

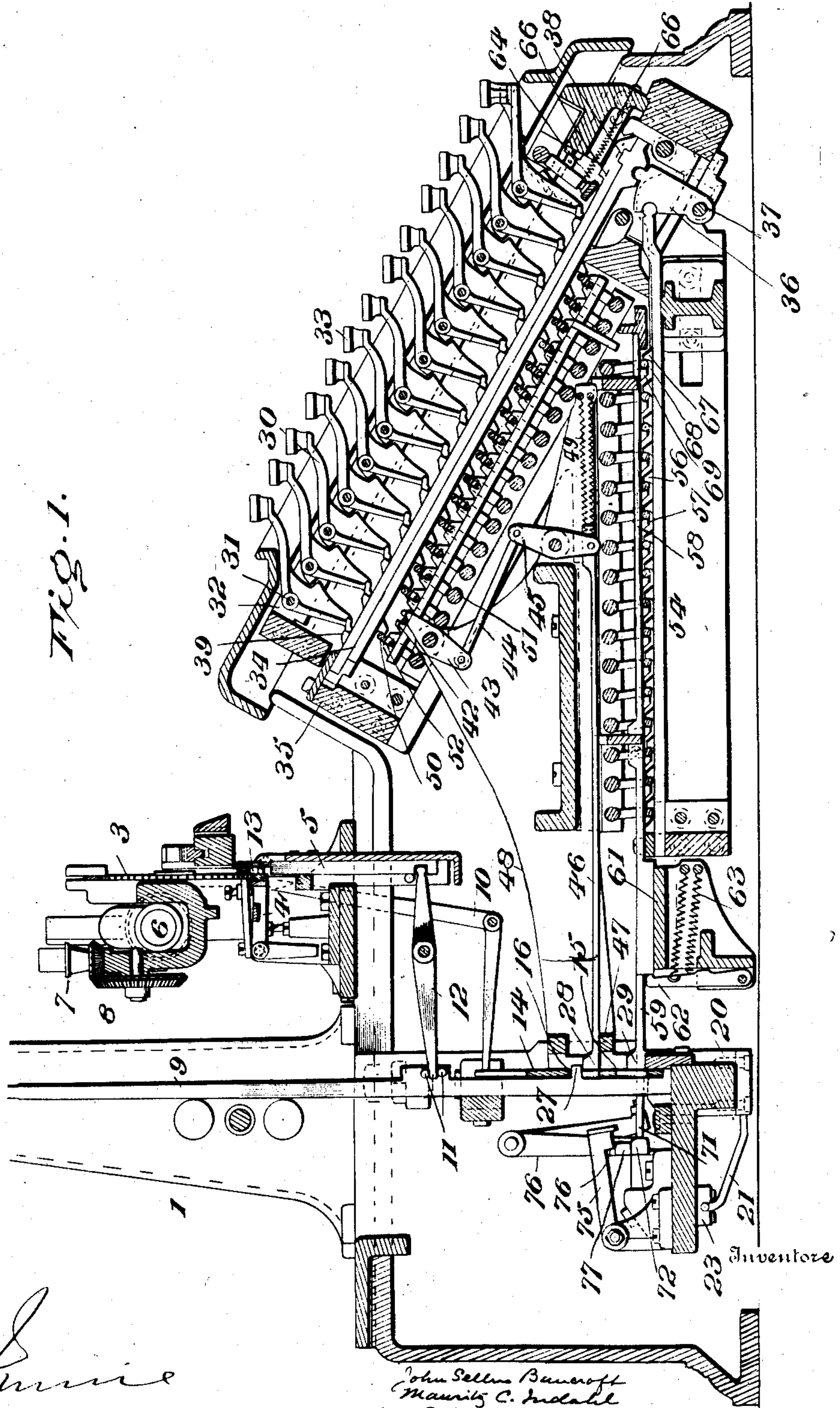
No. 883,376.

PATENTED MAR. 31, 1908.

J. S. BANCROFT & M. C. INDAHL.
KEYBOARD PERFORATING MACHINE.

APPLICATION FILED JAN. 30, 1904. RENEWED AUG. 19, 1905.

3 SHEETS—SHEET 1.



Witnesses

for
Thomas Durant

John Sellers Bancroft
Maurice C. Indahl
by Church & Church their Attorneys

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Fig. 3.

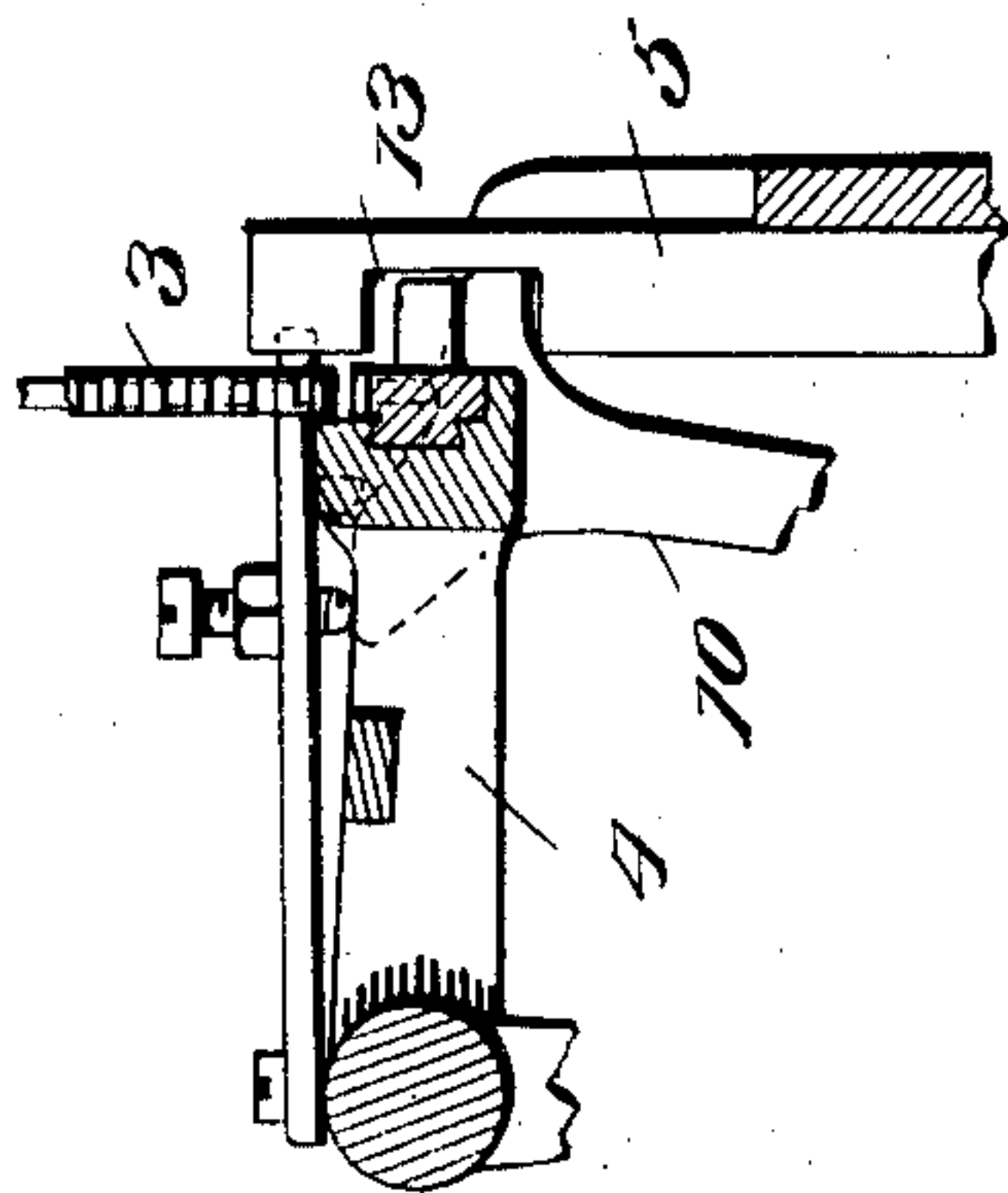
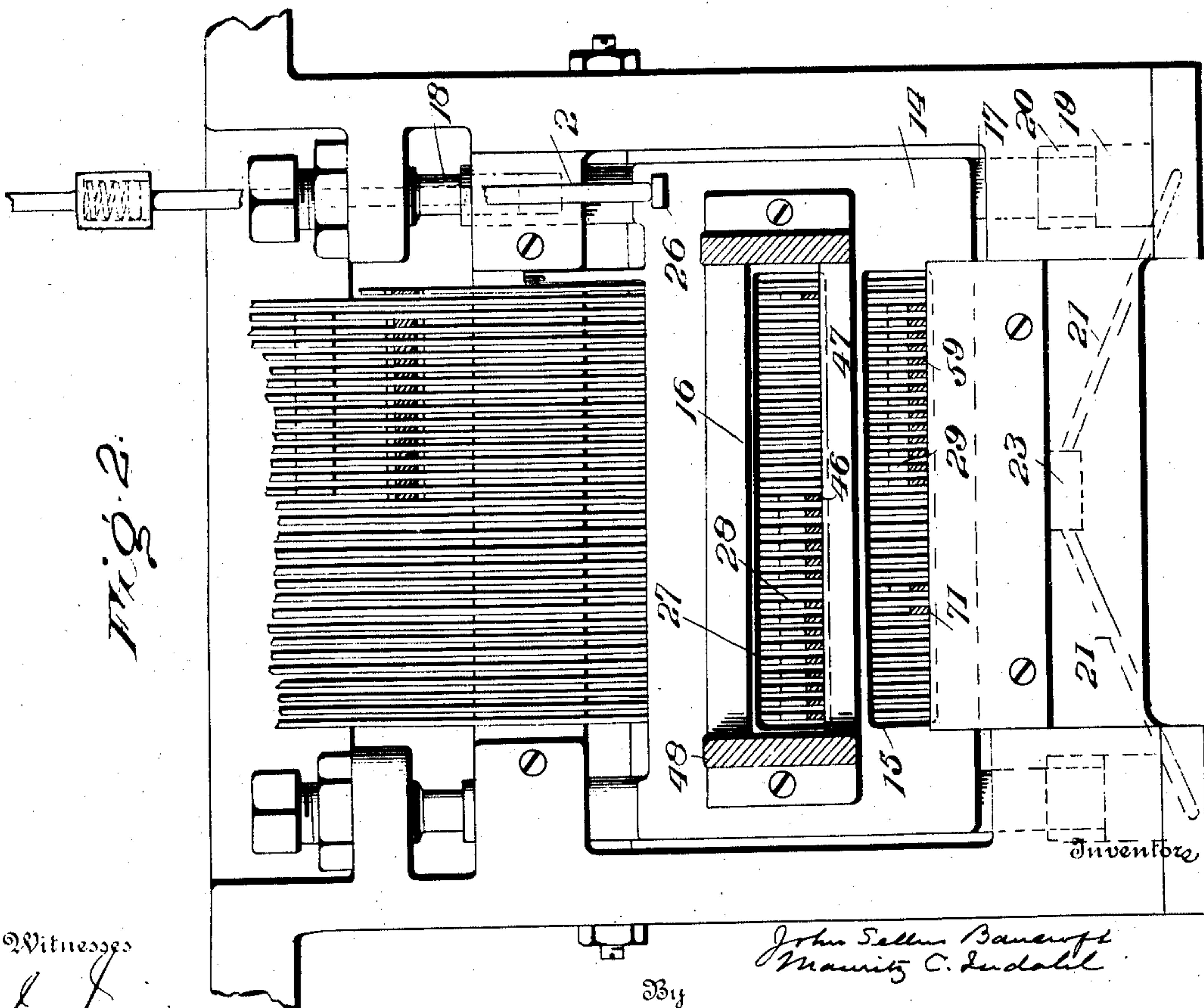


Fig. 2.



Witnesses

Thomas Durant

By

*John Sellen Bancroft
Maurice C. Indahl*

Church & Church Attorneys

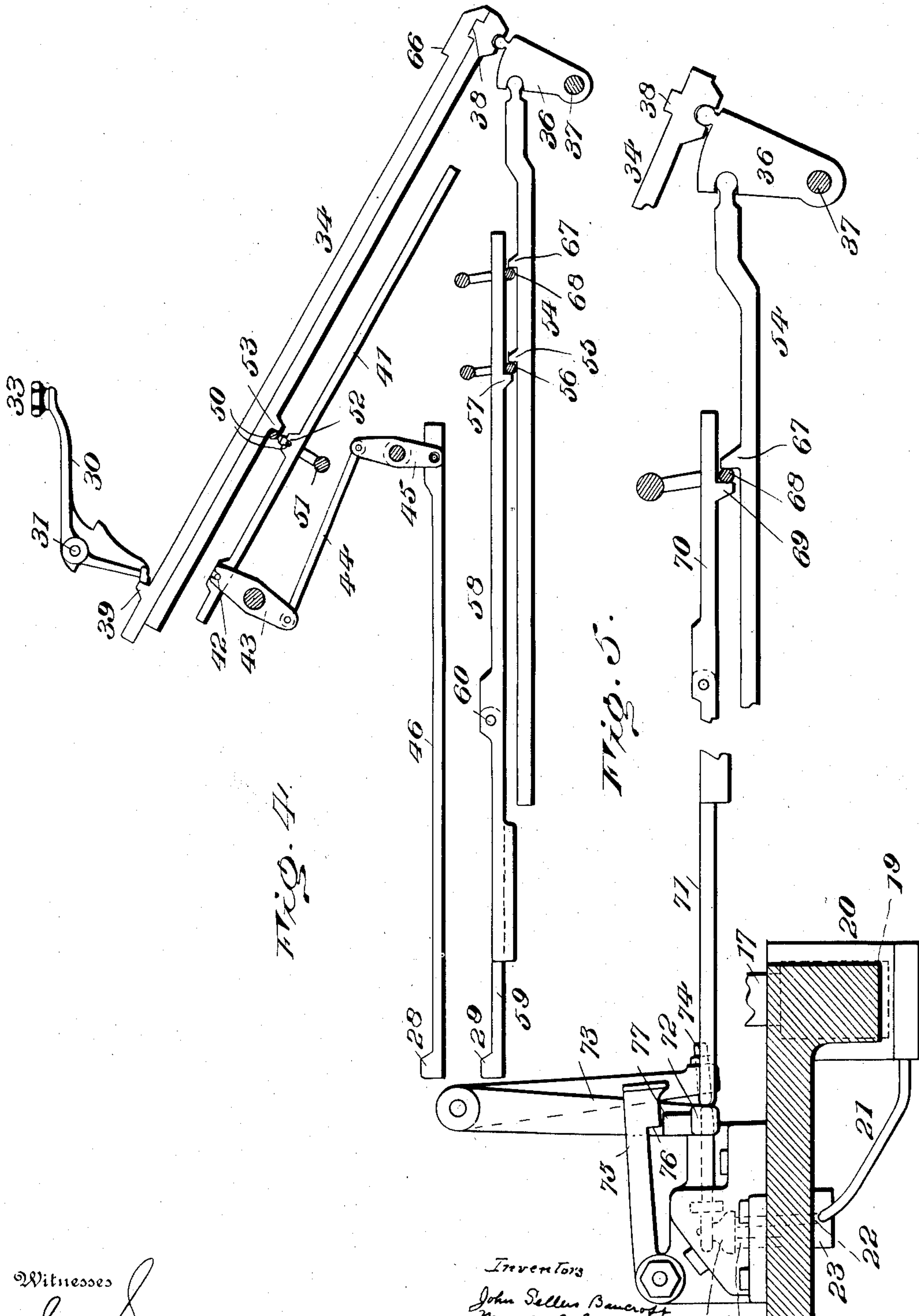
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3 SHEETS—SHEET 3.



Witnesses

for *Amie*
Thomas Durant

Inventors

John Sellers Bancroft
Maurice C. Indahl

by *Chas. & Chas. Thier* Attorneys

UNITED STATES PATENT OFFICE.

JOHN SELLERS BANCROFT AND MAURITZ C. INDAHL, OF PHILADELPHIA, PENNSYLVANIA,
ASSIGNORS TO LANSTON MONOTYPE MACHINE COMPANY, OF PHILADELPHIA, PENN-
SYLVANIA, A CORPORATION OF VIRGINIA.

KEYBOARD PERFORATING-MACHINE.

No. 883,376.

Specification of Letters Patent.

Patented March 31, 1908.

Application filed January 30, 1904, Serial No. 191,389. Renewed August 19, 1905. Serial No. 274,965.

To all whom it may concern:

Be it known that we, JOHN SELLERS BANCROFT and MAURITZ C. INDAHL, citizens of the United States, and residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Keyboard Perforating-Machines; and we do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the figures and letters of reference marked thereon.

This invention relates to a keyboard actuating mechanism for record strip; perforating and other machines employing a plurality of punches or operating devices controlled from a bank of keys, and it has for its objects to provide a system whereby the characters may be distributed on the keybank according to any desired plan, irrespective of the space value or other characteristics incident to the relative arrangement of the punches or other devices; to render the key movement easy and its action prompt and effective; to insure a full action of the devices designated and controlled by each key and prevent interference; and, generally, to improve the construction and arrangement of the machine as a whole.

To these ends the invention consists in the novel combinations, constructions and arrangements of parts and mechanisms hereinafter fully described, the novel features being pointed out in the appended claims.

In the accompanying drawings illustrating a preferred form of embodiment and adaptation of the said invention—Figure 1 is a side elevation, partly in section, of a portion of a record strip perforating machine with the new key action applied thereto. Fig. 2 is a front elevation of the punch actuating mechanism including the punch bars, punch actuator frame, the motor therefor and the system of interponents. Fig. 3 is a detail view of a portion of the line measuring mechanism with the stop bars for admeasuring its advance movements. Fig. 4 is a detail view showing the elements of the permutation system through which the motion of each key is transmitted to the interponents or interponent controlled thereby. Fig. 5 is a similar view illustrating the valve actuating devices for the motor.

Similar numerals in the several figures 55 indicate the same parts.

The invention is illustrated as applied and used in connection with the perforating, measuring and indicating mechanism of the record strip perforating machine of Patent 60 No. 654,115, as a substitute for the controlling and actuating mechanisms with their multitude of valves, pistons, cylinders, etc.

It will suffice for present purposes to identify certain of the principal elements of the 65 prior machine which are retained, such as the paper feed, represented by the paper-tower 1 and actuating bar 2; the line measuring mechanism, represented by the units wheel 3, units-rack carrier 4, stop-bars 5 and motor 70 cylinder 6; the indicator mechanism represented by the justification-scale carrier 7 and its gearing 8; and the perforating mechanism represented by the series of punch-bars 9. The escapement of the line measuring 75 mechanism may be actuated by a cam lever 10 and the resetting devices by a special key and valve after the manner described in Patent No. 828,449 of August 14, 1906, the justification indicator being connected with the 80 line measuring mechanism as in either of the before mentioned patents.

As an aid to a clear understanding of the present improvements, which have to do with the actuating system therefor, it may 85 be well to state that the commercial machines constructed under the patent hereinbefore mentioned are each equipped with thirty one punches, for producing the perforations or signals in the record-strip, and 90 with thirty two punch bars, one of the latter being without a punch. Of these punch-bars, sixteen represent space value, hence are coupled to the series of stop-bars 5, and of this number one has no punch, one corre- 95 sponds with the justification-space key or keys, and fourteen represent different degrees of adjustment for the die-case. This series of punch-bars is herein denominated the space value group. Of the remaining 100 sixteen punch bars, fourteen represent degrees of adjustment for the die-case in a direction transverse to the first and two correspond to the justification-designation signals.

In forming the type-signals in the record strip it is necessary that at least one punch bar of the space-value group should be 105

brought into action, to impress the normal space-value of the type upon the measuring devices, and in most instances two punch bars are required, representing degrees of motion on intersecting lines for locating the matrices of the die-case opposite the casting point, one of said punch-bars being selected from the space-value group and the other from the non-space-value group. The selection and operation of the punch bars, to produce the great variety of signals desired is effected by the actuating and control system intermediate the punch-bars and the keys, each of the latter representing a different type and producing the signal corresponding thereto.

The punch bars of the space value group are each provided with pins 11 engaging a lever 12 connected to one of the stop-bars 5, and as the motion of the latter is thus reversed, as compared with Patent No. 654,115 the bars 5 are notched, as at 13, for the passage of the units-rack stop, the portion above the notch intersecting the path of the units-rack when the punch-bar is elevated.

Located in proximity to and supported to reciprocate parallel with the series of punch-bars is the punch actuator 14, represented as a plate formed with two transverse slots or openings 15—16, in different planes and provided with cylindrical or other shaped guides 17 working in bearings on the frame. The upper guides 17 are bored out to receive limiting screws 18 while the lower guides terminate in pistons 19 working in cylinders 20, the latter constituting the motor. Both cylinders communicate through pipes 21 with the port 22 of a valve chest 23, Fig. 5, the latter containing a slide valve 24 and exhaust port 25. The actuator 14 is provided with lugs 26 for engaging the paper feed actuator bar 2, and the cam lever 10, so that at each reciprocation the paper feed and escapement of the measuring mechanism will be operated.

Each punch bar 9 is provided with an offset or stud 27 projecting within and normally occupying the upper section of one of the openings 15, 16 in the actuator 14, and opposite each punch-bar is an interponent 28 or 29, held normally removed from the actuator but adapted to be interposed between the latter and the stud 27. The slots or openings 15 and 16 in the actuator merely represent intervals between two opposite moving surfaces, the one acting directly upon the studs 27 of the punch-bars, to move them in one direction, and the other acting through the interponents, when in position, to move them in the opposite direction. A single slot presenting two oppositely located bars would suffice for this purpose, but for convenience and economy of space two slots are preferred of which the lower 15 receives the studs 27 of the space-value

group of punch bars, and the upper 16 the studs of the non-space value group, or vice versa. To distinguish the two groups of interponents those of the space-value group are numbered 28 and those of the other group 29.

The keys 30 of the keybank are in the form of bell-crank levers pivotally supported on rods 31 in an inclined frame 32, their horizontal arms carrying finger pieces 33. For convenience the keys are disposed in lines and columns although any other arrangement or relative disposition is permissible. Beneath the keyframe 32 is arranged a series of longitudinally movable bars 34 properly spaced and supported and guided at one end on the frame 35 and at the other upon a series of pivoted links or tumblers 36 mounted upon a shaft 37. The bars 34, one for each key, are preferably formed in two longitudinal sections, united, as by a rib and seat 38 to cause them to move together, the upper section provided with a lug 39 opposite its key lever and the lower section with a permutation or selecting lug 53.

Beneath and parallel with the series of key-bars 34 is a series of interponent bars 41, one for each interponent 28, and connected to the latter through a pin 42, lever 43, link 44 and lever 45. The interponent 28 is formed upon or carried by one end of a rod 46 resting upon a cross bar 47 attached to frame 48, the opposite end of said rod being pivotally attached to lever 45. A spring 49 may be attached to the lever 45 to retract the latter and withdraw the interponent from engagement with its stud. Extending transversely of and between the two series of interponent bars 41 and key bars 34 is a series of pairs of transmitter bars 50 equal in number to the interponent bars. Each bar 50 is mounted upon a rock-shaft 51 and is received between shoulders 52 carried by one of the series of interponent bars. As thus arranged each key bar represents a key and each interponent bar an interponent, hence to transmit motion from any key to any interponent it is only necessary to provide its key bar 34 with a shoulder or projection 53 in position to engage one of the transmitter bar 50 coupled with the interponent bar 41 of the desired interponent.

The selection and operation of the interponents 29 of the other, a non space value group, is effected through a second series of key bars 54 provided with permutation shoulders 55. Each bar 54 is pivotally connected to one of the links or tumblers 36, so as to partake of the movements of its key bar 34, and its shoulder 55 is in position to engage one of a transversely arranged series of transmitter bars 56 each of the latter in turn engaging a lug or shoulder 57 on one of a series of interponent bars 58. In this case the interponent 29 is carried by a rod 59

whose opposite end is pivotally connected to its bar, as at 60, Fig. 4, the rear ends of the key bars 54 being guided upon a plate 61 and engaging a lever 62 to which a retracting spring 63 is attached.

Each bar 54 is connected and responds to one key, and each interponent bar 58 to one transmitter 56, so that by properly locating its permutation shoulder 55, any key may be coupled with any one of the series of interponents 29. A laterally movable bar 64 provided with a spring 65 is arranged in position to engage a shoulder 66 on each key bar 34, when the latter is moved by its key, and serves to cushion the key action as well as to insure the return of the key bars.

The mechanism as thus far described is competent to place any one or more of the punch-bars in operative connection with the actuator, by the depression of a single key, irrespective of its location in the keybank, and it remains to be seen how the selected punch-bars are moved to perforate the strip and operate the connected mechanism. The interponents rest normally in close proximity to the actuator 14 so that a very slight movement will bring them into operative relation to the actuator and punch-bars.

Each of the second series of key bars 54 carries in addition to its permutation shoulder 55, a shoulder 67 engaging a transmitter 68, the latter in turn acting upon a shoulder 69 on bar 70 to which is pivoted the motor trip bar 71. Thus when any key is depressed motion is transmitted to the trip bar 71 whose rear or free end passes through the opening in actuator 14, and rests upon the lower bar so that it will partake of the motions of the actuator. When at rest the end of trip bar 71 stands opposite a shoulder or lug 72 on one arm of a pivoted lever 73, the other arm whereof carries an adjusting screw 74 engaging the stem of slide valve 24.

Above the trip bar 71 and intersecting its path is arranged a pivoted latch 75 provided with a shoulder 76 normally resting upon a shoulder 77 on lever 73 but adapted to drop in front of said shoulder when the lever is moved to uncover the port 22. Thus whenever a key is depressed to advance its interponents into engagement with the actuator, the trip bar operates through lever 73 to shift valve 24 and uncover port 22, thereby admitting pressure in the motor cylinders to advance the actuator and the selected punch bars. At the same time the latch engages shoulder 77 on lever 73, to retain the valve in its open position after pressure upon the key has been removed and the key returned to initial position. As the actuator advances it carries the trip bar 71 above the lug 72 into engagement with the latch 75 and upon the completion of the stroke, disengages the latch from its retaining shoulder 77, thus releasing the shifting lever 73 so that the valve is free

to move under the pressure on its stem, aided, if desired by a spring, to close port 22 and open exhaust port 25 to the motor, when the parts will return to initial position ready for the operation of the next key. It will be noted that by this arrangement the key operates merely to couple the selected punch-bars with the motor and inaugurate the action of the latter by setting its control valve; that the motor is automatically disconnected or thrown out of action by the movement of a member driven thereby, to wit, the actuator, and that the movement of the actuator automatically moves the trip out of engagement with the valve lever by lifting it above the lug thereon. This is conducive to quick and easy action of the keys and insures a full stroke of the punch bars; moreover, the movement of the actuator inaugurated by the depression of a key interposes a barrier to the movement of all interponents other than those controlled by the depressed key, thereby preventing interferences should another key be depressed, accidentally or intentionally before the completion of the punching operation and the return of the actuator.

Having thus described our invention what we claim as new and desire to secure by Letters Patent, is:—

1. In a perforating machine such as described, the combination of the following elements, to wit, a series of punch bars; an actuator therefor; a series of interponents intermediate the actuator and the punch bars; a motor for the actuator; controlling devices for said motor including a retaining latch and a trip, the latter coupled with the actuator; and a series of keys operatively connected with the interponents for selection, and with the motor control devices for inaugurating its action.

2. In a perforating machine such as described, the combination with the punch bars, actuator, motor, interponents and keys, of a valve controlling the motor, actuating devices for shifting said valve, a latch for retaining the valve in shifted position, and a trip for said latch coupled with the actuator and operating to release the valve by the movement and at the end of the stroke of said actuator.

3. In a perforating machine such as described the combination of the following elements, to wit; a plurality of punch-bars; an actuator provided with a motor; a series of controllable interponents intermediate said punch-bars and actuator; a series of keys coupled with the interponents; a motor valve; setting devices coupled with the keys for shifting the valve; a latch coupled with the valve for retaining it in position; and a trip bar movable with the actuator to release the latch and permit the return of the actuator.

4. In a perforator such as described the combination of the following elements, to wit; an actuator provided with opposed engaging surfaces and a motor; a plurality of punch-bars each with an off-set located intermediate the opposed surfaces on the actuator; a series of interponents, one for each punch-bar, adapted to enter between its off-set and the engaging surface of the actuator; a control valve for the motor governing the pressure and exhaust in the latter; a lever engaging said valve and provided with a shoulder; a latch engaging said shoulder when the valve is moved to admit pressure to the motor; and a trip engaging said lever to shift the valve, and connected to move in unison with the actuator for operating the latch to release the valve.

5. In a perforating machine such as described, the combination with the actuator, its motor, a plurality of punch-bars and a series of interponents, of a valve controlling the motor, a shifting lever for the valve, a latch for retaining the valve in shifted position until withdrawn, and a trip-bar engaging a lug on the valve lever for shifting the valve, and moved by the actuator to disengage said trip-bar from the valve lever and to engage and release the latch.

6. In a perforating machine such as described, the combination of the following elements, to wit, a plurality of punch-bars; a measuring mechanism provided with an escapement and admeasuring devices; connections between certain of the punches and the admeasuring devices; an actuator coupled with the escapement devices for operating the latter; an interponent intermediate each punch bar and the actuator; a motor for the actuator; control devices for said motor; and a series of keys coupled with the interponents and the motor control devices.

7. In a perforating machine such as described the combination of the following elements, to wit; an actuator in the form of a plate provided with a transverse opening; a series of punch-bars each provided with an off-set of less width than the opening in said plate and projecting therein; a series of interponents separately movable transversely of the actuator and supported in proximity to the opening therein in position to enter between the offsets on the punch-bars and one wall of the opening; a motor for the actuator; a control valve for the motor; and keys controlling the interponents and acting upon the control valve to inaugurate the action of the motor.

8. In a perforating machine such as described provided with an actuator, a motor therefor, a plurality of punch-bars, and a series of interponents, the combination therewith of the following elements, to wit, a series of interponent bars, one for each inter-

ponent; a parallel series of key-bars; a series of keys each coupled to one of the key-bars; and a series of transmitter bars extending transversely of the interponent and key-bars, each of said transmitter bars engaging a shoulder on one of the interponent bars and being in turn engaged by a permutation shoulder or shoulders of any one or more of the key bars.

9. In a perforating machine such as described provided with a series of punches and measuring and indication mechanism, the combination of the following elements, to wit; a series of punch-bars, comprising two groups of which one represents space-value and has its members connected to the admeasuring devices of the line measuring mechanism; an actuator for the punch-bars; a motor with control devices for the actuator; a series of interponents for each group of punch-bars; a series of keys; a plurality of key-bars one for each key and provided with permutation or selecting shoulders; two series of interponent bars, one for each group of punch-bars; and two series of transmitter bars, one for each series of interponent bars.

10. In a perforating machine such as described the combination of the following elements, to wit; a series of key levers; a series of keybars; a series of interponent bars parallel with the key-bars; a series of transmitter-bars situated between the key bars and interponent bars; permutation lugs on the key bars engaging the transmitter bars and lugs on the interponent bars engaged by the transmitter bars; a series of interponents, one for each interponent bar and connected to the latter; a series of punch bars; and an actuator for said series of punch bars.

11. In a perforating machine such as described the combination with the series of punch-bars, the actuator therefor and the motor and control devices for said actuator, of a series of keys for controlling said interponents; two series of key-bars of which one of each series is coupled with the same key; two series of interponent and transmitter bars, one for each series of key-bars; and connections between each interponent bar and one of the series of interponents.

12. In a perforating machine such as described, the combination with the series of punch-bars provided with off-sets or shoulders, the reciprocating actuator provided with an opening for the reception of said off-sets and a motor for said actuator, of the interponents supported in proximity to the actuator in position to enter between the punch-bar offsets and the actuator; the motor control devices located on the side of the actuator opposite the interponents; and a trip bar movable in unison with the interponents and projected across the actuator to set in action the motor control devices.

13. In a perforating machine such as de-

scribed provided with an interponent selecting and motor actuated punching mechanism and in combination therewith, a keyboard control mechanism provided with two distinct selecting and actuating mechanisms intermediate the keys and the interponents, each of said mechanisms including a series of interponent bars, transmitter bars and permutation keybars, the latter connected in pairs, one of each series, to move in unison, and a plurality of keys each engaging a key-bar of one series.

14. In a perforating machine such as described the combination of the following elements, for controlling two or more interponents from a single key, to wit; a longitudinally reciprocating key-bar connected to a link or tumbler and provided with a selecting or permutation projection or shoulder; a key engaging said key-bar; a transmitter engaged by the permuter projection on the keybar; an interponent bar engaged by said transmitter; a second keybar coupled with and partaking of the movements of the said link or tumbler; and a permutation projection on the second keybar operating through a transmitter upon a second interponent bar.

15. In a keyboard mechanism for a perforating machine such as described, the combination with the interponent and transmitter bars and the key lever, of a longitudinally reciprocating sectional keybar, one section carrying the connection for the key lever and the other the permutation member for engaging the transmitter and interponent bars.

16. A permutation keybar for the keyboard mechanism of a perforating machine such as described, divided longitudinally into two sections separably interlocked one of said sections provided with means for engaging the key lever, the other section carrying the permutation member or members.

17. In a punching machine such as described, the combination of the following elements, to wit; a plurality of punch bars each provided with an off-set or engaging shoulder, the latter disposed in different planes to designate different groups; an actuator common to all the punch bars and provided with a shoulder or engaging surface for each group; a plurality of interponents, one for each punch bar, disposed in groups corresponding to the offsets or engaging shoulders of the punch bars; a series of keys and a plurality of selecting and actuating mechanisms intermediate each key and the members of each group of interponents.

18. In a punching machine such as described, provided with a series of keys, a plurality of actuating mechanisms controlled by said keys, and a plurality of groups of interponents whose members are separately controlled through said actuating mechanisms, the combination therewith of the following

elements, to wit, a series of punch bars; an actuator provided with control devices; a paper feed connection coupled with the actuator; an escapement connection coupled with the actuator; and a series of admeasuring devices coupled to the members of one group of punch bars.

19. In a punching machine such as described provided with a paper feed, registering and indicating mechanisms, and a series of punches the combination of the following elements, to wit; a series of punch bars; a motor driven actuator; selecting interponents intermediate the actuator and punch bars; a series of keys controlling the selection of punch bars; paper feed and register escapement connections coupled with the actuator; and admeasuring devices coupled with certain of the punch bars.

20. In a punching machine such as described, provided with a series of key controlled punches, a paper feed and registering and indicating mechanism, the combination of the following elements, to wit; a series of punch bars; an actuator; selecting interponents; paper feed and register escapement connections coupled to the actuator; admeasuring devices for the register and indicator coupled to certain of the punch bars representing dimensioning signals; and an indicator connection coupled with the punch bar representing justification space signals.

21. As a new article of manufacture a sectional permutation key bar, one section provided with engaging means for the actuating device and the other with engaging means for the actuated device and means for detachably connecting said sections, whereby, by a substitution of interchangeable members a section appropriated to a given actuating device may be coupled with a section appropriated to any one or more of a series of actuated devices, or a section appropriated to a given actuated device may be coupled with a section appropriated to any one or more of a series of actuating devices.

22. In a punching machine such as described the combination of the following elements, to wit: a plurality of groups of punch bars; an actuator; a plurality of interponents, one for each punch bar; a series of keys; and means for coupling the interponents of each group of punch bars to any of the keys, said means including independent permutation systems for each group of punch bars.

23. In a punching machine such as described provided with a series of keys and a plurality of groups of punches and in combination therewith a plurality of control mechanisms intermediate the keys and groups of punches, each of said control mechanisms including independent permutation systems whereby any key of the series may be coupled with any punch in either group.

24. In a punching machine such as described the combination of the following elements to wit:—a plurality of groups of punches; a plurality of interponents, one for
5 each punch; a series of keys; and means for coupling said keys and interponents, the same including two independent and sepa-

rate permutation systems each pertaining to a group of punches.

JOHN SELLERS BANCROFT.
MAURITZ C. INDAHL.

Witnesses:

MORTIMER A. JONES,
JOSEPH B. CHURCH.