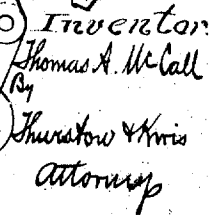


4 SHEETS—SHEET 1.



T. A. McCALL.
TYPE WRITER OPERATING MECHANISM.

APPLICATION FILED JUNE 4, 1910. RENEWED APR. 14, 1911.

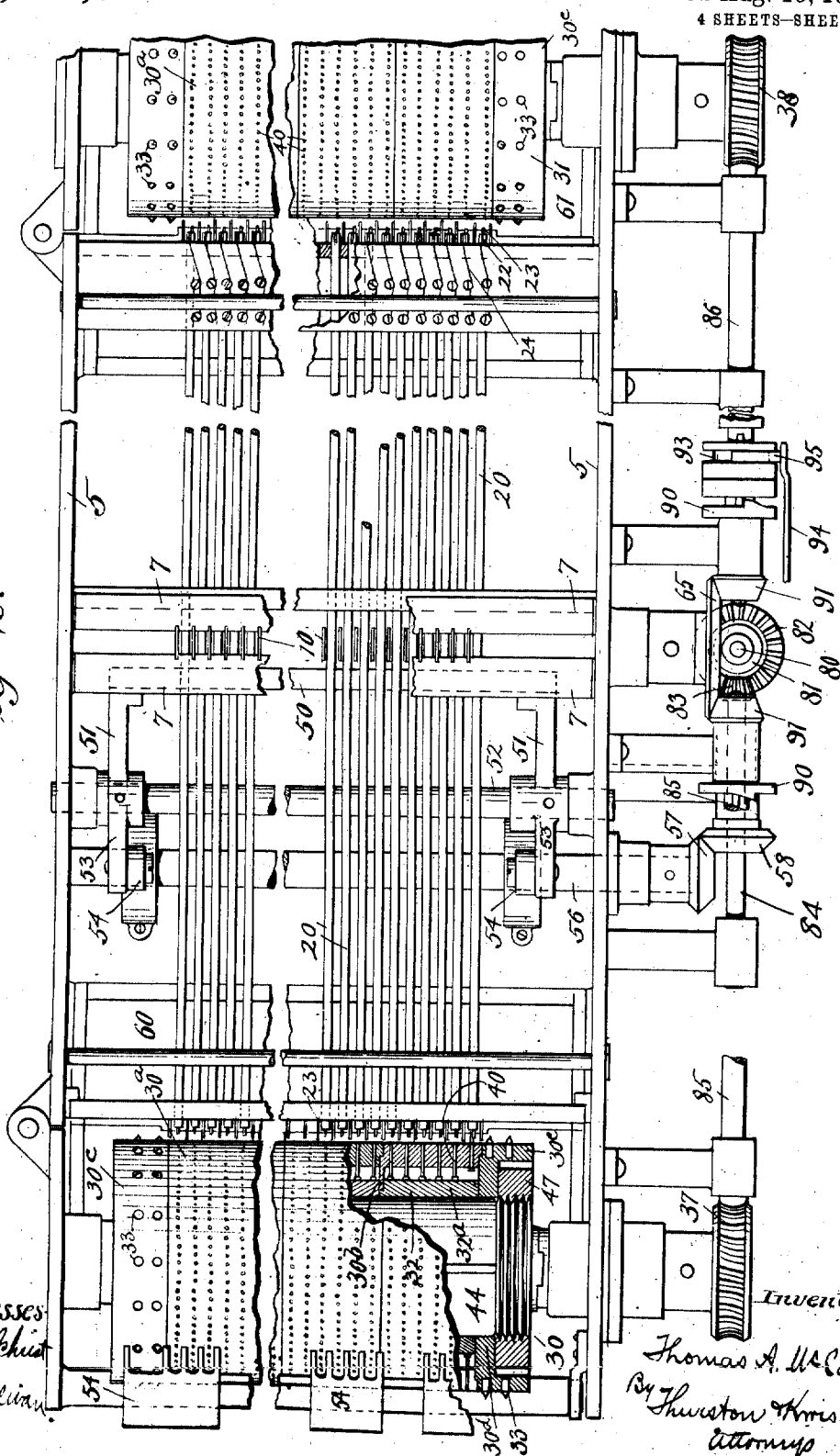
1,000,741.

Patented Aug. 15, 1911.

4 SHEETS—SHEET 2.

Fig. 2.

Witnesses
E. B. Schmitt
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Inventor:

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4 SHEETS-SHEET 3.

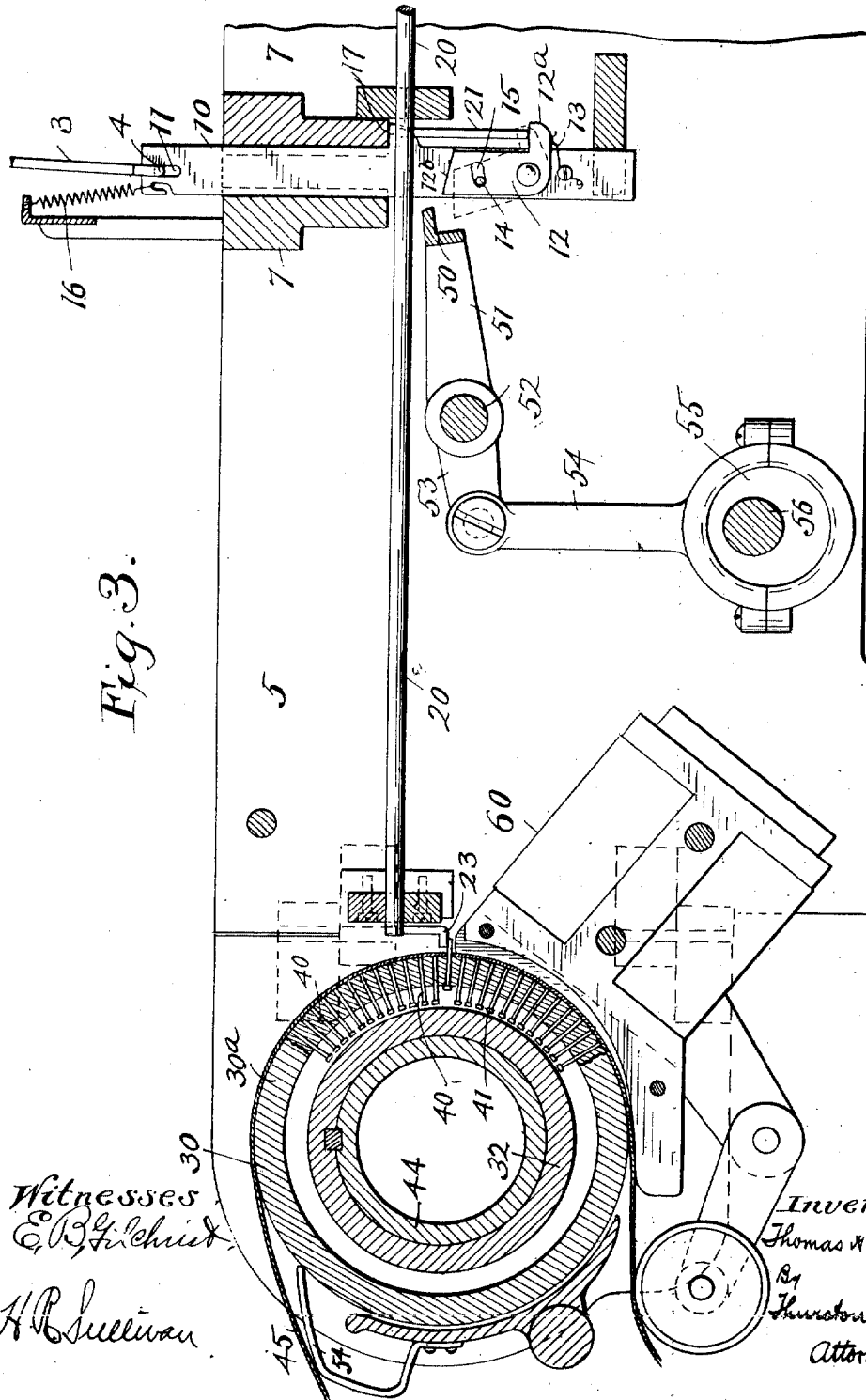


Fig. 3.

Witnesses
 E. B. Gilchrist
 H. P. Sullivan

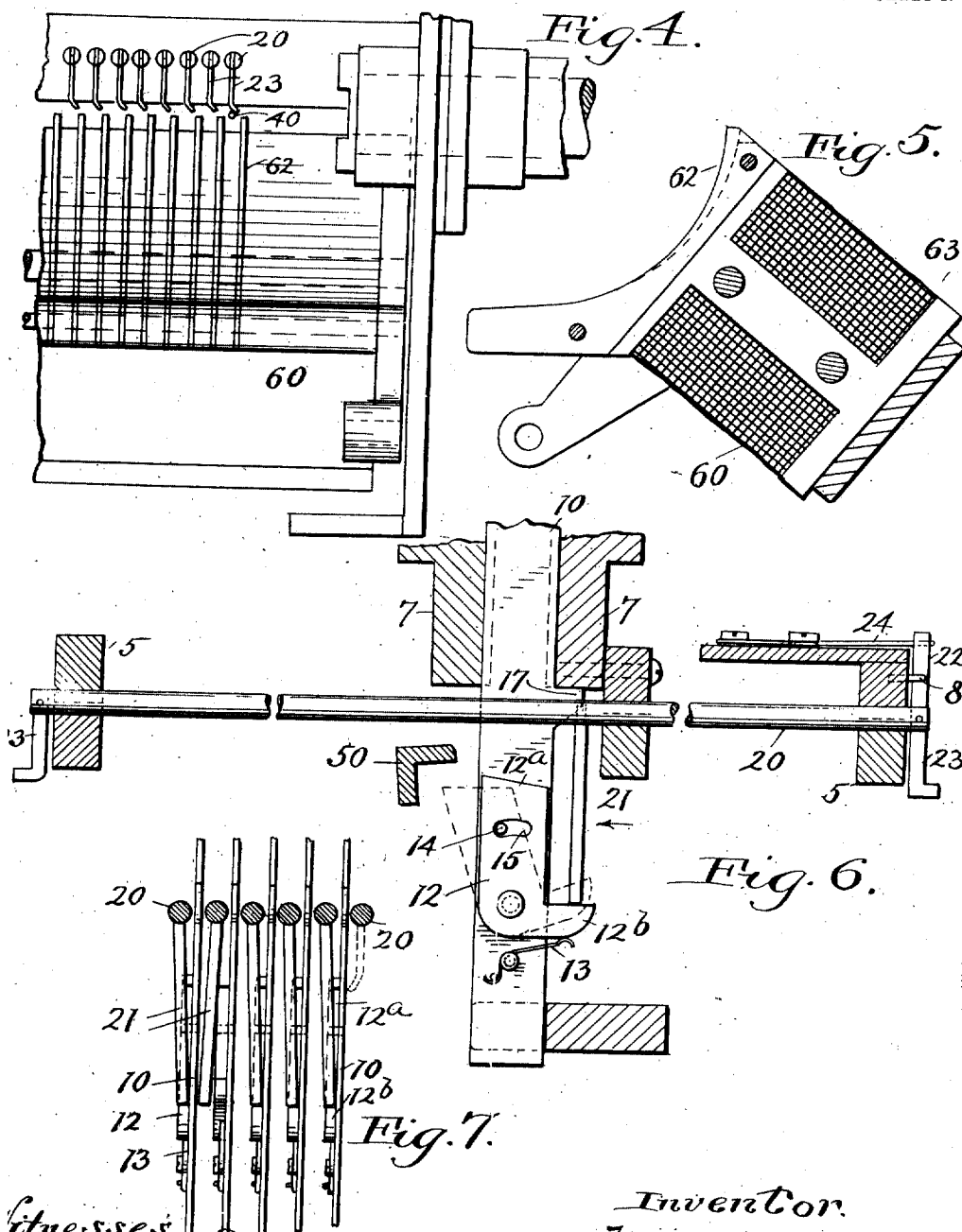
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4 SHEETS-SHEET 4.



Witnesses
B. Gilchrist
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UNITED STATES PATENT OFFICE.

THOMAS A. McCALL, OF COLUMBUS, OHIO, ASSIGNOR TO THE AUTOMATIC TYPEWRITER COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

TYPE-WRITER-OPERATING MECHANISM.

1,000,741.

Specification of Letters Patent. Patented Aug. 15, 1911.

Application filed June 4, 1910, Serial No. 564,955. Renewed April 14, 1911. Serial No. 621,129.

To all whom it may concern:

Be it known that I, THOMAS A. McCALL, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented a certain new and useful Improvement in Type-Writer-Operating Mechanism, of which the following is a full, clear, and exact description.

This invention consists of novel means, whose selective operation is controlled by perforated jacquard strips, for automatically operating, in proper sequence, the levers and other parts of a typewriter; to the end that such typewriter may print letters which are duplicates except that each has printed upon it a distinctive address.

The invention is shown in the accompanying drawing and is hereinafter described and definitely pointed out in the claims.

In the drawing, Figure 1 is a side elevation of mechanism embodying the invention. Fig. 2 is a plan view of such mechanism with the typewriter and its parts removed. Fig. 3 is a full size sectional side elevation of the front part of said mechanism. Fig. 4 is a front view of the right side of the mechanism showing particularly the magnet and the front ends of some of the rock shafts 20. Fig. 5 is a sectional view of one of the magnets. Fig. 6 is a sectional side elevation of one of the rock shafts 20 and the mechanism whose operation is controlled thereby. Fig. 7 is a view looking in the direction of the arrow on Fig. 6 of some of the slides 10 and associated mechanism.

The typewriter frame 1, a part of which is shown in Fig. 1, is secured upon brackets 6 which are rigid with the supporting frame 5 of the operating mechanism. Associated with each typewriter lever 2 and located below the same is a thin slide bar 10 which is vertically movable in guide grooves in transversely extended bars 7, 7, which are parts of the operating mechanism framework. Links 3 connect the slides 10 severally with the associated typewriter levers 2, or other mechanism to be operated. The pivot 4 at the lower end of each link 3 goes through a vertical slot 11 in the slide 10, and normally lies in the upper end of this

slot. This permits the manual depression of the typewriter keys without moving any of the operating mechanism.

Associated with each slide is a horizontal rock shaft 20 which extends forward and backward from the slide,—the ends of said rock shaft adjacent to the two trip-carrying cylinders 30, 31, to be presently referred to. It will be understood that there are as many of the slides 10 as there are levers 2, or other mechanism in the typewriter to be operated by slides 10; that the slides are located side by side and in a transverse row; that there is an equal number of the rock shafts 20; and that these rock shafts pass between adjacent slides.

Pivoted to each slide 10 is a trigger 12 which is in the form of a bell crank lever having a vertical arm 12^a and a horizontal arm 12^b. A spring 13 acting on this trigger exerts a force tending always to rock said trigger into a position (shown by dotted lines in Fig. 6) determined by a stop pin 14 fixed to the slide and going through a slot 15 in the trigger. The trigger, however, is normally restrained from being swung by this spring, and is held in a position in which its vertical arm does not project beyond the vertical edge of the slide, by the engagement with the horizontal arm of said trigger of a finger 21 which is fixed to and projects down from the associated rock shaft 20.

Just in front of all the slides 10 is a depressor 50, which, in the form shown, is a horizontally extended bar fixed to two arms 51 which are in turn fixed to a transversely extended rock shaft 52. This rock shaft has at each end a third arm 53 to which are pivoted the eccentric straps 54. These straps embrace the rotatable eccentrics 55 fixed to a shaft 56, whereby the rock shaft 52 is continuously rocked, and the depressor 50 continuously vibrated up and down the required distances.

It will be understood that when any rock shaft 20 is rocked, the finger 21 attached thereto is withdrawn from its position above the horizontal arm 12^b of the trigger, as shown by the second finger from the left in

Fig. 7. The trigger is thereupon swung by its spring 13 so that the upper end of its vertical arm 12^a passes beneath the depressor. During the next downward movement of the depressor the associated slide 10 is moved down, and it, through the link 3, operates the associated typewriter lever 2. In the meantime said rock shaft 20 has been released by the mechanism which rocked it, and a spring 24 returns it to its normal position (determined by the engagement of a finger 22 with a fixed pin 8) in which position its finger 21 is directly over the horizontal arm of the trigger. When the depressor moves upward, a spring 16 moves the depressed slide upward to its normal position, determined by the engagement of a shoulder 17 with one of the bars 7. During this upward movement of the slide the horizontal arm of the trigger strikes the finger 21, and the trigger is drawn back to its normal position.

Any of the rock shafts 20 may be rocked by trips 40 carried by either of two rotatable transversely extended cylinders 30 and 31. One of these cylinders is at the front of the machine, and the other is at the rear of the machine,—both being adjacent to the proximate ends of the rock shafts 20. In each of these cylinders are circumferential rows of radial holes. In each hole is a freely movable trip 40. These trips are pins, and each has a head 41 on its inner end to limit its outward movement. There is also within each of the cylinders 30 and 31 a concentric cylinder 32 which limits the inward movement of said trips.

Two properly perforated jacquard strips 45, 46, go over the two cylinders 30, 31, respectively. Prongs 33 on the cylinders engage in perforations near the edges of the strips and draw said strips along as the associated cylinders are turned. Associated with these two cylinders respectively are the electro-magnets 60, 61, which are substantially as long as the cylinders. The magnet 60 is located close behind the cylinder 30; and the magnet 61 is located close in front of the cylinder 31; and the ends of the cores of said magnets adjacent to the cylinders, are curved (but not concentrically with the cylinders), so that for a considerable distance they are close to the surface of the cylinders. These magnets are always energized, and they are always exerting a force tending to pull the trips 40 (which are made of steel) outward through holes in the associated jacquard strips. The strips, however, normally prevent this action, but when any trip comes opposite a perforation in the strip, that trip is drawn outward; and this carries its outer end to a position where, as the cylinder rotates, it will, as it moves upward with the cylinder, strike the beveled lower end of an arm 23 fixed to the end of

the associated rock shaft 20, and thereby said rock shaft will be rocked with the results heretofore described. It is to be understood that one of these operating arms 23, with a beveled end, is attached to each end of each rock shaft. It does not matter, therefore, whether one cylinder or the other is in rotation. The same rock shafts may be selectively operated by the described trips of either cylinder, and the same results will follow.

In order that the jacquard strips 45, 46, may not stick to the cylinders over which they run, the combs 54 are provided. These are fixed in position, but overhang the cylinders—their ends being close to the surfaces thereof so as to insert themselves between the paper and the cylinder and thereby guide the strips away from the cylinders as the latter turn.

It will be understood that the two cylinders 30 and 31 are to be rotated consecutively and not simultaneously. In the construction shown for accomplishing this result there are two shafts 85 and 86 mounted in suitable bearings; and these shafts carry the two worms 87 and 88, which respectively engage and operate worm wheels 37 and 38 fixed to the two cylinders 30 and 31. Suitable clutch mechanism may be employed for connecting either shaft to the source of power. As shown, a jaw clutch member 90 is rotatively mounted on each of these shafts. It has no longitudinal movement, but it does carry a beveled gear 91 which meshes with a beveled gear 65. On each of the shafts 85 and 86 is a longitudinally movable jaw clutch member 92 having a circumferential groove 93. A clutch operating bar 94 is provided at its ends with pins 95 which respectively engage in these grooves. This bar is pivoted to the upper ends of two parallel levers 96, to either of which power may be applied for moving the clutch operator with the result of either opening both clutches, or of closing either and opening the other.

The gear 65 meshes with the gear 81 on the main driving shaft 80. A gear 82 fixed to the same driving shaft meshes with a beveled gear 83 fixed to a shaft 84 to which also is secured a beveled gear 58 meshing with a beveled gear 57 fixed to the eccentric shaft 56.

The particular mechanism above described for turning the two cylinders consecutively and for imparting the rotary motion to the other parts described is the product of mechanical skill merely, and may be superseded by any other mechanism adapted to produce the stated results. When the mechanism which has been previously described and which constitutes the invention defined by the appended claims is a part of a machine having other functions to per-

form than merely those which have been described, it is probable that the clutches described will be operated automatically, but such automatic mechanism is not shown because it is not at all essential to the present invention, which would operate equally well if the clutches were shifted by hand.

As previously stated, the magnets 60 and 61 are continually exerting their attractive force upon the trip pins tending to draw them outward. In order to insure that the outward push of a great number of such magnetically attracted pins shall not push the jacquard strips away from the surface of the cylinders, each magnet is provided, on its end adjacent to the associated cylinder, with a plurality of thin projecting ribs 62 which are disposed between the rows of trip pins with their outer edges close to the surface of the cylinder and approximately concentric therewith. These ribs limit the possible outward movement of the jacquard strips, and keep them in proper engagement with the cylinder. At the same time they do not at all interfere with the required outward movements of the trip pins. Preferably these ribs are formed by thin plates of brass clamped between the front edges of the soft iron laminations or plates, of which the cores of the magnets are composed.

It has not been easy to arrive at a construction of the cylinders 30 and 31, such that the trip pins could be easily placed in the many holes of said cylinder in association with the concentric inner cylinder 32 for keeping them from dropping inward. In the construction shown, however, this result is attained. Each of these cylinders is made of a plurality of short longitudinal sections, which, when assembled, are keyed upon a central shaft 44. Each section comprises the outer cylindrical member 30^a and the inner concentric member 32. Each outer section is provided at one end with a cylindrical flange 30^b which is fitted into a rabbeted groove in the end of the associated inner section 32. The end members 30^a of the cylinder have inwardly directed flanges 30^a which are likewise keyed upon the shaft 44; and two nuts 47 (only one of which is shown, and that in Fig. 2) are screwed upon the threaded parts of the shaft 44, thereby clamping the several cylinder sections together to form a rigid structure.

Having described my invention, I claim:

1. In typewriter operating mechanism, the combination with a typewriter lever, of a slide, means connecting it with said lever, a trigger which is carried by said slide and is movable automatically when released into the path of the depressor, a rock shaft having a finger which normally engages said trigger and holds it in an inoperative position, a vibrating depressor adapted to engage the trigger when released, and means for

rocking said rock shaft in the trigger releasing direction, and means for returning said rock shaft to its normal position.

2. In typewriter operating mechanism, the combination with a typewriter lever, of a slide, means connecting it with said lever, a spring actuated trigger carried by said slide, a rock shaft having a finger which normally engages said trigger and holds it in an inoperative position, a vibrating depressor adapted to engage the trigger when released, an arm fixed to said rock shaft and having a beveled end, a rotating cylinder carrying a circumferential row of trips, each of which, when projected, is adapted to engage the beveled end of said arm and thereby rock the rock shaft, means tending to compel the outward movement of said trips, to the operative position, and a jacquard strip traveling on and with said cylinder and adapted to prevent the outward movement of said trips, but having perforations which when alined with a trip will permit its outward movement to operative position.

3. In a typewriter operating mechanism, the combination with a typewriter lever, of a slide, means connecting it with said lever, a spring actuated trigger carried by said slide, a rock shaft having a finger which normally engages said trigger and holds it in an inoperative position, a vibrating depressor adapted to engage the trigger when released, two arms attached respectively to opposite ends of said rock shaft, two rotatable cylinders placed respectively adjacent to the operating arms on said rock shaft, each of said cylinders having a circumferential row of trips adapted when moved outwardly to engage the adjacent rock shaft arm and rock the rock shaft, jacquard strips running respectively over said cylinders and normally holding the trips in inoperative position but having perforations through which said trips may be drawn into operative position, and means for drawing the trips through said perforations.

4. In typewriter operating mechanism, the combination of lever operating devices, means respectively connecting them with the levers of a typewriter, a vibrating depressor, a trigger carried by each lever-operating device and adapted to move automatically into the path of said depressor, devices normally restraining such movements of the triggers, a perforated jacquard strip, and mechanisms whose selective operation is controlled by said jacquard strip for operating said restraining devices in the trigger releasing directions.

5. In typewriter operating mechanism, the combination of a plurality of slides each carrying a movable spring-actuated trigger, a plurality of rock shafts associated respectively with said slides and each having a finger which normally engages the trigger

of the associated slide and holds it in an inoperative position, a perforated jacquard strip, means controlled by said strip for selectively rocking said rock shafts in the trigger releasing direction, and a vibrating depressor which will engage the released trigger and move the associated slide.

6. In typewriter operating mechanism, the combination with a typewriter lever, of a slide, means connecting said slide with said typewriter lever, a trigger mounted on said slide, a rock shaft, means operated by the rock shaft for holding the trigger in an inoperative position, two sets of mechanism for turning said rock shaft in the trigger releasing direction, means for operating either set of said rock shaft operating mechanisms, and a vibrating depressor adapted to engage a released trigger and move it and the slide which carries it.

7. In typewriter operating mechanism, the combination with a typewriter lever, of a slide, means connecting said slide with said typewriter lever, a trigger mounted on said slide, a rock shaft, means operated by the rock shaft for holding the trigger in an inoperative position, two sets of mechanism for turning said rock shaft in the trigger releasing direction, means for operating either set of rock shaft operating mechanisms, a vibrating depressor adapted to engage a released trigger and move it and the slide which carries it, and mechanisms for returning the rock shaft the slide and the trigger to their normal positions.

8. In typewriter operating mechanism, the combination with a typewriter lever, a vertically movable slide, means connecting the slide with said lever, a spring actuated trigger in the form of a bell crank lever pivoted to said slide, a spring actuated rock shaft having a finger which normally engages the horizontal arm of said trigger and holds said trigger in an inoperative position against the action of its spring, a jacquard strip, means controlled by said jacquard strip for rocking said rock shaft in opposition to its spring whereby said trigger will be released to the action of its spring, and a vibrating depressor adapted to engage the released trigger.

9. In typewriter operating mechanism in combination with a typewriter lever, a vertically movable slide having in it a vertical slot, a link connecting the lever and slide, a trigger having a slot and pivotally mounted on the slide with connection thereto allowing of a limited range of movement, the latter connection being a pin which lies in said slot, a perforated jacquard strip, and means controlled thereby for operating said slide.

10. In typewriter operating mechanism, the combination of a cylinder carrying a plurality of circumferential rows of trips,

a jacquard strip running over said cylinder for preventing or permitting the outward movement of said trips to operative position, a magnet placed adjacent to the surface of said cylinder and exerting its attractive force to move the trips outward, said magnet being provided with ribs projecting toward the cylinder in planes intermediate of the rows of trips, and the edges of said ribs lying close to the surface of said jacquard strip.

11. In typewriter operating mechanism, the combination of a cylinder carrying a plurality of circumferential rows of trips, a jacquard strip running over said cylinder for preventing or permitting the outward movement of said trips to operative position, a magnet placed adjacent to the surface of said cylinder and exerting its attractive force to move the trips outward, said magnet being provided with ribs projecting toward the cylinder in planes intermediate of the rows of trips, and the edges of said ribs lying close to the surface of said jacquard strip, and means whose operation is selectively controlled by said trips for operating the levers of a typewriter.

12. In typewriter operating mechanism, the combination of a cylinder having a plurality of rows of circumferential holes, a plurality of trip pins freely movable in said holes and having heads upon their inner ends to limit their outward motion, a cylinder within said perforated cylinder for limiting the inward movement of said pins, a magnet placed adjacent to said cylinder and exerting its magnetic force to draw said pins outward, a jacquard strip running over said cylinder to prevent or permit the outward movement of said pins, and mechanisms whose operations are caused by the projecting pins for moving the levers of said typewriter.

13. In typewriter operating mechanism, a rotatable cylinder comprising a central shaft and a plurality of longitudinal sections, each section consisting of an inner cylinder which is keyed to said shaft, and an outer cylinder having an inwardly directed flange which passes between the ends of adjacent inner cylinders, and means applying endwise clamping force to said sections to bind them into a rigid structure, each of said outer cylindrical sections having a plurality of circumferential rows of radial perforations, and each of said perforations containing a freely movable pin having a head on its inner end between the outer cylindrical section and the inner cylindrical section.

14. In typewriter operating mechanism, the combination of a rotatable cylinder having a plurality of circumferential rows of outwardly moving trips, means tending to move said trips outward to operative position

tion, a jacquard strip running over the cylinder and controlling said outward movement of the trips, and a comb whose teeth lie close to the surface of the cylinder immediately of said rows of trips, whereby it strips the jacquard strip from said cylinder as the latter turns.

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

THOMAS A. McCALL.

Witnesses:

E. L. THURSTON,
H. R. SULLIVAN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."