J. F. MAYS.

MECHANISM FOR OPERATING A TYPE WRITER FROM A CALCULATING MACHINE.

APPLICATION FILED NOV. 12, 1914.

1,166,704.

Patented Jan. 4, 1916.

3 SHEETS—SHEET 1.

FIG. 1.

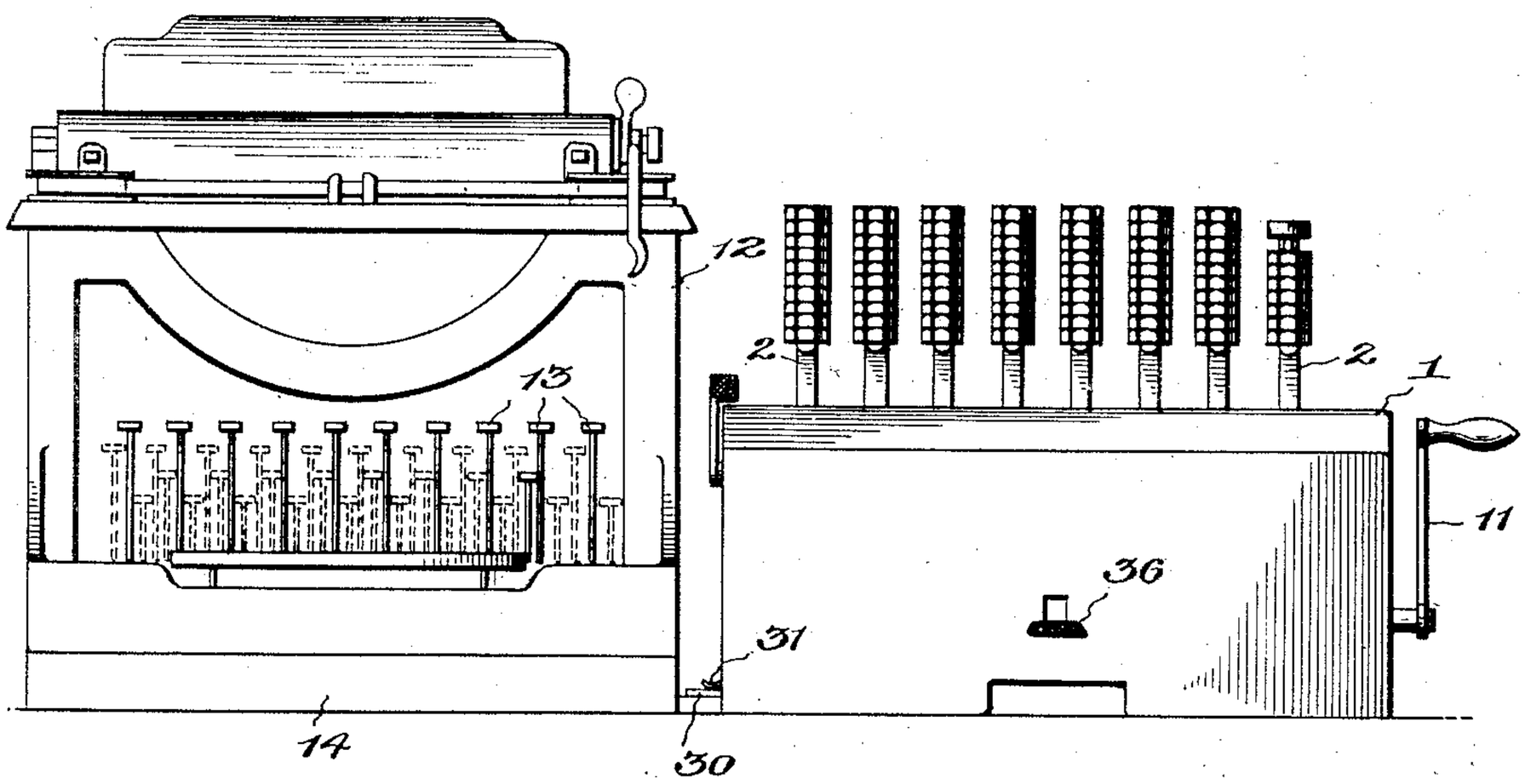

FIG. 2.

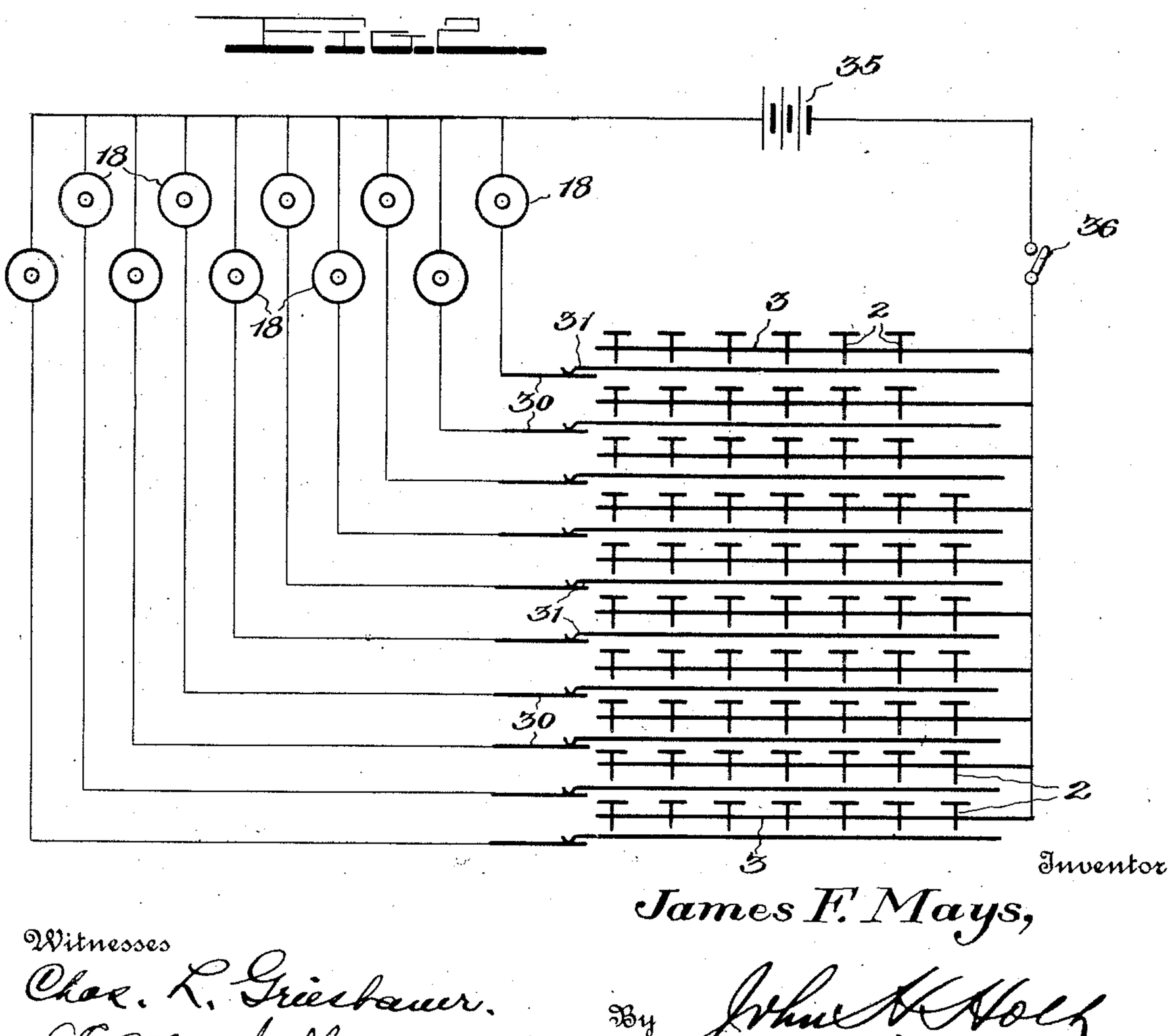

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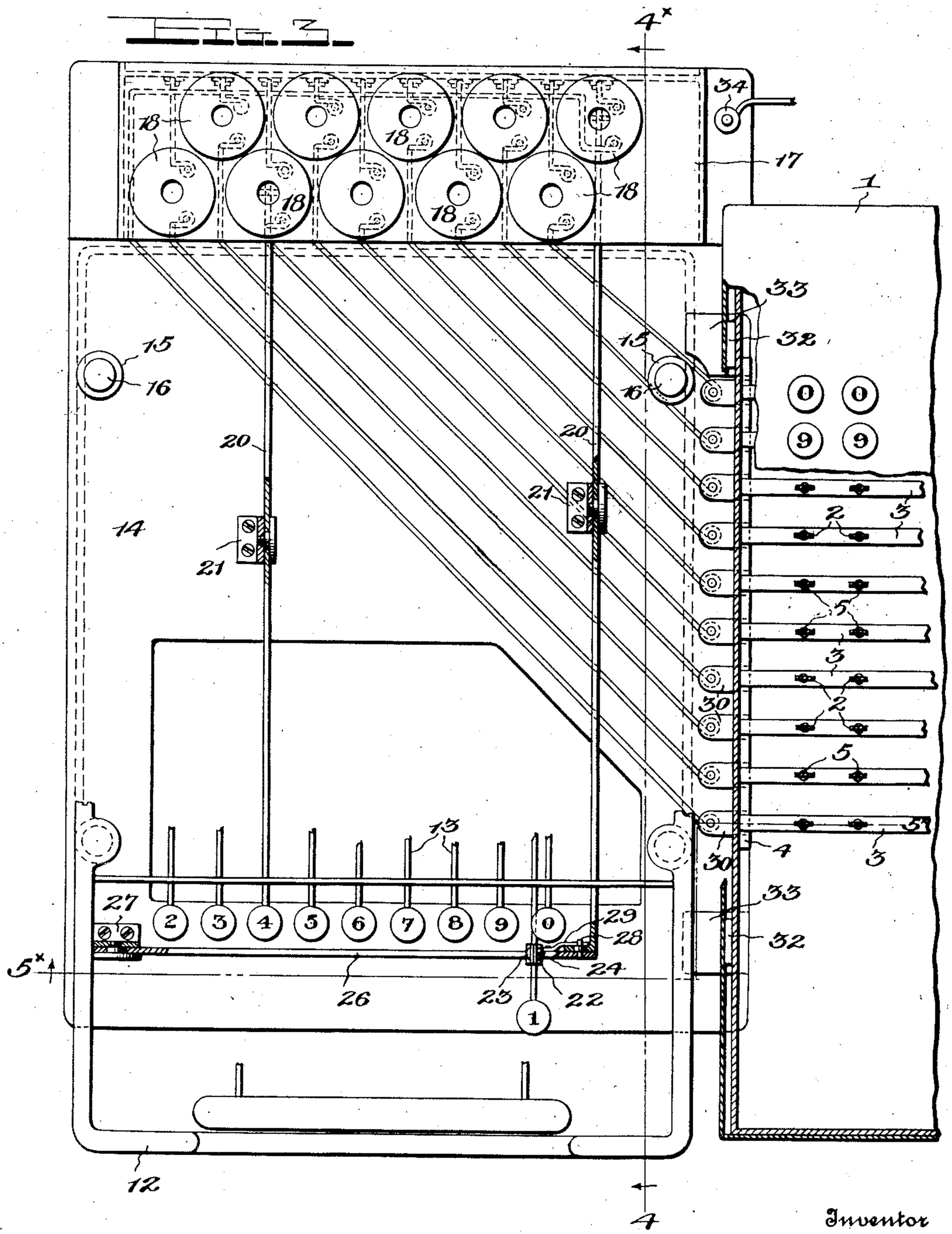
Fig. 2



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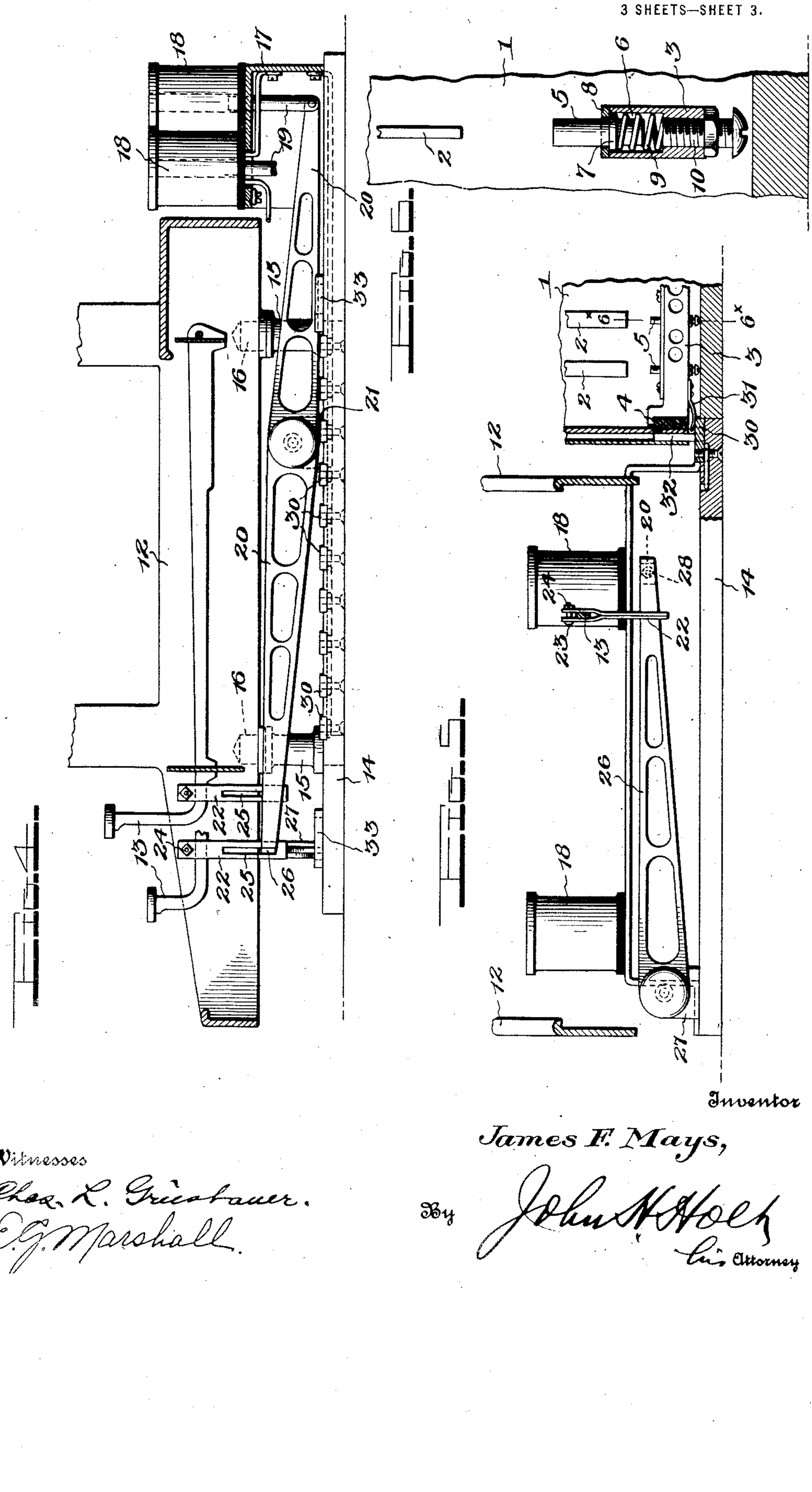
3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

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MECHANISM FOR OPERATING A TYPE-WRITER FROM A CALCULATING-MACHINE.

1,166,704. Specification of Letters Patent. Patented Jan. 4, 1916.

Application filed November 12, 1914. Serial No. 871,756.

To all whom it may concern:

Be it known that I, JAMES F. MAYS, a citizen of the United States, residing at Birmingham, in the county of Jefferson and State of Alabama, have invented certain new and useful Improvements in Mechanism for Operating a Type-Writer from a Calculating-Machine, of which the following is a specification.

This invention relates more especially to mechanism for operating a typewriting machine from the keys of an adding or calculating machine by electrical power, and its principal object is to provide a simple and effective mechanism whereby an adding or calculating machine not equipped with a full or self contained listing or printing attachment itself, may be readily so connected to a typewriting machine that the latter machine will operate to print the numbers struck on the calculating machine keys, without in any wise interfering with the normal operation of the typewriter.

My invention places in reach of those who cannot afford the more expensive adding machines now generally equipped with a complete listing attachment, mechanism whereby more inexpensive adding machines such, for example, as those of the light or portable desk type may be equipped with listing or printing mechanism with slight additional cost, assuming that the owner of the calculating machine owns a typewriter, which is usually the case.

In order to more fully describe my said invention, reference will be had to the accompanying drawings wherein:—Figure 1, represents in front elevation a typewriter and calculating machine operatively connected with my invention; Fig. 2, a diagram of one arrangement of electric circuits which I employ in carrying out my invention; Fig. 3, a top plan view partly in section, looking down upon the special base for the typewriter, and showing in horizontal section, with parts broken away, a portion of a calculating machine connected thereto in accordance with one form of my invention; Fig. 4, a sectional elevation through the lower portion of the typewriter and my special base therefor, taken on line $4^{\times}$—$4^{\times}$ Fig. 3, looking in the direction of the arrows; Fig. 5, a fragmentary vertical section taken on line $5^{\times}$—$5^{\times}$ Fig. 3, looking in the direction of the arrow adjacent that line, and Fig. 6, an enlarged detail section on line $6^{\times}$—$^{\times}$ Fig. 5.

In the accompanying drawings, 1 represents a calculating machine of the general type shown in U. S. Patent No. 838,128, for example, wherein the registering dials are operated instantly upon the operation of a given key, which is preferable for the purposes of my invention to the heavier and less portable machines of the Burroughs type, though I do not wish to be understood as limiting my invention to any particular calculating machine.

In the calculating machine here shown, each key comprises a vertically movable stem 2, and these keys are arranged in a series of columns corresponding respectively to units, tens, hundreds, thousands, etc., there being ten keys in each column numbered 1 to 0 respectively, according to the common practice in this class of machines, and all keys bearing the same digits are arranged in transverse rows. The "0" keys on the calculating machine are merely for the purpose of causing the tyepewriter to print "0", and are therefore not connected to operate the calculating machine.

In the base of the calculating machine, I mount ten metal bars 3, which extend transversely across said base and lie each beneath an individual transverse row of said key stems and in alinement therewith, so that all of the "1" keys are in line with one of said bars, all of the "2" keys are in line with another of said bars, and so on. Each of these bars is insulated from the other and from the frame of the machine by being mounted upon insulated supports 4 fast to the sides of the calculating machine frame, as shown most clearly in Fig. 5.

For each key stem there is provided a special yielding contact consisting, in the case shown, of a metal plunger 5, located directly in the line of travel of its corresponding key stem and beneath the same so as to be engaged by the lower end thereof when the corresponding key is depressed in operation. Each of these plungers is mounted for vertical movement in an individual chamber 6 (see Fig. 6) in bars 3, and each plunger is provided with a shoulder or flange 7 normally held up against the limiting plate 8 by spring 9 in said chamber, said

spring bearing at one end against said shoulder and at its other end upon a screw 10 which forms the bottom of said chamber.

It might be stated, in passing, that the arm 11 on the side of the calculating machine is for resetting the dials after operation by the keys, and therefore does not correspond to the operating arm on the side of the machine of the Burroughs type, which are employed to actually operate the dials in performing the adding operation.

As operating in conjunction with this calculating machine, I have indicated, with many parts removed, a typewriter 12 in which the digit keys 13 are indicated in full lines in Fig. 1, and the other keys in dotted lines. The actual typewriter shown is an L. C. Smith. This form of typewriter, however, is selected merely for the purpose of illustration, it being understood that I do not limit my invention to any particular make of such machines.

For the typewriter, I provide a special base 14, preferably of wood. Upon this base is mounted four upright supports 15, each having an extension 16 of reduced diameter. These supports are so placed that their extensions 16 register each with a socket in the base of the typewriter. These sockets are found upon all standard makes of typewriters and are normally employed to receive rubber feet upon which the typewriter rests. Uprights 15 support the typewriter above the auxiliary base 14 so that the typewriter base will be about two inches above the auxiliary base.

Supported upon base 14, adjacent its rear end so as to lie in the rear of the typewriter, is a metal support 17 upon which is mounted a series of ten electro-magnets 18 of the solenoid type. Each of these magnets is provided with an armature core 19, and each of these magnets is pivotally connected to an individual lever 20, each of which is fulcrumed upon an individual bracket 21 fast to the base 14.

The end of each lever 20, on the other side of its fulcrum from its armature, is operatively connected to a separate digit key of the typewriter. In the specific mechanism here shown, this connection is effected with regard to all of the typewriter keys, except the "1" key, by the engagement of each lever 20 with a hanger 22 fast to the key lever of the typewriter key to be operated by the particular lever 20. Each of these hangers consists, in the case shown, of a metal strip bent upon itself and flared slightly at its upper end, as shown most clearly in Fig. 5. These flared portions embrace the typewriter key lever and are clamped thereagainst by means of a bolt and nut 23, 24. Each hanger 22 is provided with an elongated vertical slot 25, and as to each of these hangers, except the one connected to the "1" key of the typewriter, said slot is engaged by a right angle offset or extension on the end of its corresponding lever 20, such connection permitting the typewriter key lever to be operated independently of its key lever 20, but compelling the operation of the typewriter key lever by the downward movement of the end of the lever 20 connected thereto.

The operative connection between the "1" key lever of the typewriter and its corresponding key lever 20 is effected in a somewhat different manner from that above described, due to the particular position of the "1" key of the standard typewriter keyboard here shown, this position not permitting of such alinement as to employ the more direct connection between the typewriter key levers and levers 20, above described. In the case of the "1" key lever, the slot 25 of its hanger is traversed by an auxiliary lever 26 pivoted at one end upon a bracket 27 fast to the base 14, and having its other end connected, as shown most clearly in Fig. 3, to the outer end of a lever 20 by means of a pin 28 held in position by a spring clip 29.

It will be seen that the hangers 22 permit of ready connection to the key levers of the typewriter, without in any way altering said keys.

It will also be seen that when any one of the magnets 18 is energized, it will draw up the adjacent end of its corresponding lever 20, thereby depressing the other end of said lever and causing the operation of the corresponding key lever of the typewriter. Along the right hand edge of base 14 is arranged a series of metal contact plates 30. Each such contact is permanently electrically connected to one coil terminal of a separate one of the magnets 18, and said contacts are so disposed as to register each with an individual contact spring 31 fast to and in electrical engagement with individual metal bars 3 respectively, so that when the calculating machine is placed in the proper position alongside the typewriter supporting base 14, spring contacts 31 will rest each upon a separate contact 30.

For the purpose of readily connecting the typewriter and calculating machine in proper alinement so that said contacts will register, the calculating machine is provided with two flat lugs 32, fast to the casing thereof and adapted to engage respectively sockets formed in metal plates 33 fast to base 14.

The other coil terminals of all the magnets 18 are electrically connected to metal support 17, said support being provided with a binding post 34 from which electrical connection is made to one pole of the battery 35 or other suitable source of electric current. The other pole of this battery is electrically connected through a switch 36 to the frame of the calculating machine, so that all of the key stems

2 of the calculating machine may be simultaneously connected to the source of current through said switch. The electrical connections and circuits are clearly shown in diagram in Fig. 2.

It will therefore be seen that when any of the calculator keys in a horizontal or transverse row is operated, it will make electrical connection with its corresponding bar 3 and thus complete the circuit of the magnet 18 connected to that bar, and cause said magnet to operate the digit key of the typewriter corresponding to the digit key of the calculating machine operated. If it is desired to operate the calculating machine independently of the typewriter, switch 36 is opened, which breaks the connection from the calculating machine to the source of current. The typewriter, however, may be operated independently of the calculating machine while such switch is closed, as will be readily understood from the foregoing description.

One of the great advantages of this invention is the ease with which the calculating machine may be connected up to the typewriter for operating the same, it being necessary merely to set the calculating machine down alongside the typewriter, assuming that the typewriter has been placed upon the auxiliary base and connected to the levers 20, which may be very easily and expeditiously done.

It is not believed to be necessary to here enlarge upon the utility of operating a typewriter from a calculating machine, it being well understood that such use arises principally in cases where it is desired to make a list of the numbers and result entering a given calculation on the adding or calculating machine, and for billing purposes.

Having thus described a specific form of my invention, it should be understood that the same is susceptible to modification without departing from the spirit of my invention.

What I claim is:—

1. In mechanism of the class described, the combination with a supporting base, of a typewriter removably supported upon said base, a series of magnets mounted on said base, means to operatively connect said magnets to the printing mechanism of said typewriter, a calculating machine placed alongside said supporting base and having a plurality of rows of calculating keys, each row containing a series of keys corresponding to the same numeral, a series of electrical conductors individual respectively to said rows of keys and operatively associated therewith to close each an individual electric circuit, and a series of electrical circuits each including an energizing coil of one of said magnets and one of said conductors.

2. In mechanism of the class described, a calculating machine having a plurality of rows of calculating keys, each row containing a series of keys corresponding to the same numeral, and a series of electrical conductors individual respectively to said rows of keys and operatively associated therewith, each to close an electric circuit individual to each of said conductors on the operation of any key of a row corresponding thereto, a typewriter supporting base, a series of magnets mounted on said base, means to effect operative connection between said magnets and the printing mechanism of a typewriter placed upon said base, a series of electrical contacts located upon said base adjacent one of its side edges and forming individual terminal connectors for said magnets, said magnet terminal contacts and said conductors being so arranged as to be brought into electrical contact respectively with each other when the said calculating machine and typewriter base are placed side by side.

3. In mechanism of the class described, the combination with a calculating machine having a plurality of rows of calculating keys, each row containing a series of keys corresponding to the same numeral, of a series of insulated metal bars individual respectively to said rows of keys, a series of yielding contact members carried by and in electrical engagement with each of said bars and operatively connected with said keys to close an electric circuit through the individual bars on the operation of any key of a row corresponding thereto, a typewriter supporting base, a series of magnets mounted thereon, means to effect operative connection between the said magnets and the printing mechanism of a typewriter placed upon said base, a series of electrical contacts located upon said base adjacent one of its side edges and forming individual terminal connectors for said magnets, and means to effect electrical connection between said insulated metal bars and said magnet terminal contacts individually by placing the calculating machine and typewriter side by side.

4. Mechanism for operating a typewriter from a calculating machine having a plurality of rows of keys each row containing a series of keys of the same numeral, and the numerals of the keys of any row differing from those of any other row, said mechanism comprising in combination with said keys a series of electrical conductors individual respectively to the said rows of keys and arranged to be brought into electrical connection with any key in its corresponding row when actuated to perform a calculating operation, a typewriter supporting base, a series of magnets supported thereon, a series of levers operated individually by the respective magnets, means to ef-

fect operative connection between said levers and the key levers of a typewriter placed upon said base, a series of electrical contacts located upon said base adjacent one of its side edges and forming individual terminal connectors for said magnets, and means to effect electrical connection between said electric conductors associated with the calculating machine keys and said contacts when the calculating machine and typewriter are placed side by side, a source of electricity and means for connecting said source in circuit with the energizing coils of said magnets and the said keys.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES F. MAYS.

Witnesses:
C. B. BULL,
E. G. MARSHALL.