Oct. 27, 1931. R. VON REPPERT 1,828,755

TYPEWRITING MACHINE

Filed Nov. 10, 1928

Fig. 1.

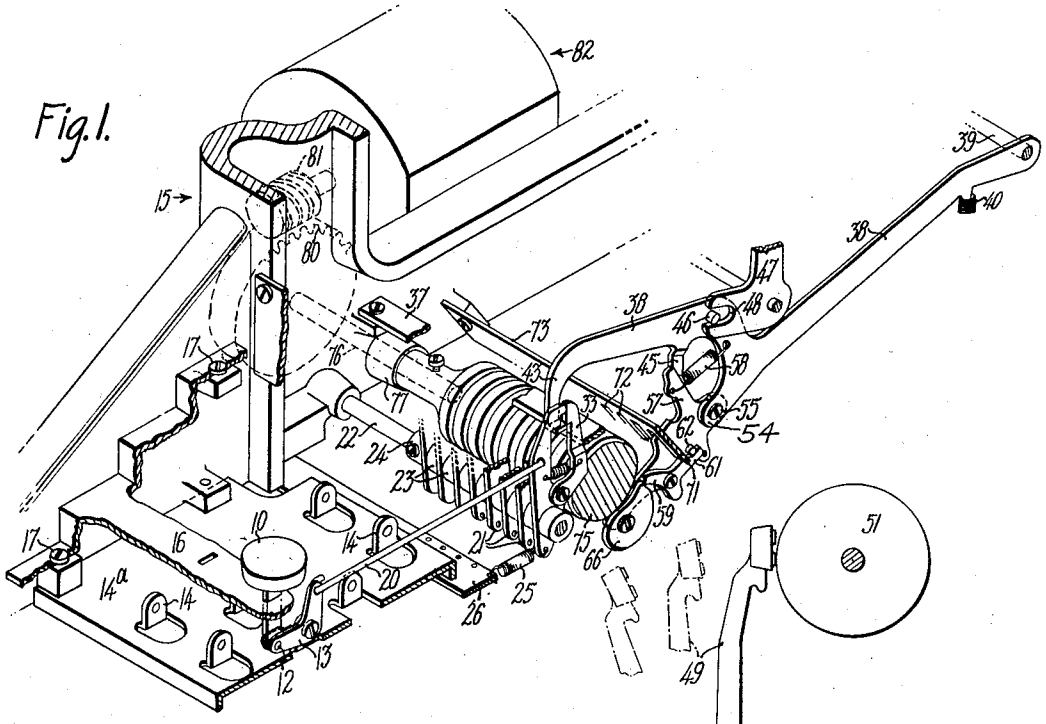


Fig. 3.

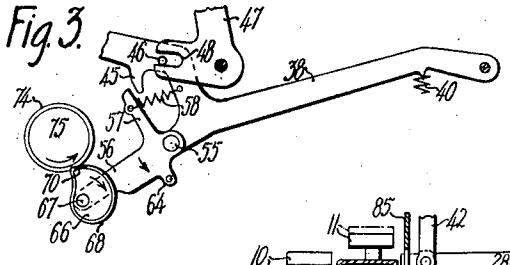


Fig. 2.

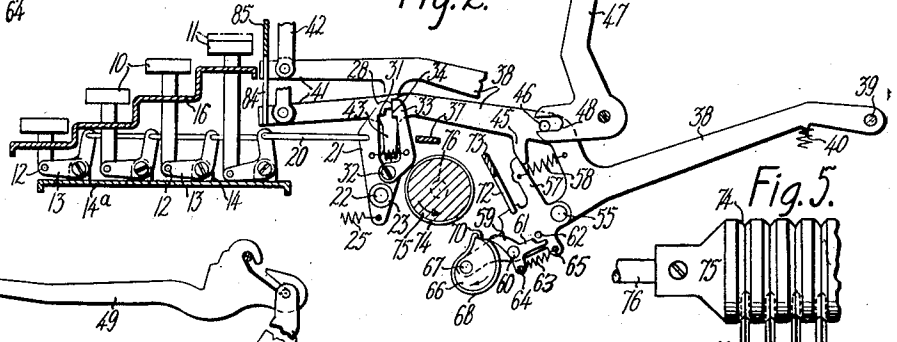


Fig. 4.

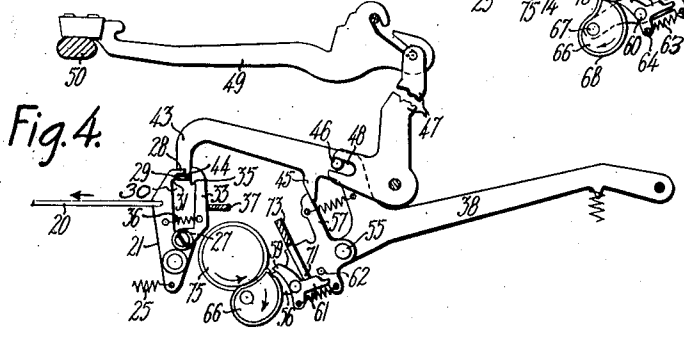


Fig. 5.

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UNITED STATES PATENT OFFICE

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TYPEWRITING MACHINE

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This invention relates to power-devices applicable to typewriters, and to combined typewriting and adding machines, and to other machines wherein type-bars or other devices are under control of keys to be selectively connected with the power-devices for actuation.

In this invention, means are provided which prevent damage to the typing or adding mechanism, in case of an accidental jamming of their parts. Should this occur, the actuating members will nevertheless be positively restored to normal positions, and manual resetting is avoided. These benefits result through the use of spring-couplings between the type-bars and power-devices. These springs will stretch when a "lock-up" occurs, and permit the actuated members to continue in motion independently of the jammed type-bars. For this reason, the type-bars are not bent or strained, and will function properly when restored. The component parts of this invention are simple, easy to manufacture, and are easily and inexpensively assembled. Furthermore, as they will not be broken when operated, the annoyance of delays and cost of repairs are eliminated.

In this invention, there is employed a rotating power-roller having a series of annular friction-grooves. The keys are selectively depressed for the purpose of connecting this power-roller with their type-bars. Each type-bar mechanism has a friction-cam, there being a row of cams which correspond with and underlie the grooves, and are normally disengaged therefrom. The depression of any key will cause the associated cam to connect its type-bar mechanism with said power-roller. Each cam has an operating spring, but is normally latched out of use. When a key is depressed, it releases a latch and allows the spring to force the cam into position for type-bar operation. During this movement, a detent on the cam-lever is tripped and released from a perimetral notch on the cam, which permits its rotation through frictional engagement with one of the grooves.

In the present machine, an upwardly-pressed main lever has a forward extension which is releasable by a key. The main lever carries a stop, and also a pivotal member having an arm held against the stop by a spring, which acts to unify the two members. The pivotal member also has an eccentrically-mounted friction-cam, which underlies a rotating power-roller. When a key is depressed, the cam is swung up through the operating spring of the main lever and engages said roller. The cam is thereupon frictionally rotated, and wedges down the main lever, which operates the associated type-bar. During the typing-stroke, the cam is rotated to normal disengaged position, after which the main lever is reset by its spring. Should there be a "lock-up" of the type-bar mechanism, the pivotal member will swing down through expansion of its unifying spring, and the cam will still be rotated to normal disengaged position, and will not have to be manually reset.

The automatic resetting of the cam is made possible through its elongated form, and because it is mounted off center. When the peripheral point on its longest radius has passed a dead-center line, the momentum of the rotating cam and its overbalanced weight throw it still further around, and the notch on its perimeter will be engaged by the detent carried on its cam-lever, and the cam will be reset.

After the cam has passed said dead-center position, the operating spring will raise the main lever until an offset ear thereon engages a stepping lever or latch pivoted on a latch-rocker. This stepping lever is spring pulled toward the rocker and will hold down the lever and maintain the cam in disengaged relation with said roller. When the key is released, the latch is rocked by a spring, which returns both the key and the rocker to normal positions. During this movement a stop on the rocker forces the stepping lever away from said ear and the latter rises slightly against a seat on the rocker, to be held thereby. The rising of main lever has concurrently restored its associated members, so all parts will again lie ready for subsequent operations.

In forming the rockers and stepping levers they are cut out to have abutting hooked ends

which leaves a space between the respective arms of the two members. It is within this space that the aforementioned offset ears are confined, the ears for this purpose being lateral projections on overhung forward portions of the main levers. When a key is depressed, the latch of the rocker slides off the ear and permits the latter to rise through spring-pressure. The ear slides up a face on the stepping lever and is not caught by the seat thereon, whereupon the associated cam is raised to engage the roller.

A feature of this invention resides in its simplified structure.

Another feature is embodied in the resilient connection between the cams and the main levers, whereby dangerous strains are avoided in case of a "lock-up", and the cams are permited to rotate to normal reset positions.

Another feature lies in the mounting of the cams on the main levers, whereby, as the associated type-bars move to complete their strokes through momentum, the cams will be disengaged from the power-roller, and will be left free to reset through their own momentum.

Other features and advantages will hereinafter appear.

In the accompanying drawings,

Figure 1 is a partial perspective view of a typewriter, and shows this invention attached thereto, with the parts as positioned before the key is depressed.

Figure 2 is a side elevation of parts of a typewriter having this invention associated therewith. In this view the main lever has been released through depression of the key, and the type-bar has struck the platen through momentum. Through the same force also the cam has revolved almost to reset position.

Figure 3 is a side elevation illustrating how the cam-lever will be independently swung down by the cam when the main lever gets jammed. As soon as the cam has passed the dead-center position shown, it will be rotated to normal reset position, and the cam-lever will also return to normal position through the action of its coupling-spring.

Figure 4 is a side elevation, and shows the position of the parts just after the key has been depressed. In this view the main lever has swung up slightly to engage the cam with a groove of the power-roller.

Figure 5 is a detail front-elevational view of part of the power-roller, and shows the relation between the grooves therein and the underlying cams.

Referring to the drawings, the character-keys 10 and the numeral-keys 11 are pivoted at 12 to bell-cranks 13, fulcrumed on upstanding ears 14, carried by a bed-plate 14ª on the main frame 15 of a typewriter shown partly in outline. The keys are guided by holes in an apron 16, attached to said main frame by screws 17. The bell-cranks 13 have links 20, which connect them to rockers 21 on a shaft 22, the latter being supported on said main frame.

The rockers 21 are separated by spacers 23, and are located as a unit by set-collars 24. Each rocker is connected by a contractile spring 25 to an anchorage 26, which is supported on the main frame 15. Said rockers have ears 27 and ends 28 which act as latching stops. Near said ends a portion of the rockers is cut out to form clearance spaces 29, while, between such spaces and the ears 27, the rockers are also cut away to form part of other clearance spaces 30. Said rockers also have seats 31 and studs or screws 32.

On the studs 32 are rockable stepping levers or latches 33 formed with faces 34 and latching seats 35. Said levers are also cut out to form the other part of the clearance spaces 30. Across the latter there are contractile springs 36, which are attached respectively to the rockers 21 and the stepping levers 33. A stop-bar 37, which is attached to the main frame 15, holds the connected keys, rockers and stepping levers, in normal positions through tension of the springs 25. Main levers 38 are fulcrumed at 39 and are held in normal positions by restoring springs 40. The main levers have forward extensions 41, which may be pivotally connected, by links 42, to a totalizer-mechanism, not shown. The main levers may also have over-hangs or depending arms 43, having lateral or offset projections 44, which are engageable by the rockers 21 and stepping levers 33. The main levers have stop-ears 45 and drive pins 46, which engage bell-cranks 47, having slots 48. The latter are slightly wider than the diameters of said drive pins, to permit lost motion for a purpose as will hereinafter appear.

The bell-cranks 47 actuate type-bars 49, to swing up from a rest 50 and strike against a platen 51, which is journaled in a usual carriage, not shown, that is mounted on the main frame 15.

The main levers have undershot extensions 54, fulcrum-studs 55, and cam-levers 56, which are pivoted thereon. The cam-levers have arms 57, which normally abut the stop-ears 45, through tension of springs 58. For such abutment, either said arms or said stop-ears may be offset slightly. The cam-levers carry pawls or detents 59, which are pivotally mounted on studs 60. The detents also have arms 61 that are engageable with stops 62, carried by said cam-levers. Contractile springs 63 link ears 64 on the detents with ears 65 on said cam-levers, to rock the arms 61 towards said stops 62.

At the forward ends of the cam-levers 56 are cams 66, which are rotatable on studs 67, carried by said levers. The cams are double beveled, to form wedge-shaped perimeters

68. Each cam has a notch 70 in its perimeter, which is engageable by its associated detent. The latter normally abuts a trip 71, there being a trip for each detent, which forms a series separated by slots 72. Said trips and slots form a comb-plate 73, which is attached to the main frame 15. Said slots 72 serve as guides for the cam-levers 56.

Each cam 66 is engageable with one of a series of annular grooves 74, formed on a power-roller 75. The latter has stub-shafts 76 at each end, of which only one is shown, and which are journaled in bosses as at 77. A gear-base, not shown, is also used and is attached to the main frame 15 by bolts or screws. One of said stub-shafts is connected to a worm-gear 80, which is driven by a worm 81. The latter in turn is driven by an electric motor 82, which is also attached to said main frame by bolts or screws. The forward extensions 41 of the main levers 38 slide in slots 84, in a front plate 85, which is attached to the main frame 15.

In operation, the depression of a key will rock the connected rocker 21 and slide the seat 31 from above the projection 44. This permits the spring-pressed main lever to rise, whereby the cam-lever will be raised, because the tension of the spring 58 holds the two members unified. The cam will then move toward engagement with one of the grooves 74. Concurrently with this movement of said cam, the trip 71 arrests the arm 61 and swings the detent 59 out of the notch 70. This leaves the cam free and it will engage a groove and be revolved by the rotating power-roller through friction.

As the cam is revolved arrow-wise, its spiraled perimeter wedges down the cam-lever, which operates the associated typing and adding mechanisms. The notch 70 may be varied somewhat as to depth and shape, and is not limited to the exact form shown in the drawings. Said notch is rotationally located adjacent the highest end of the cam, which end almost instantly passes the detent as the cam is rotated. The cam while operating the main lever is therefore not frictionally retarded by the detent, which for this purpose is held by the stop 62. The latter, however, permits the detent to lie in the path of the notch, which is engaged by the detent as the cam is rotated.

To avoid too heavy an impact of the type-bars against a work-sheet on the platen, which might perforate the paper, said type-bars are power actuated for only part of the printing stroke, and complete the latter through the momentum of themselves and associated members. This momentum also swings the cams out of contact with the power-roller, which leaves the cams free, and they will easily rotate and reset themselves through their own unretarded momentum. After the typing-stroke, the type-bars are returned through tension of the main levers.

The provision of momentum is made in order to provide a slight lost-motion connection between the main levers and the type-bars, after the latter have come to a stop on the rest 50. This lost-motion connection lies in the slots 48, which are wider than the diameters of the drive pins 46, whereby the latter can rise slightly without actuating the bell-cranks, and, for this reason, the main levers are not held down by the bell-cranks when released from the latches, but are free to rise slightly to engage the cams with the power-roller to be actuated thereby.

No provision need be made against a too rapid successive operation of the same key, because such operation would not affect the automatic resetting of the power-driven parts. If, therefore, a key is depressed before such resetting, no errors will result in the totals, and conventional locking devices are therefore unnecessary for the keys.

Figure 2 shows the several parts positioned as at the end of a typing stroke, where the projection 44 of the main lever 38 is near the bottom of the clearance space 30, and the free end of the rocker 21 engaging the free end of the latch 33 under the tension of the spring 36, and the latch 33 drawn forward away from the stop-bar 37. Under these conditions should the finger linger upon the depressed key, the return of the main lever 38 will raise the projection 44 until intercepted by the seat 35 on the latch 33 and held until the depressed key is released and the rocker and its latch restored by the spring 25 against the stop-bar 37. The return of the rocker 21 will rock the seat 35 clear of the projection 44, and said projection will be finally arrested by the seat 31 on the rocker, there being a slight drop from the seat 35 to the seat 31. In this manner, the latch 33 becomes a stepping latch for the main lever when the key is held depressed, but when the depressed key is immediately released in the usual manner of typing, the stepping latch is without utility.

The flexibility of the cam-levers 56 relative to their main levers provides that should two projected type-bars jam together, the bars will arrest themselves, and the consequent camming of the levers 56 will be absorbed by their springs 58, and no serious injury to the typing devices can result.

It will be noted that each connecting spring 58 is not only flexed for a main lever driving tension, so that a normal cam actuation of the lever 57 will not separate a normally tensioned lever from its stop 45, but the actuation of a heavier tensioned main lever 38 may cause the lever 57 to withdraw from the stop 45 to increase the normal tension of the spring 58 until the main lever has acquired a normal momentum; that under normal conditions, the flexed springs 58 function as positive con-

nections between the levers 57 and the levers 38; that under other conditions, as when two typing devices clash before reaching the platen and the two levers 38 are arrested before the completion of their typing depression, the two associated cam-driven levers 57 will complete their stroke and this excess of camming motion will be absorbed by the springs 58 and without strain upon the typing devices; that the cams 66 are rotatable about pivots eccentrically disposed thereto; that the disposition of the axes 67 of the cams 66, the notches 50 and the pawls 59 is such that a cam will roll off the roller 75 at the high spot of the cam, and through its momentum will complete its cycle to the pawl-arresting position; that the pawl-arresting position of the notches 70 is maintained at gravity due to the overhang of the spiral cam over its axis 67 towards its pawl 59; that at the normal release of the rotating cam 66 from the roller 75, the typing device is approximately at its typing position, and the lever 38 has vibrated its cam below the rotary field of the roller, and the cam by its acquired momentum has re-engaged its notch 70 with its pawl 59 before the depressed lever 38 has responded to its spring 40, and the restoration of the main lever cannot be impeded by cam interference; that the loose connection between each lever 38 and its bell-crank 47 provides for a pawl-engaging motion for the main lever 38 without vibrating the associated typing device; that the rocker 21 and its latch 33 are in vertical equipoise and require only a slight key-depression to vibrate them to release the main levers and only a slight spring to restore the keys; that the length of the extensions 54 may be varied to vary the leverage thereof to transmit different speeds to different typing devices; that the long leverage of the projections 44 on the main levers 38 provides for a light spring-pressure against the latches and a light key-pressure to release them; and that the comb-plate 73 guides the levers 57 to hold their cams 66 in alignment with the grooves 74 on the roller.

Variations may be resorted to within the scope of the invention, and portions of the improvements may be used without others.

Having thus described my invention, I claim:

1. Power-mechanism for typewriters and the like, comprising a constantly rotating power-roller, a series of main levers to actuate the typing devices connected thereto, an actuating lever pivotally connected to each main lever, a spring tending to hold the actuating lever in normal position against a stop on the main lever, actuating means mounted on the actuating lever and adapted to be cooperatively connected with the power-roller to be actuated thereby, and keys adapted to be selectively operated to connect the selected one of the actuating levers with the power-roller to transfer movement to the main lever through the spring and thereby actuate the typing devices.

2. Power-mechanism for typewriters and the like, comprising a constantly rotating power-roller, a main lever to actuate the associated typing device, a cam-lever pivotally mounted on the main lever, a spring tending to hold the cam-lever in normal position, a cam pivoted on the cam-lever and adapted to move the cam-lever when brought into contact with the power-roller, and key-operated means to bring the cam into contact with the power-roller to actuate the main lever through the medium of the cam-lever spring.

3. Power-mechanism for typewriters and the like, comprising a constantly rotating power-roller, a main lever to actuate the typing device, a cam-lever pivotally mounted on the main lever, a spring tending to hold the cam-lever in normal position against a stop on the main lever, a cam rotatably mounted on the cam-lever; a detent to hold the cam in normal rotary position, and a key adapted to be operated to connect the cam with the power-roller and to disconnect the detent from the cam, to thereby permit rotation of the cam and actuation of the main lever, through the medium of the cam-lever spring.

4. In a power mechanism for typewriting machines having a series of typing devices and a power-driven rotating roller to drive the typing devices, the combination of a series of swingable main levers, each lever having a restoring spring and each lever also having connections operable by the swinging of the lever to drive a typing device, a series of keys, each key having means operable to normally restrain a main lever against its spring, a lever swingably mounted upon each main lever, a cam rotatably mounted upon each swingable lever and engageable with the roller to be frictionally rotated thereby to drive its main lever, a peripheral notch in each cam, a detent mounted upon each cam-lever and spring-pressed into engagement with the cam and its notch to determine a normal position for the cam, and detent-releasing means common to all the detents and operable to vibrate a detent to release its cam when a key-released main lever moves the cam into engagement with the roller to drive the main lever.

5. In a machine of the character described, the combination of a rotating power roller, typing devices, main levers having connections to actuate the typing devices, levers pivoted on the main levers, cams eccentrically pivoted on said pivoted levers, spring for the main levers tensioned to move the cams into frictional engagement with the power roller, notches in the cams, detents pivoted on the cam-levers, springs to engage the detents with the notches, the detents having stop-arms, trips to engage said arms, keys, rockers

connected to the keys, springs to hold the keys and rockers in normal positions, and projections on the main levers engageable by the rockers and releasable therefrom when the keys are depressed, whereupon the main levers and their cam-levers will rise, the detents will be tripped from the notches, and the cams will engage the power roller to be rotated thereby to partially drive the typing devices, the latter completing their typing strokes through momentum, and this momentum moving the cams out of contact with the power roller, whereby the cams will be free to rotate through their own momentum until the detents re-engage the notches and hold the cams in normal reset positions.

6. In a machine of the character described, the combination of a rotating power roller, typing devices, main levers having connections to actuate the typing devices, levers pivoted on the main levers, cams eccentrically pivoted on said pivoted levers to be rotatively overbalanced, spring for the main levers tensioned to move the cams into frictional engagement with the power roller, notches in the cams, detents pivoted on the cam-levers, springs to engage the detents with the notches, the detents having stop-arms, trips to engage said arms, keys, rockers connected to the keys, springs to hold the keys and rockers in normal positions, and projections on the main levers engageable by the rockers and releasable therefrom when the keys are depressed, whereupon the main levers and their cam-levers will rise, the detents will be tripped from the notches, and the cams will engage the power roller to be rotated thereby to partially drive the typing devices, the latter completing their typing strokes through momentum, and this momentum moving the cams out of contact with the power roller, whereby the cams will be free to rotate through their own momentum to be checked by their detents, the overbalanced weight in the cams assisting the detents to hold the cams by gravity.

7. In a machine of the character described, the combination of a rotating power roller, typing devices, main levers having connections to actuate the typing devices, levers pivoted on the main levers, cams eccentrically pivoted on said pivoted levers, springs for the main levers tensioned to move the cams into frictional engagement with the power roller, notches in the cams, detents pivoted on the cam-levers, springs to engage the detents with the notches, the detents having stop-arms, trips to engage said arms, keys, rockable latches connected with the keys, springs to hold the keys and latches in normal positions, and projections on the main levers engageable by the latches and releasable therefrom when the keys are depressed, whereupon the main levers and their cam-levers will rise, the detents will be tripped from the notches, and the cams will engage the power roller to be rotated thereby to initially drive the typing devices, the latter completing their typing strokes through momentum, and this momentum throwing the cams free of the power roller, to quickly rotate through their own momentum to their detented positions before the main levers are restored by their springs, and the full restoration of the main levers not being retarded through interference between the power roller and cams.

8. In a machine of the character described, the combination of a rotating power roller, typing devices, main levers having connections to actuate the typing devices, levers pivoted on the main levers, cams eccentrically pivoted on the pivoted levers and having a spiral perimeter, springs for the main levers tensioned to move the cams into engagement with the power roller, notches in the cams, detents pivoted on the cam-levers, springs to engage the detents with the notches, the detents having stop-arms to abut stops on the cam-levers, trips to engage said arms, keys, rockable latches linked to the keys, springs to hold the keys and latches in normal positions, and projections on the main levers engageable by the latches and releasable therefrom when the keys are depressed, whereupon the main levers and their cam-levers will rise, the detents will be tripped from the notches to release the cams, and the cams will frictionally engage the power roller to be rotated thereby to initially drive the typing devices, the latter completing their typing strokes through momentum, and this momentum throwing the cams out of contact with the power roller, and, as only the spiral part of the periphery of the cams is engageable by the roller for a complete cycle of the cams, any slight variation in the inert positions of the cams will not prevent each cam properly functioning when rotated.

9. In a machine of the character described, the combination of a rotating power roller, typing devices including type-bars, main levers having connections to actuate the typing devices, a rest for the type-bars, bell-cranks connected with the type-bars, slots in the bell-cranks, the main levers having pins loosely engageable within said slots for a loss of motion, levers pivoted on the main levers, cams eccentrically pivoted on the pivoted levers, springs for the main levers tensioned to move the cams into engagement with the power roller, notches in the cams, detents pivoted on the cam-levers, springs to engage the detents with the notches, the detents having stop-arms to abut stops on the cam-levers, trips to engage said stop-arms, keys, rockable latches linked to the keys, springs to hold the keys and latches in normal positions, and projections on the main levers engageable by the

latches and releasable from the latches when the keys are depressed, whereupon the main levers and their cam-levers will rise, the detents will be tripped from the notches to release the cams, and the cams will engage the power roller to be rotated thereby, to operate the type-bars, said pin-and-slot loss of motion permitting the main levers to rise when released, so that the cams will engage the power roller to be rotated without disturbing the type-bars on their rest.

10. In a machine of the character described, the combination of a rotating power roller, typing devices, main levers having connections to actuate the typing devices, levers pivoted on the main levers to extend under the roller, cams eccentrically pivoted on the pivoted levers to underlie the roller, springs for the main levers tensioned to move the cams into engagement with the power roller, notches in the cams, detents pivoted on the cam-levers, springs to engage the detents with the notches, the detents having stop-arms to abut stops on the cam-levers, trips to engage with said arms, keys, rockable latches linked to the keys, springs to hold the keys and latches in normal positions, and projections on the main levers engageable by the latches and releasable from the latches when the keys are depressed, whereupon the main levers and their cam-levers will rise, the detents will be tripped from the notches, and the cams will engage the power roller to be rotated thereby to initially drive the typing devices, the latter completing their typing strokes through acquired momentum, and this momentum throwing the cams out of contact with the power roller, and the axes of the cams being below the axis of the power roller, the downward actuation of the main levers to separate the cams from the roller is assisted by gravity.

11. In a machine of the character described, the combination of a rotating power roller, typing devices, main levers having connections to actuate the typing devices, levers pivoted on the main levers to extend under the roller, cams eccentrically pivoted on the pivoted levers and below the roller, springs for the main levers tensioned to move the cams into engagement with the power roller, notches in the cams, detents pivoted on the cam-levers, springs to engage the detents with the notches, the detents having stop-arms to abut stops on the cam-levers, trips to engage with said arms, keys, rockable latches connected with the keys, springs to hold the keys and latches in normal positions, and projections on the main levers engageable by the latches and releasable from the latches when the keys are depressed, whereupon the main levers and their cam-levers will rise, the detents will be tripped from the notches, and the cams will engage the power roller to be rotated thereby by friction to depress the main levers, and the axes of the cams being below the axis of the power roller, the cam-levers may be swung down around their fulcrums independently of the main levers should the downward travel of the main levers be inadvertently arrested by the clashing of the typing devices.

12. In a machine of the character described, the combination of a rotating power roller, typing devices, main levers having connections to actuate the typing devices, levers pivoted on the main levers, cams eccentrically pivoted on the pivoted levers and having a spiral perimeter, springs for the main levers tensioned to move the cams into frictional engagement with the power roller, notches in the cams, detents pivoted on the cam-levers, springs to engage the detents with the notches, the detents having stop-arms to abut stops on the cam-levers, trips to engage with said arms, keys, rockable latches vertically disposed over their axes and connected with the keys, springs to hold the keys and latches in normal positions, and horizontal projections on the main levers engageable by the vertical latches and releasable from the latches when the keys are depressed, whereupon the main levers and their cam-levers will rise, the detents will be tripped from the notches, and the cams will engage the power roller to be rotated thereby to initially drive the typing devices, the latter completing their typing strokes through acquired momentum, and this momentum throwing the cams out of contact with the power roller and into engagement with their detents, the off-center weight of said spiral cams being nearly balanced over their fulcrums, a very light pressure on the keys will rock and release said cams to gravitate into contact with the roller, and the latches will be reset to latch the projections by very light springs.

13. In a machine of the character described, the combination of a rotating power roller, typing devices, main levers having connections to actuate the typing devices, levers pivoted on the main levers, stops on each main lever, a spring to tension each pivoted lever against a stop, cams eccentrically pivoted on the pivoted levers, springs for the main levers tensioned to move the cams into frictional engagement with the power roller, notches in the cams, detents pivoted on the cam-levers, springs to engage the detents with the notches, the detents having stop-arms to abut stops on the cam-levers, trips to engage with said arms, keys, rockable latches having connections to the keys, springs to hold the keys and latches in normal positions, and projections on the main levers engageable by the latches and releaseable from the latches when the keys are depressed, whereupon the main levers and their cam-levers will rise, the detents will be

tripped from the notches, and the cams will engage the power roller to be rotated thereby to initially drive the typing devices, the latter completing their typing strokes through acquired momentum, and this momentum moving the cams out of contact with the power roller and into engagement with their detents, the cam-levers to swing down independently of their main levers through the expansion of their springs, if the main levers or typing devices are arrested or retarded, whereby the connections to the typing devices will not be overstrained.

14. In a machine of the character described, the combination of a rotating power roller having grooves, typing devices, main levers having connections to actuate the typing devices, levers pivoted on the main levers, cams eccentrically pivoted on the pivoted levers to engage the grooves on the roller, springs for the main levers tensioned to move the cams into frictional engagement with the grooves of the power roller, notches in the cams, detents pivoted on the cam-levers, springs to engage the detents with the notches, the detents having stop-arms, a plate, slots in the plate, trips on the plate which alternate with the slots, the trips to engage with said arms, keys, rockable latches connected to the keys, springs operable to hold the keys and latches in normal positions, and projections on the main levers engageable by the latches and releasable from the latches when the keys are depressed, whereupon the main levers and their cam-levers will rise in said slots and the arms will be rocked by the trips, which releases the detents from the notches, and the cams will engage the power roller to be rotated thereby, to operate the associated typing device, the typing device will be restored independently of the depressed key, the slots acting as guides for the cam-levers, to hold the cams in proper alignment with the grooves in the roller.

15. In a machine of the character described, the combination of a rotating power roller, typing devices, main levers having connections to actuate the typing devices, levers pivoted on the main levers below the roller, cams eccentrically pivoted on the pivoted levers and below the roller, springs for the main levers tensioned to move the cams into frictional engagement with the power roller, notches in the cams, detents pivoted on the cam-levers, springs to engage the detents with the notches, the detents having stop-arms to abut the cam-levers, trips to engage with said arms, keys, rockable latches connected to the keys, springs to hold the keys and latches in normal positions, and projections on the main levers engageable by the latches and releasable from the latches when the keys are depressed, whereupon the main levers and their cam-levers will rise, the detents will be tripped from the notches, and the cams will engage the power roller to be rotated thereby to initially drive the typing devices, the latter completing their typing strokes through acquired momentum, and this momentum moving the cams out of contact with the power roller and into engagement with their detents, and the axes of the cams being below the axis of the power roller provides that variation in the lengths of the main levers supporting the cam-levers may be made to vary the leverage and oscillatory speed of the main levers, to transmit different speeds to different typing devices.

16. In a machine of the character described, the combination of a rotating power roller, typing devices, main levers having connections to actuate the typing devices that include type-bars, a rest for the type-bars, bell-cranks, slots in the bell-cranks, the main levers having pins loosely engageable within said slots for a loss of motion, levers pivoted on the main levers, cams eccentrically pivoted on the pivoted levers, springs for the main levers tensioned to move the cams into frictional engagement with the power roller, notches in the cams, detents pivoted on the cam-levers, spring to engage the detents with said notches, the detents having stop-arms to abut the cam-levers, trips to engage with said arms, keys, rockable latches connected to the keys, springs to hold the keys and latches in normal positions, and projections on the main levers engageable by the latches and releasable by the latches when the keys are depressed, whereupon the main levers and their cam-levers will rise, the detents will be tripped from the notches, and the cams will engage the power roller to be rotated thereby, to initially drive the type-bars, the latter completing their typing stroke through momentum, and this momentum moving the cams out of contact with the power roller, the pin-and-slot connection to the type-bars providing a loss of motion to the bell-cranks while the cams are being connected with the roller and a loss of motion to the main levers when the bell-cranks are driving the type-bars by momentum to type.

17. In a machine of the character described, the combination of a rotating power roller, typing devices, main levers having connections to actuate the typing devices, levers pivoted on the main levers, cams eccentrically pivoted on the pivoted levers, springs for the main levers tensioned to move the cams into frictional engagement with the power roller, notches in the cams, detents pivoted on the cam-levers, springs to engage the detents with the notches, the detents having stop-arms to abut the cam-levers, trips to engage said arms, keys, rockable latches connected to the keys, springs to hold the keys and latches in normal positions, and projections on the main levers engageable by

the latches and releasable by the latches when rocked by the keys, whereupon the main levers and their cam-levers will rise, the detents will be tripped from the notches, and the cams will engage the power roller to be rotated thereby to operate the typing devices, said projections having a long leverage on the operating springs of the main levers, whereby the upward pressure of the projections against the latches is slight, and a light pressure on the keys will release them.

18. In a machine of the character described, the combination of a rotating power-roller, keys, rotatable latches, the keys linked to the latches, springs to hold the latches in normal position against a stop, a front plate, slots in said plate, main levers, springs on the main levers, lateral projections on the main levers, the projections engageable by and releasable from the latches, extensions on the main levers, which slide in said slots, cam-levers on the main levers, a comb-plate, slots in the latter in which the cam-levers slide, and cams rotatably mounted on the cam-levers, the cams engageable with and frictionally rotated by the power-roller when the keys are depressed, whereupon the main levers are actuated and said forward projections slide in one set of slots, and said cam-levers slide in the other set of slots, two associated and separated parts of each main lever therefore sliding in unison, whereby torsion of the main levers is avoided, because both of said associated parts are guided in parallel planes, and binding of the main levers in the slots is avoided and makes their operation easier.

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