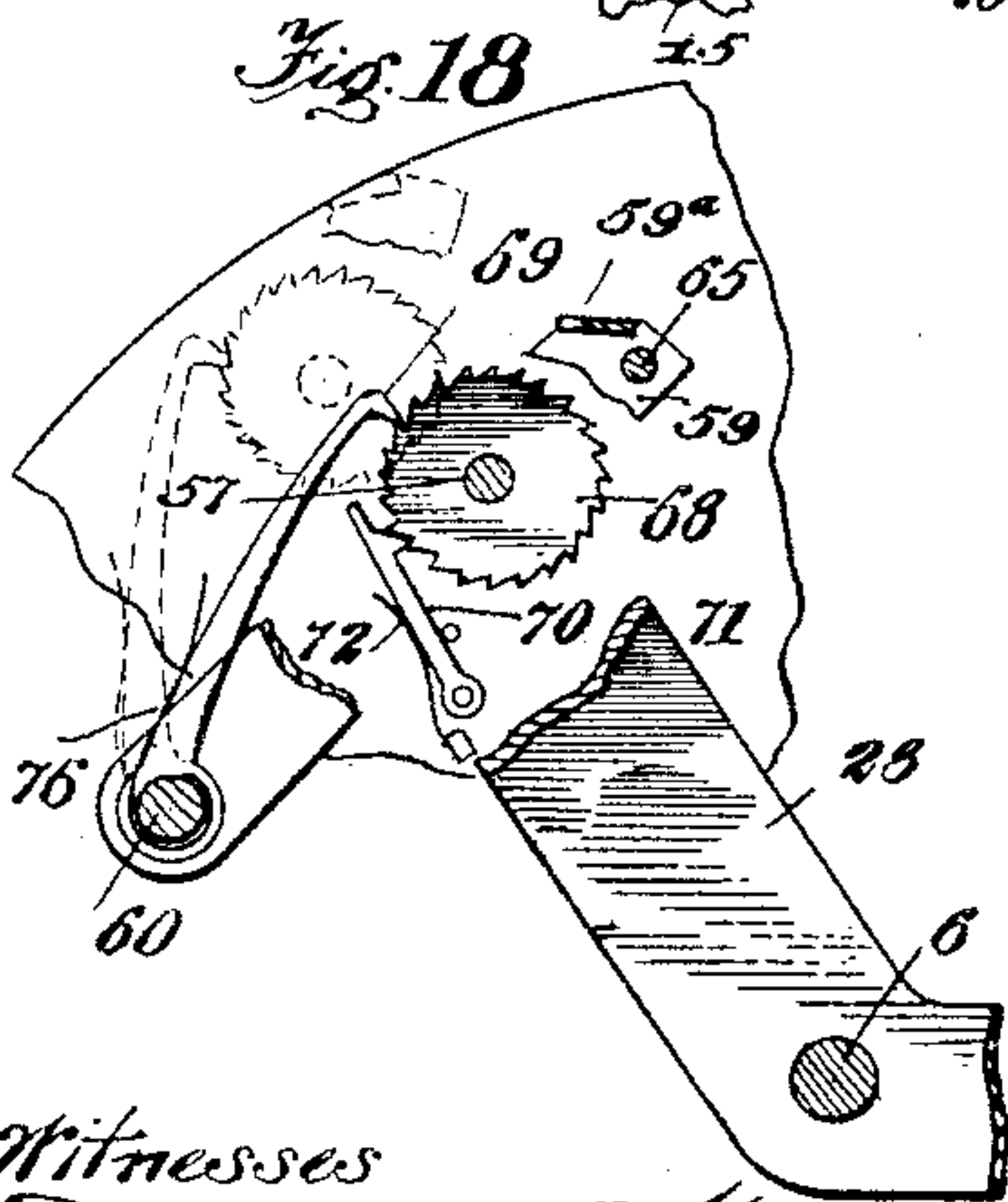
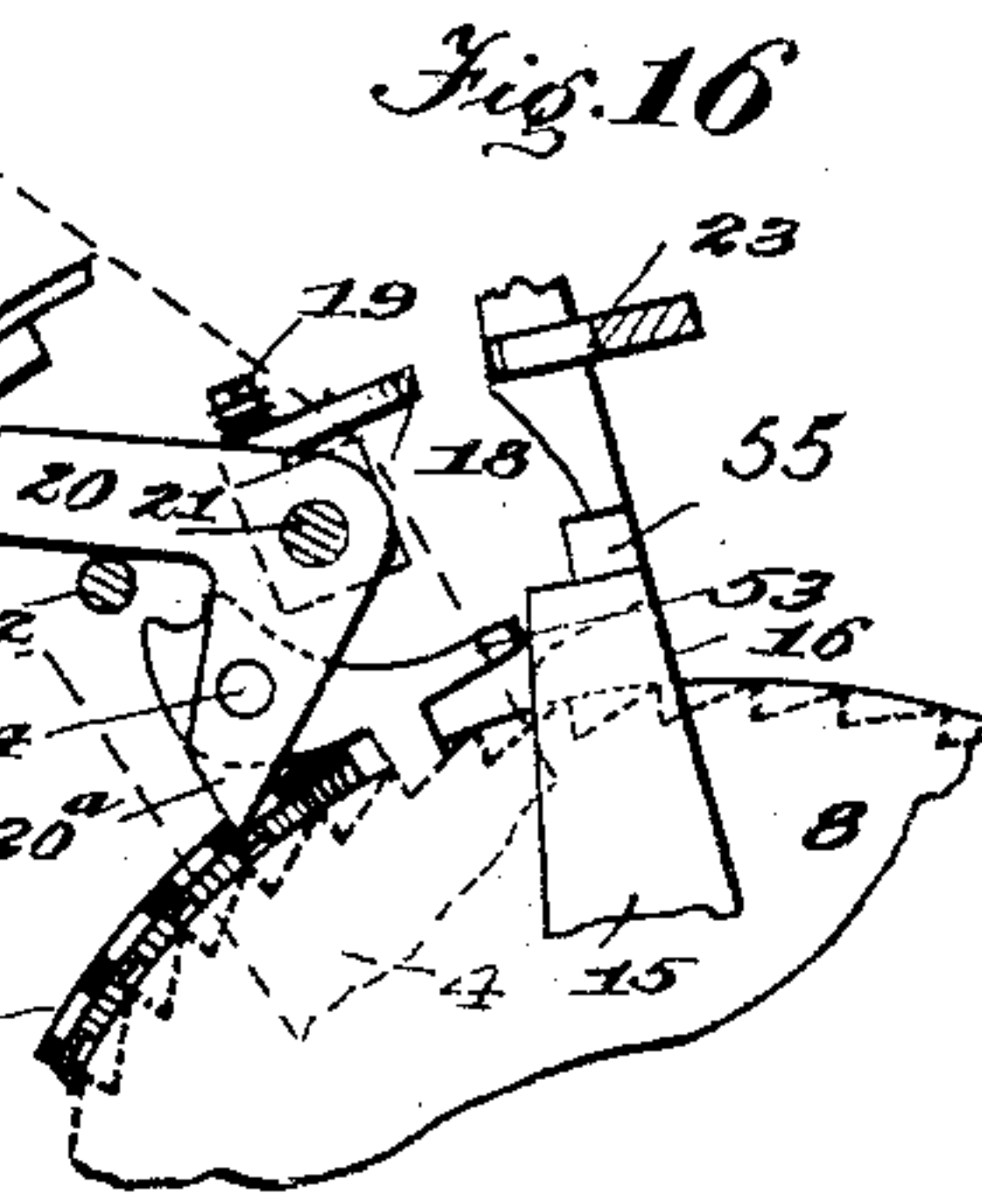
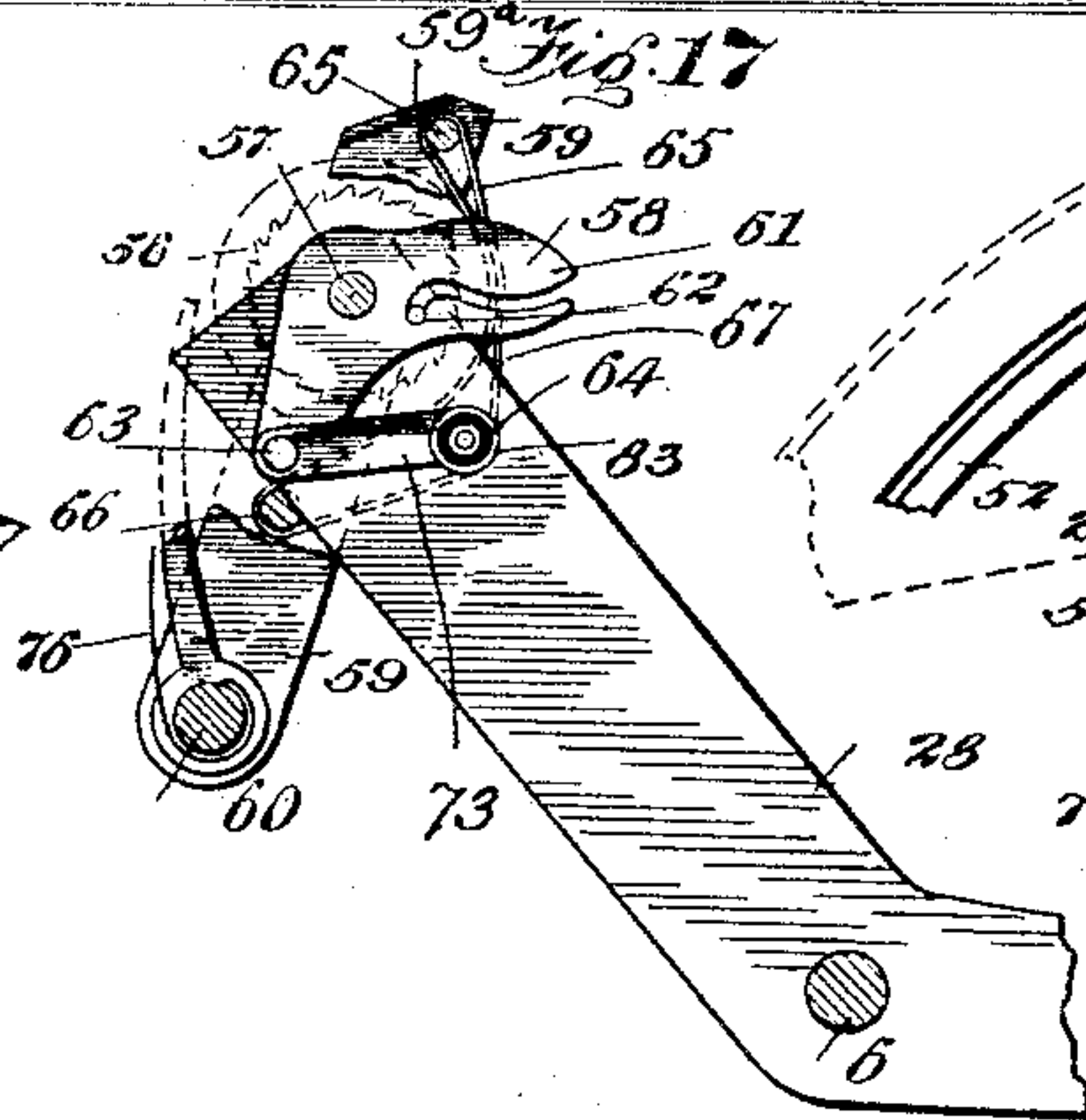
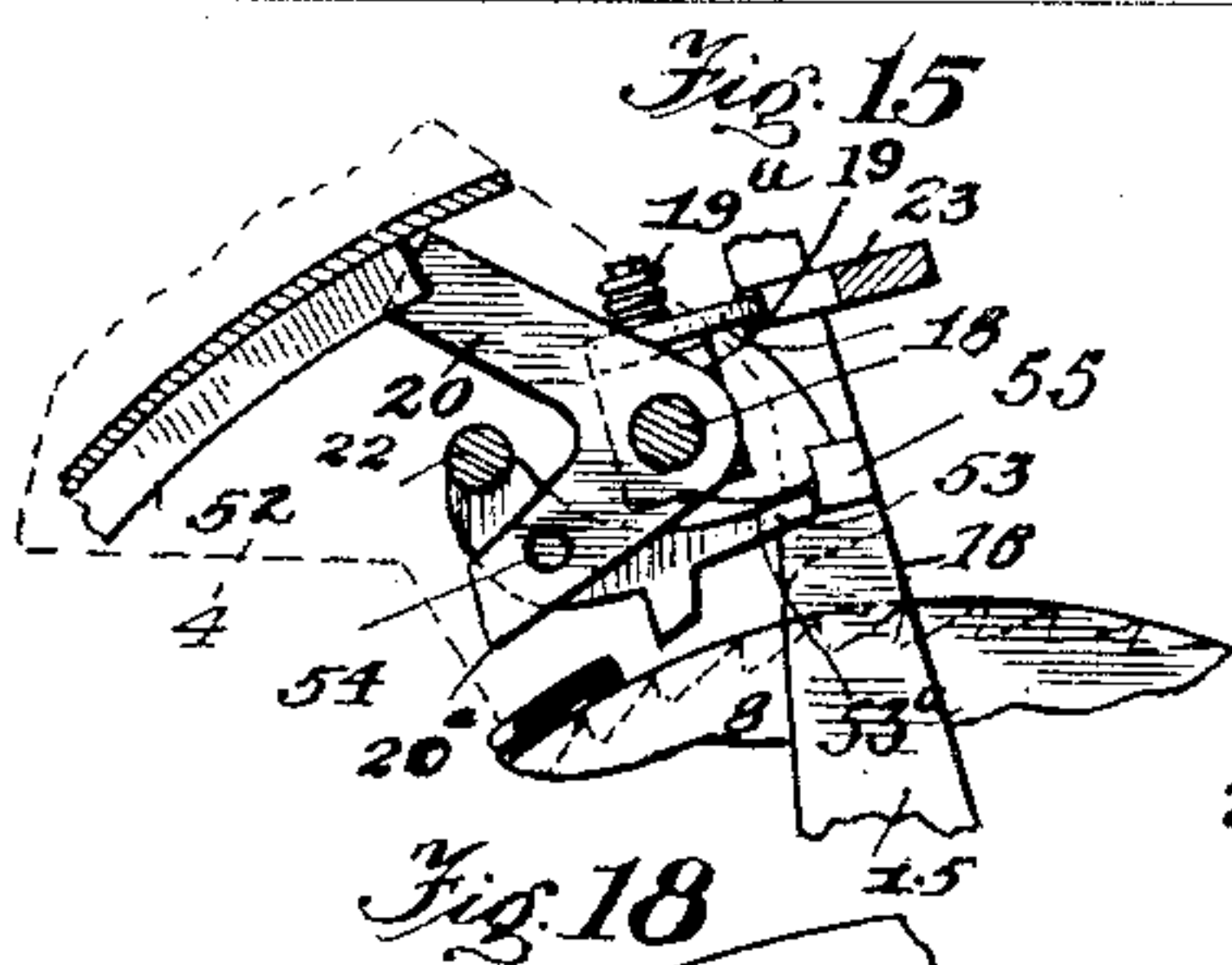
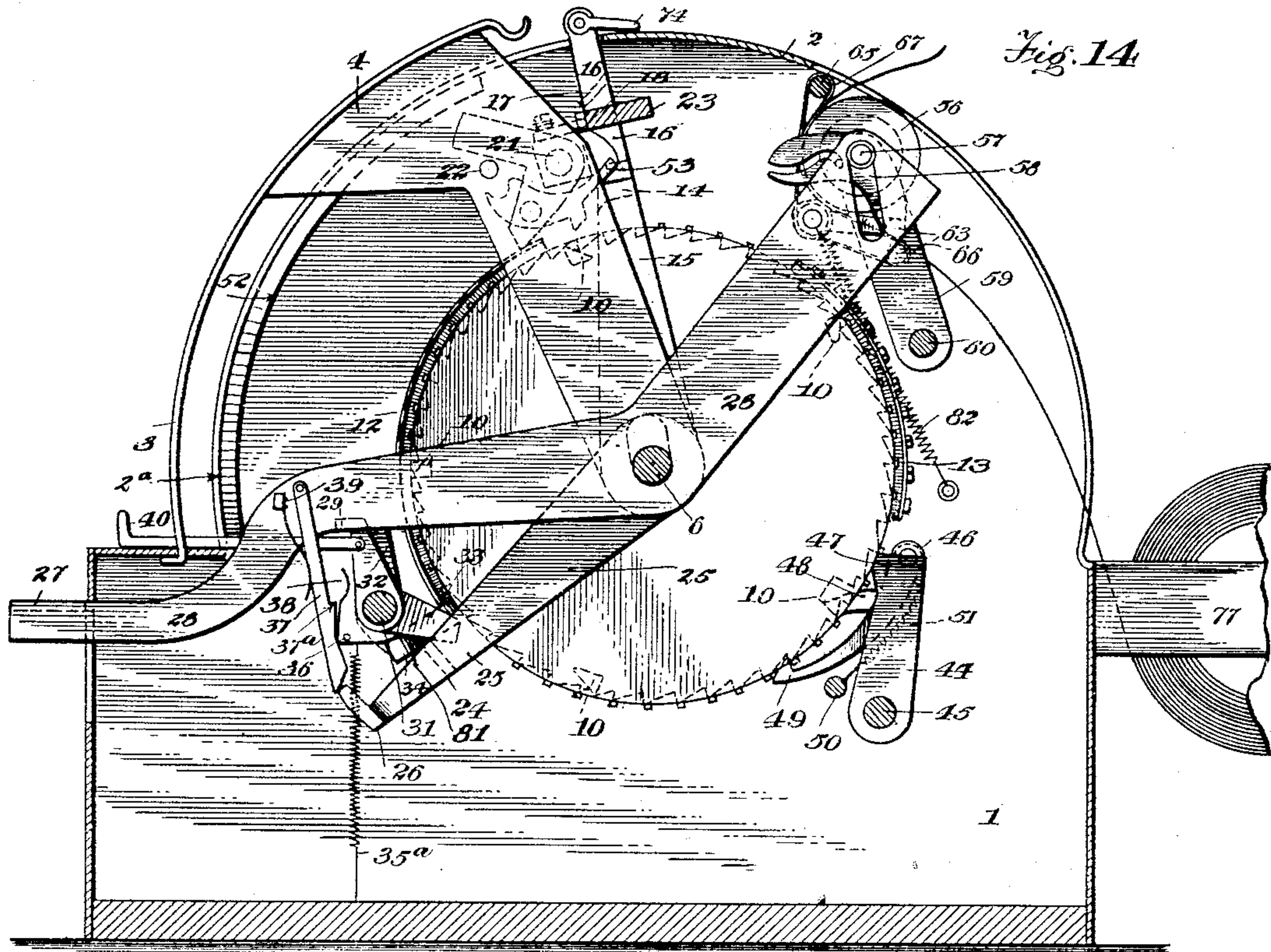
Inventor
Adam Hoch

A. HOCH.
ADDING MACHINE.

(Application filed June 21, 1900.)

(No Model.)

3 Sheets—Sheet 3.



Witnesses
Edmund A. Thomas
M. Regnier

Inventor
Adam Hoch
Smith & Co. by
By [Signature]

UNITED STATES PATENT OFFICE.

ADAM HOCH, OF ALAMEDA, CALIFORNIA, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO WENDLING-HOCH ADDING MACHINE COMPANY, OF SAN FRANCISCO, CALIFORNIA, A CORPORATION OF CALIFORNIA.

ADDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 696,173, dated March 25, 1902.

Application filed June 21, 1900. Serial No. 21,107. (No model.)

To all whom it may concern:

Be it known that I, ADAM HOCH, a citizen of the United States, and a resident of Alameda, in the county of Alameda and State of California, have invented new and useful Improvements in Adding and Printing Machines, of which the following is a specification.

This invention relates to improvements made in machines that are constructed to add and print columns of figures and print the sum-total at the bottom of the column; and the invention consists in certain novel parts and combination of parts, as hereinafter described, and pointed out in the claims, reference being had to the accompanying drawings, that form part of this specification.

Figure 1 is a front elevation of a machine embodying my present improvements and showing the front of the case partly broken away to expose parts beneath. Fig. 2 is a front elevation in detail of the printing-wheels and adding-wheels, portions of the stationary frame, and parts of the mechanism, the first or units wheel on the right of the set being shown in section. Fig. 3 is a top plan of the machine with the curved top of the casing broken away except for a portion beneath the operating-key. Fig. 4 is a top view of the dogs and parts of the accumulating mechanism of the adding-wheels. Fig. 5 is a front elevation of one of the dogs in the mechanism shown in Fig. 4. Fig. 6 is a perspective view of the first and second dogs that control the units-wheel and tens-wheel of the set of adding-wheels. Fig. 7 is a top view of the spring-barrels of the order-printing wheels and the dogs that control the wheels. Fig. 8 is a vertical transverse section at 8 8, Fig. 7, through the stationary shaft and the rocking bar that throws the dogs into and out of action. Fig. 9 is a detail in perspective of two sets of the dogs, Fig. 8, and the locking-dog that controls the printing-key. Fig. 10 is a vertical transverse section through one of the spring-barrels, Fig. 7. Fig. 11 is a view in detail of an order-printing wheel or segment and an adding-wheel. Fig. 12 is a side view of the two parts, taken from the left of Fig. 11. Fig. 13 is a detail side view of one of the rocking le-

vers and dogs operating the register-wheels. Fig. 14 is a side elevation of the machine, with the side of the stationary casing removed and the stationary shafts shown in section. Fig. 15 is a detail view, in side elevation, of parts of the selecting device and the mechanism connecting the same with the single operating-key. Fig. 16 is a view of the same parts, illustrating their position when engaged with and moving the printing-segment and adjacent adding-wheel. Fig. 17 is a detail view, in side elevation, of the paper-roller, inking-roller, and connected parts. Fig. 18 is a similar view illustrating two positions of the inking-roller. Fig. 19 is a view in detail of the dogs and spring-barrels that control the printing-segments.

The recording mechanism in this machine is composed of a set of wheels or disks, one for each order of numbers, mounted for rotation on a common axis and arranged to print in rows and columns according to arithmetical order, units under units, tens under tens, and so on, after the required number of wheels are set in position to imprint a line of figures on the paper. The adding device by which the sum-total of the figures printed by the first-named wheels is given consists of a set of type-carrying wheels mounted to rotate on the same axis and corresponding in number with the column-printing wheels before mentioned, the two sets of wheels or disks being so constructed that the adding-wheels lie within and are covered by the type-bearing rims of the column-printing wheels or segments, except for a portion of the rim of the adding-wheel, which is exposed to contact with the paper through a cut-away segment of the rim of the printing wheel or disk that overlies the adding-wheels. The wheels composing each of these two sets have the function of printing-wheels; but the inner ones are not brought in contact with the paper until the others with the overlying rims have been set and operated, and after the required numbers of lines or the amount to be added have been printed these printing wheels or segments being thrown back to position uncover and expose the numbers on the rims of the

adding-wheels. All the setting movements of the wheels in both sets are produced through the medium of a selecting device and mechanism actuated from a single operating-key, whereby the said device is set from right to left at the beginning of each operation to print a given number or series of figures in a row, starting from the highest numerical order in the row and shifting laterally from left to right to operate on one wheel at a time. At the end of this selecting and setting operation when all the figures of the line are set up the line is imprinted upon the paper by bringing the paper-carrying roller in contact with the rims of the wheels. This printing operation is effected by a separate finger-key, herein designated the "printing-key," the operation of which will be hereinafter described. By movements of the same operating-key the adding-wheels are actuated and caused to add the several rows of figures as they are printed by the segments and afterward to print their sum-total upon the paper directly from the adding-wheels. This last-mentioned operation to print the sum-total is produced by a single stroke of the printing-key. In addition to its function of operating one set of wheels to print in rows and columns this printing-key operates the total-printing wheels, and by a second stroke following the printing of the last row of figures this key brings the paper in contact with the adding-wheels and prints the sum-total.

A device for numbering and recording on the same paper the number of rows of figures printed thereon by the adding mechanism is provided for use in the machine in those cases where the same will be found a convenient attachment, such device consisting of a set of numbering-wheels mounted on the same shaft with the adding and printing wheels and actuating mechanism by which the first-mentioned wheels are set, one figure at a time, from the strokes of the printing-key. These last-mentioned wheels are herein termed the "registering device," as they serve to register the number of papers or pieces of work passed through the machine. These parts and features and the mechanism connecting the same are constructed and combined for operation as follows:

The frame of the machine consists of the sides and ends 1 and the curved top 2. The operating-key is composed of a curved finger-piece 3, having along each side upwardly-turned horns or curved projections to form finger-rests corresponding in number to the ten digits. Rocking arms 5, having a stationary shaft 6 for a center of motion, are connected at their upper ends to the key 3 by a cross-piece 4, turned at right angles to the arms and connecting those parts rigidly together. The cross-piece is bent in the middle at right angles and projects forwardly through a slot 2^a in the curved front of the case, as indicated in dotted lines in Figs. 1 and 3 and shown in Fig. 14, and it is rigidly

attached to the finger-piece 3. The finger-key is a segment of a curved plate having for its center the shaft 6, on which it moves in a vertical arc with a greater or less length of stroke, according to the extent of movement downward given to it by the person operating the machine. This movement of the finger-key 3 is produced by placing the top of the finger in the selected one of the crotches or finger-rests formed by the horns and then pressing downward until the finger is arrested by contact with the projecting flat plate 2^b on the base, as seen in Fig. 3, while the return or upward movement restoring the finger-piece to position is produced by a spring 5^a, connected to one of the arms 5. The finger-rests are numbered from the bottom of the finger-key upward, beginning with the cipher, situated at the lowest right-hand crotch, and progressing in ascending order of digits alternately to the left and right, so that the odd numbers are situated on one side and the even numbers on the opposite side of the finger-key. The length of stroke imparted to the piece 3 being thus determined and controlled by the distance of the selected crotch from the lower end of the finger-key, it will be seen that the rocking frame, composed of the parts 4 5 5, is governed in its extent of movement by the length of stroke thus given to the finger-piece at any time. On the same shaft 6 are the type-wheels 7 7, that print the figures in rows and columns, and also the wheels 8 8 of the adding mechanism. The wheel 7 consists of a thin disk centered on the shaft 6 and having a segmental flange 13 on the rear portion of the periphery at right angles to the disk and bearing on its curved face printing-type figures properly spaced from "0" to "9," inclusive. This portion of the rim of the wheel 7 is herein designated the "printing-segment" to distinguish it from the wheels of the adding device, which also has the function of a printing device. A similar flange on the front of the disk, provided with spaced notches 12, forms a locking-segment by which the wheel 7 is held at rest while the printing is being done.

The adding-wheels 8, also centered on the shaft 6, are of proper diameter to lie within and set clear of the flanges 12 and 13 of the wheel 7, and the periphery of each wheel 8 is divided into five sections, each containing printing-type from "0" to "9," inclusive, in arithmetical order. The figures on the rim of the wheel 8 are in alinement with the figures on the overlying segment 13, so that the figures printed on the paper by the wheels 8 will be directly in line with those in the columns printed by the wheels 7. On one side of each wheel 8 are ratchet teeth or notches corresponding in number with the type-figures on the rim, and in addition to the ratchet-teeth there is a stop-block 10 on the side at each division of the numbers on the periphery of the wheel. In the present construction each wheel 8 bears five sets of digits, and con-

sequently there are five stop-blocks 10 on the side of the wheel. In the motion of the wheel 8 from one stop-block to the next ten figures of one division will have been brought into operation, and the stop acting upon the next wheel in the same series through connecting mechanism (to be hereinafter described) sets the next higher order forward the distance of one number. One wheel acting upon the other in ascending order accumulates and transfers the revolutions of the units-wheel to the tens-wheel, the tens to the hundreds, and so on throughout the series. When the last row of figures in the column is printed, the row of figures standing in position to print at the top of the wheels 8 gives the sum of the figures in the columns already printed by the printing-segments. At such time the sum shown on the adding-wheels is exposed to make contact with the paper by setting back all the printing-segments.

In beginning to print and add several rows of figures all the printing-segments and adding-wheels must first be set back to the starting-point or zero, and in this operation the printing-segments are brought back by a spring-reel 78 to each printing-segment, connected to an arm 34 on the lower side of the segment by a cord 79, laid around the barrel or reel containing the spring and attached to the end of the arm. This cord being drawn off the reel as the printing-segment is moved downward operates to wind up the reel, and thereby store sufficient force to draw the segment back to place as soon as the segment is released after being brought in contact with the paper. The spring-reels are all mounted to turn upon a shaft 31, fixed in the sides of the frame and provided with a longitudinal slot 31^a. The bore of the barrel of the reel 78 is of greater diameter than the diameter of the shaft 31 to afford space for the coiled spring 101, one end of which is secured to the inside of the barrel, and the other end fits in the slot 31^a of the shaft 31. The side plates 78^a of the reel are bored to fit loosely on the shaft 31, and the springs will be secured in the barrels when the reels are being manufactured, and they can readily be slipped on the shaft 31 endwise, with the free end of the spring 101 in the slot 31^a. The parts that lock and release each printing-segment in these operations consist of the controlling-dog, having two angular members 32 33, rigidly united, and having limited movement in a vertical arc on the shaft 31 as a center, from which they set toward the notched rim of the segment in such relation that when one dog engages the notched rim the other dog will stand clear of the notches. The dog 32 acts to hold the printing-segment stationary at the starting-point or zero and the other dog 33 to hold the segment against the retro-active force of the spring-reel, and being rigidly connected together or forming one piece the movement of one dog into action always throws out the other dog. These dogs, corre-

sponding in number to the number of printing-segments, are mounted on the stationary shaft 31 and throw into or out of action simultaneously by a rocking bar 35, mounted on the shaft 31 and having a yielding finger 38, setting in front of and in line with the dog 32 of each printing-segment, and a similar finger 81 under the other dog 33. A slight rocking movement of the bar 35 in one direction brings the finger 38 against the dog 32, pressing that part backward against the notched rim 12 and at the same time throwing the dog 33 away from the rim. The movement of the same bar in the opposite direction, on the other hand, presses the finger 81 against the dog 33 and throws the dog 32 out of action, thereby leaving the printing-segment free to be moved by the operating-key 3. These movements of the rocking bar are produced and controlled by the coiled spring 35^a, the function of which is to draw down the bar 35, and thereby press the dog 33 upward and throw the upright dog 32 away from the notched rim, and in addition thereto by the pivoted latch-piece 37 on the printing-key 27, which when rising after being released will move the rocking bar in the proper direction, to throw the dogs 33 clear of the notched rims of all the printing-segments. A shoulder 37^a on the latch-piece engaging a pin 36 on the side of the rocker-bar 35 causes the latch-piece to draw up the rocker-bar when the printing-key is released by the operator after the printing operation. A spring 39 holds the latch-piece in working contact with the pin 36, and the spring 100, connected to the key 27, returns the printing-key to position after the downstroke. (See Fig. 1.)

In the present arrangement of the printing-segments and adding-wheels and from the fact that the sum-total is also printed directly from the adding-wheels it is necessary to set the segments back, so as to uncover the adding-wheels for contact with the inking-roller and afterward with the paper-carrying rollers after the whole number of lines of figures have been printed, and at such times, therefore, the dogs 33 are thrown away and the dogs 32 are set into the notched rims, so as to lock the segments after they are returned by the spring-barrels. The parts operating the locking-dogs 32 33 are so arranged that when the printing-key is depressed the shoulder of the latch-piece 37 is set under the pin 36, and in the upward movement following the release of the key the rocking bar will be drawn upward and its finger 38 pressed against the dogs 32, thereby throwing the dogs 33 away from the notched rims.

In connection with the spring-barrels and cords before described that return the printing-segments to zero means are provided to insure the complete return and alinement of all the printing-segments in case any of them lag behind on account of variation or irregularity in the action of the spring-reels 78, the same consisting of the arms 25, supporting

the cross-bar 24 across the front of the segments 12 and under the projections 34, and coiled springs 25^a, that press the cross-bar against the segments to set them in line after they are released and returned by the spring-reels 78. In addition to this function one of the arms 25 operates, through the medium of a lug 26, to throw off the latch 37 from the pin 36 and disconnect the printing-key from the bar 35. In this connection it should be noted that the printing-key is locked and cannot be worked during the setting operation in which the printing-segments are selected and set one after another, as the key 27 is not released until the last or "units" printing-segment has been moved. This is for the purpose of preventing the operator from working the printing-key until all the figures contained in the line are set ready to print upon the paper, and thus avoid any improper operation of the machine through carelessness on the part of the operator in attempting to print before the entire line is set up. The means by which this is accomplished consists in connecting a locking-dog 30 rigidly by a sleeve 30^a with the dogs that control the first or units segment 12 and in position to engage a stop-block 29 on the side of the arm 28 of the key. The sleeve 30^a is fitted loosely on the shaft 31, and the dog 30 is set to stand upright under the stop-block when the dog 32 stands away from the notched segment and, on the other hand, to be thrown from beneath the stop-block as the dog 32 is set into and the other dog 33 away from the notched segment. As this last-mentioned change in the position of the dogs can take place only after the last or units segment has been set, it will be evident that the key 27 is locked and cannot be pressed down until the dog 30 has been set back from under the stop-block 29, and, on the other hand, also, the printing-dog is locked as soon as all the segments, including the units-segment, shall have been returned to position after the printing operation.

The arms 28 of the printing-key, extending upwardly at an angle beyond and rearwardly of the shaft, carry and operate the paper-carrying roller 56, which is so arranged that the roller is moved down against the type by depressing the key 27. This key thus has the function of a printing-key, both for the segments by which the several lines of figures are printed and also for the adding-wheels 8, that print the sum-total.

The roller 56 is mounted in an oscillating frame composed of arms 59, united by a top bar 59^a over the roller and journaled on a stationary shaft 60, on which as a center the frame is movable in an arc downward against the type segments and wheels. The journals 57 of the roller 56 project through the arms 59 and into an inclined slot 58 in each lever 28, and on the same journals is loosely centered a rocking plate 61, to the lower end of which at 63 the inking-roller 64 is connected by a link 73 at each end. Those parts

bring the inking-roller down in contact with the type as the lever-arms 28 are moved downward and the type becomes inked; but before the paper-roller is brought against the wheels and the segments the inking-roller is moved up and held away from the type and out of the way of the paper-roller. These movements of the inking-roller result from the connection between the piece 61 and the lever 28, as shown in Figs. 14 and 17, where it will be noticed that a pin 62 on the side of the lever 28 works in a curved slot in the forwardly-extending member of the piece 61 in front of the pivot 57, the slot being of such shape that as the key 27 is depressed the lever 28 begins to move forward, carrying the paper-roller downward in the slots 58 toward the type-wheels. In this movement the inking-roller is drawn against the type by a coiled spring 82, having one end attached to the inking-roller journal and the other end to a fixed point on the side of the case, at the same time that the roller is caused to travel across the face of the type by the oscillating movement of the pivoted arms 73.

The paper-feeding device consists of the notched wheel 68 on the paper-roller shaft 57 and the stationary pawl 70, pivoted at 71 to the side of the casing and held in position to engage the wheel 68 by a spring 72 behind the pawl and a stop-pin in front. A second pawl 69, carried by the shaft 60, on which the arms 59 of the paper-roller are centered, serves as a detent to hold the roller from turning backward. The paper is confined on the roller 56 by an endless rubber band 67, passing around a roller 65 above and a second roller 66 beneath the paper-carrying roller, so as to run against the face of the roller on the front side. This band is utilized also to hold up the inking-roller 64 clear of the type by carrying the outer half of the band outside of the inking-roller shaft, as shown in Figs. 14 and 17. Direct contact of the inking-roller with the paper is prevented, however, by rollers or pulleys 83 on the inking-roller shaft, somewhat larger in diameter than the inking-roller carrying the band 67 and bearing against the paper-roller 56.

The second movement of the roller 56 to print the total from the adding-wheels 8 is produced by depressing the printing-key 27 a second time, following the motion required to print the last row of figures from the printing-segment, and to release the key for that operation a push-rod 40, attached to the dog 30, extends through a slot in the front of the case at one side of the segment-setting piece 3. This last-named piece is a part of the oscillating frame 4 5 5, in which is mounted a pawl composed of two angular arms or members 20 20^a, freely movable transversely of the machine on a guide-rod 21 in the frame and also having a limited rocking or oscillating movement in a vertical plane on the rod. Under this last-mentioned movement of the piece its member 20^a, when thrown up to clear

the segments 12 of the units-printing wheel will, when the pawl 20 20^a is moved one step or space to the right of the units-printing segment, bring the other member 20 in position to engage an inclined rib or rail 52, projecting from the inner face of the curved front 2 of the case and standing diagonally with respect to the movement of the key 3, by virtue of which the arm 20, engaging the rib and being held frictionally in contact therewith, through pressure exerted on the key, will shift the pawl laterally and set it a distance of one, two, or more printing-segments or from right to left, according to the length of stroke given to the key. From this starting-point the following strokes of the key then actuate the pawl and feed it step by step from one segment to the next along the line through the mechanism illustrated in Figs. 2, 3, 14, 15, and 16. On the slide 19 to which the dogs 20 20^a are attached a pawl 18 is pivotally attached in position to engage a notched bar 23, extending across the case behind the oscillating frame 4 5 5, the point of the pawl being held toward the bar by a coiled spring 19^a on the pivot of the pawl, so that in the upstroke or rising movement of the finger-piece the point of the pawl 18, standing in advance of the slide 19, will meet the bar 23 just before the upstroke is completed, and by engaging one of the notches it will form a fulcrum-point on which, as the key 3 completes its stroke, the pawl will act to set the slide to the right a distance equal to the space between the two segments 12. Before this lateral movement takes place the end of the pawl 20^a will have moved onto a plain unnotched part of the segmental flange 12, and the dog being wider than the space between two flanges can slide across the faces of adjacent flanges into position to drop into a notch directly after the key 3 begins its next downstroke. This lateral movement brings the point of the pawl 20^a in line with the notches of the next segment 12 ready to move that segment in the next downward movement of the finger-key. Moving in this manner from left to right the dog 18 shifts the pawl 20^a one space as the point of the pawl 18 catches into the notches of the bar 23, and the piece 3 completes its upstroke. In this way the pawl 20^a is set to act in the next downstroke of the finger-key upon the segment of the wheel of the next lower denomination.

The means for setting the adding-wheels 8 to zero from the same key 3 consists of an oscillating yoke composed of two arms 15 15 and the cross-bar 14, having downwardly-projecting teeth in line with the blocks 10 on the wheels and adapted to enter the space between the wheels and catch behind the blocks by a downward movement of the yoke. The side arms 15 are slotted to play on the shaft 6, and the yoke is raised and held up so as to clear the adding-wheels when they are operated by means of an incline 17 on the side of an up-

right arm 16 on the yoke. The arm 16 is fitted to play in a slot in the cross-bar 23, and the incline 17, riding on that cross-bar, produces vertical movement of the yoke and also holds it up while the arm 16 remains at rest in the guide-slot in the bar 23; but when the arm 16 is drawn forward out of the slot the yoke will drop and the teeth on the bar 14 will engage the projections 10 on the side of the wheels, so that by drawing the yoke over toward the front of the machine the wheels 8 will be turned a sufficient distance to set the ciphers in the uppermost sections or divisions of all the wheels in the same line and to the same starting-point across the machine. This forward and downward movement of the yoke to set the adding-wheels before starting to print is effected by a simple downward stroke of the finger-key by connecting the upper end of the arm 16 temporarily to the finger-key by a loop 74 on one end and a hook 75 on the other part. These parts are attached together at the beginning of the operations to clear out the machine, and afterward the loop 74 is thrown off from the hook 75 and the arm 16 is left at rest in the slot in the cross-bar. The same stroke of the finger-key that sets the printing-segment also rotates the corresponding wheel 8 of the adding mechanism with a length of movement equal to that of the segment through the medium of a short lever 53, pivotally attached to the pawl 20^a and provided with a tooth to engage the ratchet-teeth on the side of the adding-wheel. Being attached to the pawl 20^a, that connects the key 3 with each individual wheel 7, this dog follows the vertical movements of that piece, by which it is disengaged and set clear of the wheels for the preliminary shifting movement from right to left. At the end of every upstroke, or when the pawl 20^a is shifted from the segment it has set to the adjacent segment of the next lowest order, the lever 53 is brought into position to engage the adding-wheel of that segment and is dropped into the ratchet-teeth of the wheel at the same time that the pawl 20^a takes the first notch of the segment. Before the lateral shifting takes place, however, the dog 53 will engage the bar 14 and be lifted into the position shown in Fig. 14, with its tooth above the adding-wheels. In the last upstroke of the finger-key following the setting operation of the last printing-segment on the right the tail of the dog 53 comes in contact with a fixed block 55 on the cross-bar 14, near the end of the upstroke of the key, thereby throwing the dog into position shown in Fig. 15 and raising the pawl 20^a clear of the printing-segments. In that movement of the dog its front end is set against the rod 22, by which it is held in such elevated position until the tail of the dog is drawn away from the block 55 and cross-bar 14 in the next movement of the finger-key. In its elevated position the pawl 20 sets in line with the diagonal rib 52 on the inner side of the stationary case and is ready to make contact with and ride on the up-

perside of the rib in the following downstroke of the key in which the slide 19 and connected parts are drawn forward and downward. In this movement the parts are drawn away from the cross-bar 14; but as long as the dog 20 maintains its engagement with the rib 52, which will be until pressure on the key 3 is released and the latter commences its upward movement, the dogs 20^a and 53 cannot drop down into engagement with the segments or the adding-wheels, and they will thus be free to slide laterally on the rod 21. As soon, however, as the key 3 begins its upward movement the dog 20 will become disengaged from the rib 52, and thereby permit the dogs 20^a and 53 to drop into engagement with a segment 12 and an adding-wheel, respectively. A spring 53^a, attached to the slide 19 and bearing on the dog 53, insures the proper engagement of the pawl with the ratchet-teeth on the adding-wheels, although the weight of the pawls would ordinarily be sufficient for this purpose. The two positions of these parts above described are shown in dotted lines in Fig. 14 and in full lines in the detail view, Fig. 16. These figures also show the stationary incline 52, the position of which is indicated by the diagonal lines across the front of the machine in Fig. 1. The movements of each adding-wheel thus produced from the strokes of the finger-key are transferred from one wheel to the adjacent one of the next higher order of figures by the pivoted dogs and arms illustrated in Figs. 4, 5, 10, and 14. In this mechanism an arm 46, fitted loosely on a fixed shaft 45, carries a dog 49 with a hook-shaped end that engages the ratchet-teeth on the side of the adding-wheel. In the outward movement of the arm on its support 45, the dog 49 being pivotally attached at the upper end to the arm and catching into a tooth of the ratchet will turn the wheel the distance of one tooth or number, while in the return movement of that arm the hooked end of the dog will slip over the notches. On the inner side next the wheel every arm is provided with a tooth 47, that acts as a detent to prevent reverse movement of the wheel, and in addition to that projection every arm but the first one carries a projecting rib or finger 48 offset laterally or standing to one side of the arm a distance equal to the space between one wheel and the next, so that such projection 48, projecting forward into the space between the wheels will set directly in the path of the stop-blocks 10 on the wheel of the next lower order. Thus for illustration the arm 46, that carries the pawl 49 to engage and turn the tens-wheel or the second one counting from the right-hand side of the machine, is provided with a finger 48, setting forward in the path of the stops 10 on the units-wheel, and consequently every ten movements of the units-wheel will bring one of the stops 10 against the finger 48, and thereby throw up the arm 44 and move the second wheel forward the distance of one number

through the agency of the hooked dog 49. By such means each wheel moves the wheel of the next higher order the distance of one number in every ten movements. These dogs and detents are held up to the wheels by coiled springs 51, attached at one end to the pivoted dogs 49 and to a stationary rod 50 across the frame. The first arm 44 does not require a stop-finger 48 or a dog 49, because the wheel that it controls is the lowest in the series.

The registering device is provided on the machine for the convenience of bankers and others, where it may be desirable to number the lines or rows of figures being printed—as, for example, in copying deposit-slips or lists of checks and drafts. This attachment consists of two or more register-wheels 42, having printing-type on the circumference and mounted to rotate on the shaft 6 and a vibrating lever 41, carrying a pivoted pawl 43, that is set to engage ratchet-teeth on the side of the first wheel and turn the same forward in the downstroke of the lever the distance of one tooth or number, as shown in the details, Fig. 13. The lever 41 is fulcrumed on the stationary shaft 31 and is connected to the printing-key 27 to operate in every downstroke of that key, thereby recording every printing movement. The second wheel in the series 42 is connected with the first wheel by a rocking arm 46, carrying a pawl 49^a, and a stop-finger 48^a, held up to the wheels by a spring 51^a, the same as employed to transfer the movements of one adding-wheel to the next, as seen in Figs. 4, 5, and 7.

As thus constructed and arranged the several mechanisms operate as follows: The preliminary downstroke of the finger-key first sets the connecting mechanism carried by the key to the left into position to start from the highest order of numbers in the line to be printed, and this position being governed by the length of stroke given to the key the finger of the operator is first placed on the proper finger-rest to obtain that movement, and the key is pressed down until it is arrested by the stop-plate on the frame. To print any number containing four figures or from one thousand to nine thousand, inclusive, the finger is placed on the fourth finger-rest, and the length of stroke thereby obtained will set the connecting devices 20^a and 53 into position to engage and start with the fourth wheel in each set 7 and 8 at the left as soon as the key is released and returned to place. In the following stroke of the key the required numbers are set up for printing by selecting the proper finger-rest corresponding to the first figure of the line and operating the key, then the second figure, and so on until the last figure in the units-column is set up. The line being ready then to be printed on the paper, the printing-key is depressed to bring the paper-roller against the printing-segment. As the printing-key is released and allowed to rise after printing

the line the locking-dogs that hold the wheels 7 are thrown clear of the notched segments 12, and, the same being released, the printing-segments are returned to zero by the spring-barrels. When all the rows of numbers are printed in this manner, the printing-key is depressed and the paper-roller is brought against the adding-wheels to print the sum total of all the numbers that in the meantime have been accumulated thereon by the operation of the adding mechanism. In order to actuate the printing-key at such time, however, the same must be unlocked by pressing in the releasing-key 40.

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

1. In machines of the character described, a separate registering device for each order, a single operating-key, a selecting device actuated by the key and movable transversely with respect to the registering devices and adapted to connect the key with the recording devices in successive order whereby all the registering devices are selected and actuated by the same key.

2. In machines of the character described, a registering-machine having a separate registering device for each order, a single operating-key, a selecting device operated by the key and adapted by the length of stroke of the key to connect it with any one of the recording devices at will, and mechanism actuated by the movements of the key to rotate the registering device so connected, and mechanism operating to shift the selecting device from one registering device to another to set the same in successive order from the movements of the key.

3. In machines of the character described, a separate registering device for each order, an operating-key, a selecting device transversely movable with reference to the registering devices, and mechanism controlled by the selecting device to connect the key separately with the registering devices in successive order said key when so connected determining by its length of stroke the movement of the particular registering device to which it is connected, and means actuated by a separate key to reset the registering devices to zero after each operation.

4. In a machine of the character described a separate recording device for each order, a selecting device, and an operating-key determining by its length of stroke the position of the selecting device with respect to any given recording device.

5. In machines of the character described, a recording mechanism composed of a separate recording device for each order of numbers, an adding mechanism comprising a wheel for each order, a selecting device transversely movable with respect to said recording and adding mechanisms, a single operating-key determining by its length of stroke the position of the selecting device with rela-

tion to the said recording and adding mechanism, means controlled by the selecting device to connect the operating-key with the recording mechanism and with the adding mechanism, whereby the same are actuated and set to the desired figures from the movements of the operating-key.

6. In machines of the character described, an adding mechanism composed of a separate adding-wheel for each order, a selecting device transversely movable with reference thereto, a single operating-key, and means controlled by the selecting device connecting the key separately with the adding-wheels in successive order and determining the movement of the adding-wheel so connected from the length of stroke of the key.

7. In machines of the character described, a recording mechanism composed of a separate recording device for each order, a selecting device movable transversely thereto, a single operating-key determining by its length of stroke the position of the selecting device with respect to the recording devices, mechanisms controlled by the selecting devices and adapted to connect the operating-key with the several recording devices in successive order to operate them from the movements of the same key, a printing-roller, a printing-key adapted to bring the roller and the recording devices in contact, and mechanism operated by the printing-key to reset the recording devices after every printing operation.

8. In machines of the character described, an adding mechanism having a separate adding device for each order, a single operating-key, a selecting device adapted to connect the operating-key with the adding devices in successive order, mechanism connecting the selecting device with the separate adding devices through varying lengths of stroke of the operating-key.

9. In machines of the character described, an adding mechanism having a separate adding device for each order, a single operating-key, a selecting device adapted to connect the key with the adding devices in successive order, mechanism connecting the selecting device with the adding devices through varying lengths of stroke of the operating-key, and mechanism controlled by a separate key to reset the adding devices to zero.

10. In machines of the character described, a recording mechanism having a separate recording device for each order, a single operating-key, a selecting device adapted to connect the key with the recording devices in successive order, and mechanism connecting the selecting device with the recording devices through varying lengths of stroke of the operating-key.

11. In machines of the character described, a recording mechanism having a separate recording device for each order, a single operating-key, a selecting device adapted to connect the key with the recording devices in successive order, mechanism connecting the se-

lecting device with the recording devices through varying lengths of stroke of the operating-key and mechanism controlled by a separate key to reset the recording devices to zero.

12. The combination of a recording and printing device consisting of a disk mounted for rotation on a shaft and having a segmental flange bearing printing-type on its periphery, an adding-wheel on the same shaft rotatable within the segmental flange of the disk, and setting mechanism and a controlling-key adapted to set the segment and the adding-wheel with an equal extent of movement with reference to a printing-roller.

13. The combination of the adding mechanism comprising a separate wheel for each order, means connecting the wheel of one order with that of the next highest order, whereby the rotation of the lower wheel ten numbers will rotate the next higher wheel one number, a recording mechanism comprising a separate wheel for each order bearing figures from "0" to "9" inclusive, a single operating-key, and connecting mechanism movable transversely with respect to the recording-wheels and adding-wheels and adapted by varying lengths of stroke of the operating-key to disconnect said key from one of the wheels of one order and connect it with the wheels of the next order in succession, a printing-roller, and a separate key and mechanism controlled thereby to bring the printing-roller

in contact first with the recording-wheels and finally with the adding-wheels.

14. In machines of the character described, an adding mechanism composed of a separate adding device for each order, a selecting device movable transversely thereto, a single operating-key determining by its length of stroke the position of the selecting device with respect to the adding devices, mechanically controlled by the selecting device and adapted to connect the operating-key with the several adding devices in successive order to operate them from the movements of the same key, a printing-roller, and a printing-key adapted to bring the roller and the adding devices in contact.

15. In machines of the character described, a separate adding device for each order, a single operating-key, a selecting device transversely movable with reference to the adding devices, and mechanism controlled by the selecting device to connect the operating-key separately with the adding devices in successive order, said key when so connected determining by the length of its stroke the movement of the particular adding device to which it is connected.

In testimony that I claim the foregoing I have hereunto set my hand and seal.

ADAM HOCH. [L. S.]

Witnesses:

GEO. T. KNOX,
A. WOLF.