

June 7, 1932.

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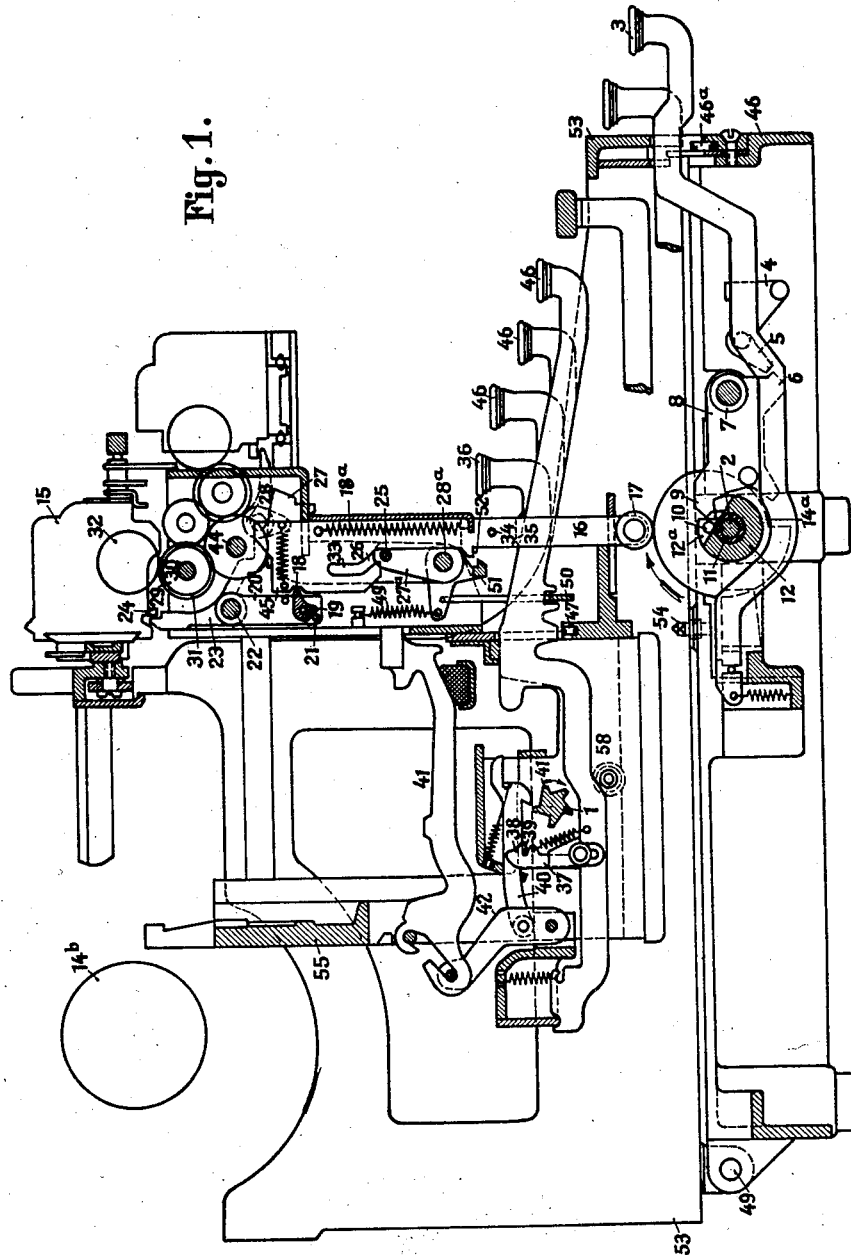
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CALCULATING TYPEWRITING MACHINE

Filed April 16, 1923

5 Sheets-Sheet 1

Fig. 1.



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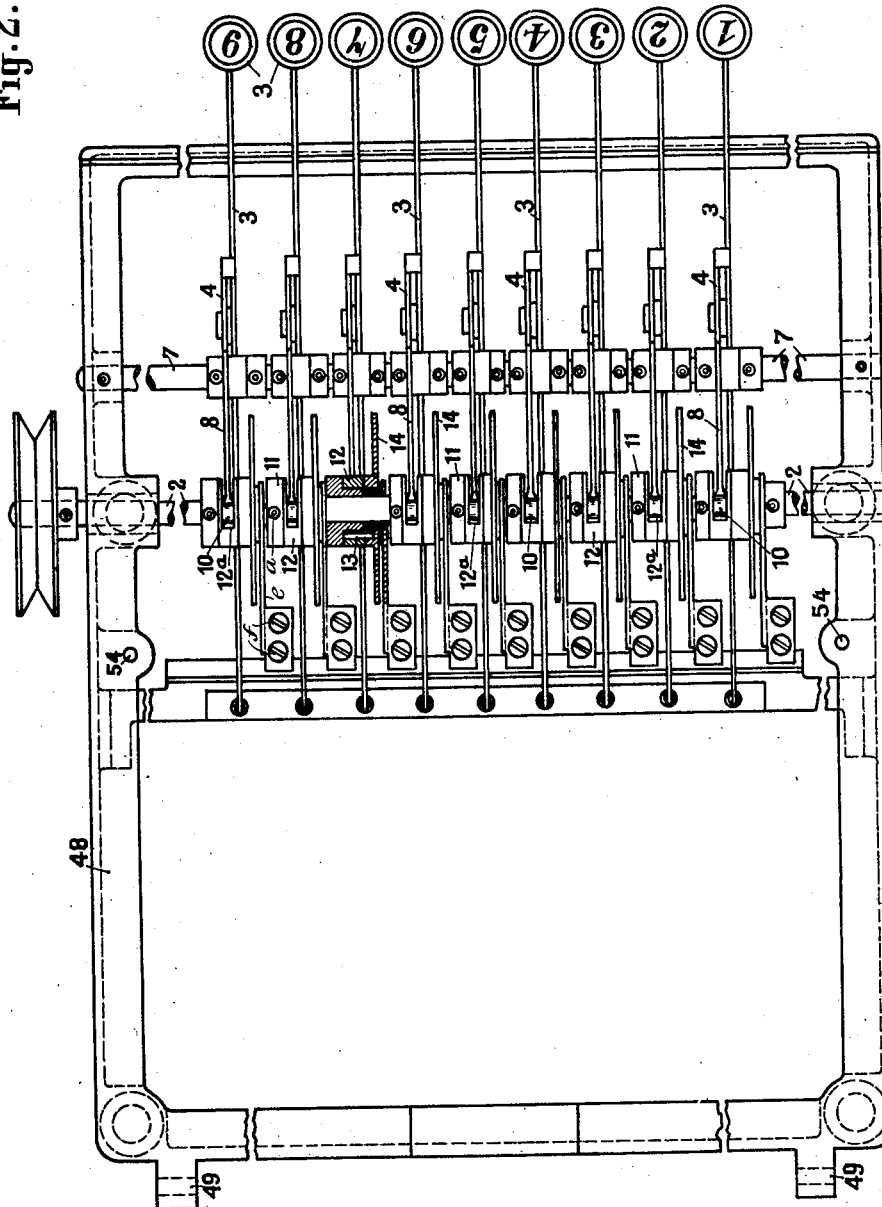
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CALCULATING TYPEWRITING MACHINE

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Fig. 2.



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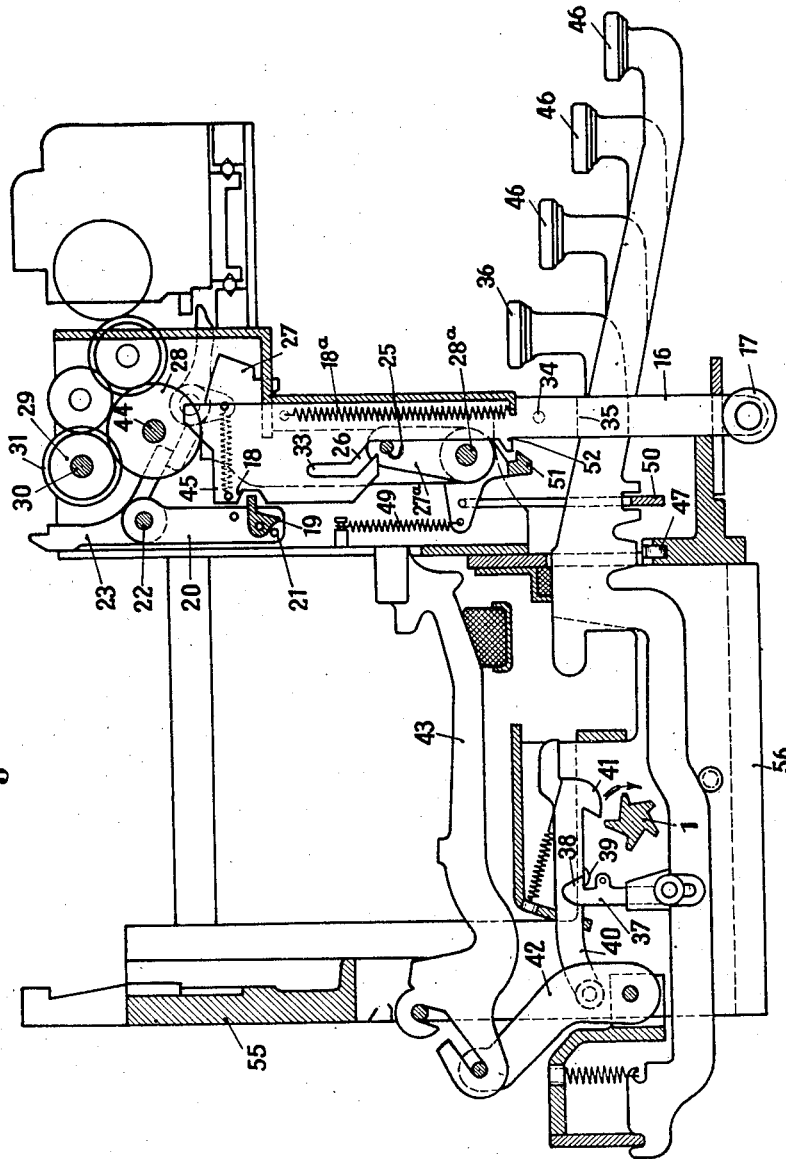
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CALCULATING TYPEWRITING MACHINE

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Fig. 3.



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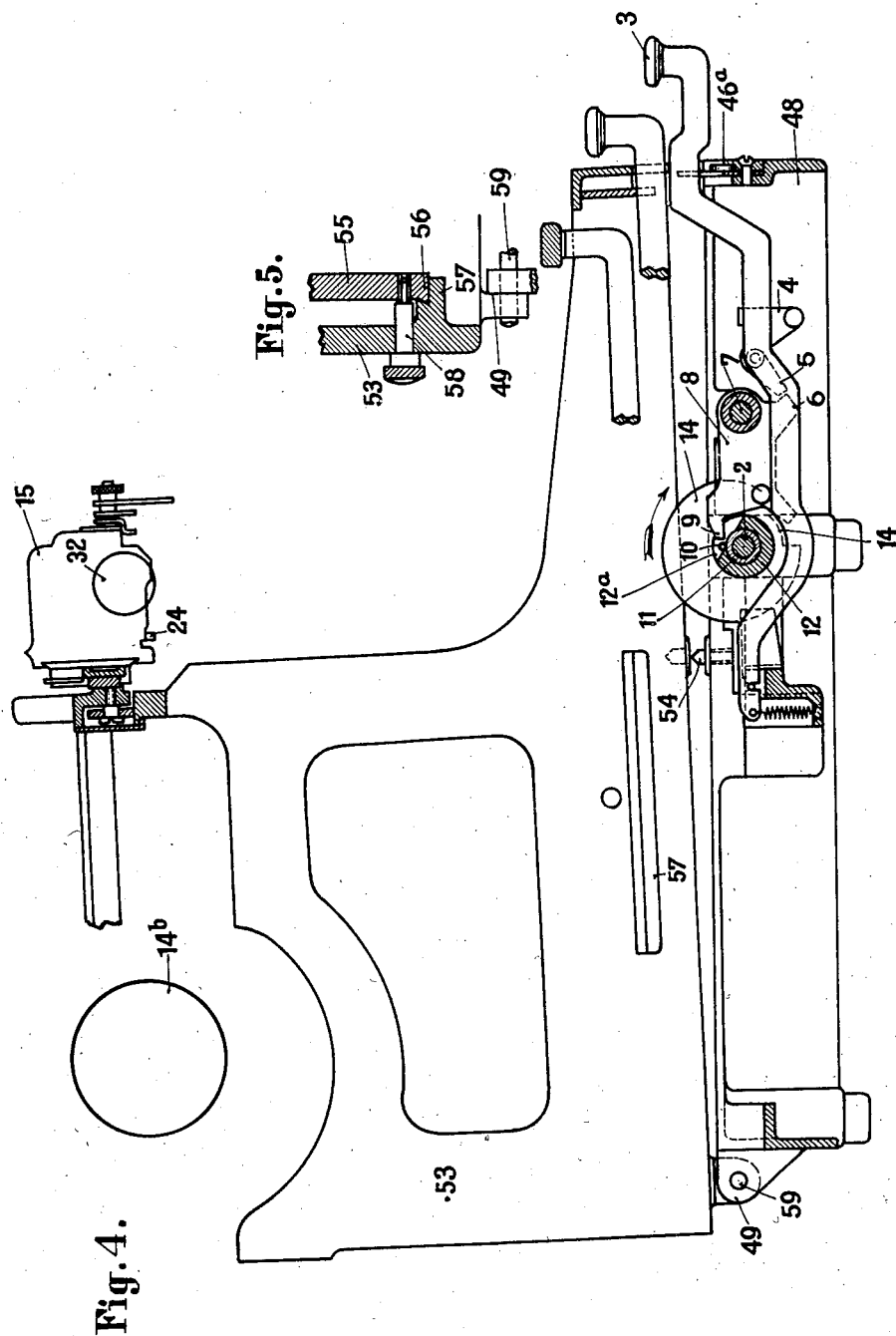
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CALCULATING TYPEWRITING MACHINE

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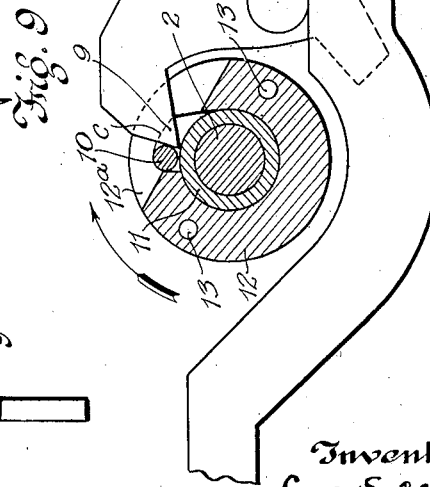
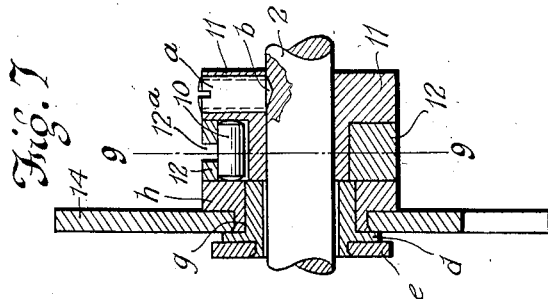
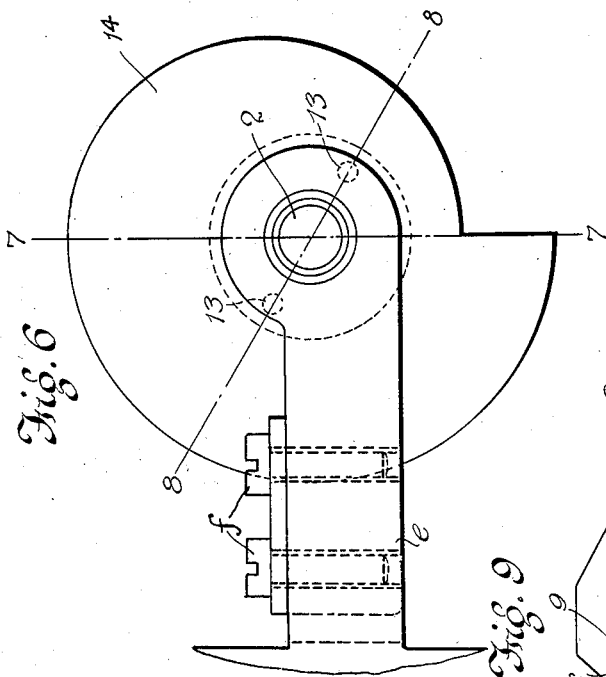
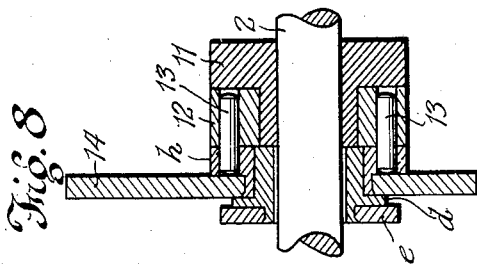
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CALCULATING TYPEWRITING MACHINE

Filed April 16, 1923

5 Sheets-Sheet 5



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CALCULATING TYPEWRITING MACHINE

Application filed April 16, 1923, Serial No. 632,480, and in Germany April 20, 1922.

This invention relates to a calculating typewriting machine. According to the invention the energy consuming work of the calculating and of the typewriting are carried out by mechanically driven continuously rotating elements. At the depression of a typewriting or calculating key the transmission members are coupled with the continuously revolving driving elements so that a light touch of the key with the shortest possible stroke and a secure working of the machine are secured. It is advisable to arrange the drive of the figure type bars so that it may be coupled to the latter by striking either the figure keys or the calculating type bars. The operation of the figure keys is effected only after the complete transmission into the calculating mechanism of the value registered by the calculating keys, in order to prevent a premature advance of the carriage and consequently a premature feeding of the calculating mechanism. The special driving member for the calculating mechanism arranged in a lower frame acts by a thrust motion upon the calculating mechanism which is arranged in the upper frame part on the typewriting machine.

Owing to this arrangement, on removing the typewriting machine per se from the casing of the calculating keys it is not necessary to disconnect special connecting rods and the type bar basket with the transmission means for the calculating mechanism can also be easily removed as a whole from the typewriting machine.

The locking, known per se, designed to prevent the operation of the calculating mechanism at the comma position is preferably also produced by interrupting the mechanical drive. In order to securely prevent the simultaneous depression of a figure or type-key and of a calculating key a member is used for the simultaneous locking of all the transmission elements of the calculating keys at the operation of a type or figure key so that the mechanical drive is interrupted. The pawl which serves in the well known manner for disengaging the feed-element of the continuously revolving driving shaft, acts directly upon a wedging roller known per se

and is controlled by the calculating key on the first part of the stroke of this key.

A preferred form of mechanism by which the invention is carried into effect is shown by way of example on the accompanying drawings, wherein:—

Fig. 1 shows the mechanism in cross section.

Fig. 2 is a plan view of the case for the calculating keys with the keys 1 to 9, the clutch elements and the driving element.

Fig. 3 shows the cage with the driving mechanism for the calculating mechanism.

Fig. 4 shows in cross section the machine on a reduced scale, the type cage being removed and the machine frame being shown slightly raised from the case of the calculating keys.

Fig. 5 shows in cross section the mounting of the cage.

Figure 6 is a side view of the clutch element on a larger scale;

Figure 7 is a section of Figure 6 on line 7—7;

Figure 8 is a section of Figure 6 on line 8—8; and

Figure 9 is a section of Figure 7 on line 9—9.

The machine is shown in Fig. 1 in the position of rest. The two driving elements 1 and 2 revolve constantly but they are adapted to be alternately stopped with the aid of convenient clutch members according to whether the machine is to be used for typewriting or for calculating.

On the constantly rotating shaft 2 (Figs. 4 and 6—9) is fixed a collar 11 by means of screw *a*, which engages a recess in the shaft. The clutch ring 12 is revolvably mounted on the collar 11 and is provided with a recess *c* eccentric to its axis. The clutch roller 10 lies normally free in this recess. The clutch ring is provided with a tangential recess 12*a*, which intersects the recess *c*. A collar *d* adjacent collar 11 is provided with a central aperture of such diameter that it does not contact with the shaft. A lever *e* supported from the frame 48 by means of screws *f* supports collar *d* and prevents its rotation. On the hub *g* of collar *d* is rotatably arranged

the collar *h*, which is coupled with the clutch ring 12 by means of pins 13 and which likewise carries the disc 14.

If a calculating key is depressed in order to bring a value into the calculating mechanism 15 and likewise on the paper which is arranged in the usual manner on the platen 14^b, the nose 5 of pawl 4 comes in contact with the nose 6 of the pawl 8 rotatably arranged on axle 7 so that pawl 8 is lifted. The nose 9 of pawl 8 thus releases the clutch roller 10 which now, carried along by its friction with the collar 11 rotating in the direction of the arrow, is wedged between the collar 11 and the top wall of recess *c*. In this manner disc 14, which is positively attached to the collar 12 is coupled with collar 11 and is forced in the rotation of the latter.

At the depression of a key 3 only one revolution of the corresponding disc 14 will take place, even if the key is held in depressed position, since nose 5 of the pawl 4 after a very short stroke glides over nose 6 of the pawl 8 so that nose 9 of the latter returns into the slit 12^a of the clutch ring before the rotation of the latter is completed and is thus in a position to intercept roller 10 whereby the coupling between disc 14 and the constantly rotating drive element 11 is interrupted.

A slide 16 having a roller 17 on its lower end which is pressed by the action of a spring 18^a against the cam 14 so that it works positively, descends at the rotation of cam 14 in accordance with the shape of this cam whereby, if a value has to be transferred to the counting mechanism 15, at the descent of the slide 16 at first the universal bar 19 is moved to the left by the cam edge 18 of the slide 16, said universal bar 19 being constructed like a pawl in cross section, pivotally connected with levers 20 (of which only one is shown) and stopped by pin 21 when rotating in downward direction. The lever 20 is keyed upon a rotatable axle 22 so that the axle is oscillated. On axle 22 a lever 23 is keyed also, which is thus oscillated to the right so that it comes in contact with the locking lever 24 of the counting mechanism 15 which it unlocks upon further oscillation so that the counting mechanism is released and prepared for the registering of a new value.

During the first working period the slide 16 has descended so far that the inclined slot 26 of the slide 16 has arrived near the rod 25. When the descending movement continues the inclined slot 26 of the slide 16 slides along said rod 25 and as the rod 25 is rigidly connected with the toothed segment 27 and with the lever 27^a, this toothed segment, the lever 27^a and the rod 25 are rocked, all together, around a common axle 28^a. The toothed segment 27 is in gear with the toothed

wheel 28 keyed on shaft 44 so that this shaft is rotated. A second toothed wheel of the same diameter as toothed wheel 28 is loosely mounted on shaft 44 and adapted to be coupled with said shaft by means of a convenient ratchet device if the shaft rotates in one direction, but to be uncoupled if the shaft rotates in the opposite direction. This loose toothed wheel meshes with a toothed wheel 29 keyed on axle 30. On this axle 30 a toothed wheel 31 is further arranged which transmits the movement imparted by the toothed segment 27 to the driving wheel 32 of the counting mechanism 15 so that a value is transferred to this counting mechanism. At this instant rod 25 has arrived at the end of the inclined slot 26 and enters into the vertical slot 33 whereby the toothed segment 27 is stopped, the transfer of a value to the calculating mechanism 15 being thus completed.

The slide 16 has descended so far that the universal bar 19 slides off the upper edge 45 of said slide. The levers 20 and 23 return to their position of rest and the locking lever 24 locks up the value transferred into the calculating mechanism.

At the further descent of the slide 16 its pin 34 comes in contact with a surface 35 of a figure key 36 and depresses this key so that, though the intermediary of a pawl 37 the nose 38 of which grips over a projection 39 of the traction element 40, this element is pulled and its nose 41 is brought into the range of the constantly rotating driving element 1. The traction element 40 which is hingedly connected with the intermediate lever 42 is thus pulled forward and throws the type lever 43, with which it is connected in a commonly used manner, against the platen 14^b. The value which had been transferred into the calculating mechanism 15 is thus printed upon the paper on the platen 14^b.

The feeding of the platen takes place only during the return of the type lever 43 to its normal position of rest. The successive working periods are as follows:—

First working period.—Unlocking of the calculating mechanism for the reception of a value.

Second working period.—Transfer of a value into the calculating mechanism.

Third working period.—Locking of the value which has been transferred into the calculating mechanism.

Fourth working period.—Typing of the value transferred into the calculating mechanism.

Fifth working period.—Feeding of the platen.

After the above-stated working periods have been completed the cam disk 14 has revolved so far that the roller 17 of slide 16 bears upon the face 14^a of the cam 14 having thus reached its lowest position. When the

cam disk 14 continues to revolve the slide 16 is gradually pushed upward into the initial position, the nose 9 of the pawl 8 engaging within the slit 12^a of the clutch ring 12 so that, as the roller 10 strikes against the nose 9 of the pawl, the cam disk 14 is disengaged from the constantly rotating driving element 2.

In calculating mechanisms with comma inserting means a lock has to be provided in order that, if a calculating key should be accidentally depressed, at the comma position, the corresponding figure key 36 will not be operated. With this object in view a fixed stop is arranged in the calculating mechanism at the comma position as substitute for the releasable locking lever 24. If in this position of the mechanism a calculating key 3 is depressed the slide 16 can descend only until its cam edge 18 comes in contact with the universal bar 19 and makes the latter oscillate until the lever 23 comes in contact with the stop 24. The slide 16 is thus locked in this position, that is so soon that neither the shaft 25 can reach the inclined slot 26 nor the pin 34 can reach the surface 35 of the figure key 36. The cam 14 continues its revolution, however, and at the last part of the revolution raises the slide 16 into the initial position.

A well known roller stop gear 46^a serves to prevent two calculating keys 3 from being depressed at the same time, said stop gear locking all the other keys if one key is being depressed. A similar stop gear 47 is provided also for the figure and type keys so that only one of these keys can be depressed.

Another locking device is provided, that during the depression of a figure or type key 36 or 46 by hand prevents the descending of any of the slides 16 in spite of the depression of a calculating key 3, thereby preventing the transferring of a value to the calculating mechanism. This locking device consists in the main in a universal bar 50, which extends under all the figure and type key levers and is lowered at the depression of such key. The pawl rail 51 is thus oscillated so that it comes under the noses 52 of all the slides 16. If a calculating key 3 is now depressed the slide 16 cannot descend as its nose 52 is locked by the pawl bar 51 and the transfer of a value to the calculating mechanism 15 is prevented. The transfer of a value by a calculating key 3 can take place only if all the figure and type keys are in the position of rest.

The thrust drive of the slide 16 facilitates the assembly of the machine.

Owing to this arrangement the cage 55 with the transmission mechanism for the calculating mechanism 15 may be removed, the dove-tail slides 56 sliding upon the guides 57 (Fig. 5) after the pin 58 has been loosened. The typewriting machine may be further disconnected from the case 48 of the calculating

keys without the loosening of transfer-elements and connecting rods.

The machine frame 53 of the typewriting machine is connected with the case 48 of the calculating keys by means of hinges 49 having a pintle 59. Centering pins 54 serve to ensure the accurate mutual position of the parts. The connection may however be effected by means of screws, push bolts and the like.

I claim:—

1. In a calculating typewriting machine, a calculating mechanism, a constantly rotating shaft, control members for said calculating mechanism, means for clutching said control members individually to said shaft, and key actuated means for selectively throwing in said clutches and automatically releasing the same upon one complete rotation of the control member, said keys on their down strokes moving clear of the means for throwing in and releasing said clutches.

2. In a calculating typewriting machine, a pair of continuously rotating shafts, a calculating mechanism, transmission members for operating said calculating mechanism, a control member for each transmission member, means for selectively coupling said control members to one of said shafts, figure type bars, a key lever for each type bar, means on said transmission members for operating said key levers, means for individually coupling the type bars to the other shaft for operation thereby, and links connected to said key levers for actuating said last mentioned coupling means.

3. A calculating typewriting machine comprising a constantly rotating drive shaft, selectively operable control members on said shaft, a calculating mechanism, transmission members for the calculating mechanism adapted to be controlled by said control members, springs arranged to impart the driving force to said transmission members, and figure keys adapted to be operated from respective transmission members.

4. A calculating typewriting machine comprising a constantly rotating drive shaft, selectively operable control members on said shaft, a calculating mechanism, transmission members for the calculating mechanism adapted to be controlled by said control members, figure keys, connections between said transmission members and said figure keys adapted to actuate the latter subsequent to the complete transmission of respective values to the calculating mechanism by said transmission members.

5. In a calculating typewriter, a pair of rotating shafts, type bars, key levers for said type bars, means controlled by said key levers for coupling said type bars to one of said shafts for operation thereby, transmission members for operating said calculating mechanism, control members for said trans-

mission members on the other shaft, a second set of key levers for selectively rendering said control members operative, and means on said transmission members for actuating the corresponding key lever of the first mentioned set of key levers, said second set of key levers having no direct connection with said transmission members.

6. In a calculating typewriting machine, a pair of constantly rotating shafts, figure type bars, type key levers, an actuating member for each key lever, a control member for each actuating member, means for selectively coupling said control members to one of said shafts, and means controlled by said key levers for coupling said type bars to the other shaft for operation thereby.

7. In a calculating typewriting machine, a pair of constantly rotating shafts, figure type bars, type key levers, an actuating member for each key lever, a control member for each actuating member, means for selectively coupling said control members to one of said shafts, means controlled by said key levers for coupling said type bars to the other shaft for operation thereby, and a calculating mechanism controlled by said key actuating members.

8. A calculating typewriting machine comprising separable upper and lower frames, a calculating mechanism on said upper frame, a typewriting machine and transmission mechanism for operating said calculating mechanism mounted in said upper frame, and removable as a unit therefrom, and driving means for said transmission mechanism in said lower frame, the driving connections between said driving means and said transmission mechanism and between said transmission mechanism and said calculating mechanism being merely abutting connections, whereby the upper frame, the lower frame, and the unitary typewriting machine and transmission mechanism can be separated from each other to facilitate cleaning, without the necessity of unfastening connecting rods.

9. In a calculating typewriting machine, type keys, a calculating mechanism, motor-actuated control means for said calculating mechanism, transmission means interposed between said control means and said calculating mechanism, and means for locking said transmission means against the influence of said control means on the depression of a type key.

10. In a calculating typewriting machine, a calculating mechanism, a constantly rotating shaft, control members for said calculating mechanism, clutches for coupling said control members individually to said shaft, pawls normally engaging said clutches for holding the same disengaged, and key levers having dogs for moving said pawls from clutch engaging position, said dogs moving

past said pawls after moving the same to permit the pawls to return to clutch engaging position regardless of whether the key is released or not.

11. In a calculating typewriting machine, a calculating mechanism, a constantly rotating shaft, a plurality of cams rotatably mounted on said shaft, means for selectively coupling said cams to said shaft, and spring influenced transmission members interposed between said calculating mechanism and said cams and normally urged toward the latter.

12. In a calculating typewriting machine, a calculating mechanism, selectively operable motor driven cams, spring influenced transmission members interposed between said calculating mechanism and said cams and normally urged toward the latter, type bars, key levers therefor, and means controlled by said key levers for restraining said transmission members from the influence of said cams.

13. In a calculating typewriting machine, a calculating mechanism, a set of calculating keys, a constantly rotating shaft, cams revolvably mounted on said shaft for controlling said calculating mechanism, a clutch for each cam for coupling the same to said driving shaft, a pawl normally engaging each clutch for holding the same disengaged, and means inserted between each pawl and its corresponding calculating key for moving the pawl from clutch engaging position, said means forming an operative connection only during the first portion of a downward stroke of the key.

14. In a calculating typewriter, a calculating mechanism, a set of selectively operable cams, transmission members interposed between said calculating mechanism and said cams, and springs urging said transmission members toward said cams and in the direction for actuation of said calculating mechanism, said cams being adapted to restore said transmission members after each actuation.

15. In a calculating typewriting machine, a calculating mechanism, a power drive therefor, a set of calculating keys for controlling said power drive, a set of figure type bars, type keys therefor, and connections between members of said power drive and said type keys, adapted to become effective only after the transmission of a value to said calculating mechanism, for actuating said type keys.

16. In a calculating typewriting machine, a calculating mechanism, driving means therefor, a set of figure type keys, a set of combined key actuating and transmission members having inclined cam surfaces adapted to actuate said driving means and means for engaging said keys to actuate the same, said engaging means being adapted to strike said keys after said inclined cam surfaces have passed said driving means, and means for selectively driving said transmission members.

17. In a calculating typewriting machine, a calculating mechanism, transmission members adapted to operate said calculating mechanism, a constantly rotating shaft, selectively operable cams on said shaft, springs urging said transmission members against said cams, and figure keys adapted to be operated by said transmission members under the power of said springs.

18. In a calculating typewriting machine; a set of figure type keys; a set of calculating keys; two frames in which said sets of keys are respectively mounted; a power drive, comprising a set of eccentrics, mounted in the frame having the calculating keys, and actuating members for said figure type keys abutting on, but otherwise not connected with said eccentrics; said two frames being freely separable.

19. In a calculating typewriting machine, a calculating mechanism, selectively operable motor driven cams, and spring influenced transmission members interposed between said cams and said calculating mechanism and normally urged toward the former.

20. In a calculating typewriting machine, a calculating mechanism, a typewriting mechanism, a pair of constantly rotating power driven members, driving means between said calculating mechanism and one of said power driven members comprising a set of cams adapted to be selectively coupled to said power driven member and transmission members normally in operative condition between said cams and said calculating mechanism, driving connections between the other of said power driven members and said typewriting mechanism, keys controlling said driving connections, and means on said transmission members for actuating some of said keys.

21. In a calculating typewriting machine, a calculating mechanism, a constantly rotating shaft, control members for said calculating mechanism rotatably mounted on said shaft, each control member comprising means for clutching the same to said shaft, stop and release members for said clutching means, and a set of keys having means for effecting a transitory connection between each key and a corresponding stop and release member during downward motion of the key, the connection being broken before the key reaches the bottom of its movement.

22. In a calculating typewriting machine; two separable frames, one mounted upon the other; typewriting and calculating mechanism in the upper frame; driving means comprising a series of cams in the lower frame; transmission members in the upper frame for driving said calculating mechanism, said transmission members abutting against said cams, and springs urging said transmission members toward said cams.

23. In a calculating typewriting machine; two separable frames, one mounted upon the

other; typewriting and calculating mechanism in the upper frame; driving means comprising a series of cams in the lower frame; transmission members in the upper frame for driving said calculating mechanism, said transmission members abutting against said cams, springs urging said transmission members toward said cams, and locking devices on the upper frame whereby said transmission members may be held in elevated position when the frames are separated.

24. In a calculating typewriting machine; two separable frames, one mounted upon the other; typewriting and calculating mechanism in the upper frame; driving means comprising a series of cams in the lower frame; transmission members in the upper frame for driving said calculating mechanism, said transmission members abutting against said cams, springs urging said transmission members toward said cams, and means controlled by said calculating mechanism for locking said transmission members in elevated position.

25. In a machine of the class described, two freely separable frames, a calculating mechanism and driving members therefor mounted in one of said frames, a typewriting mechanism including figure type keys mounted in the same frame, calculating keys and a power drive comprising a set of eccentrics mounted in the other of said frames, said driving members abutting on but otherwise not connected with said eccentrics, and actuating members on said driving members for operating said figure type keys.

26. In a calculating typewriting machine, a pair of constantly rotating members; numeral type bars; driving means for each of said type bars adapted to be coupled with one of said constantly rotating members; a coupling mechanism for each driving means, including power transmitting devices operated by the other of said constantly rotating members; and manipulative means for causing the selective operation of said coupling mechanisms.

27. In a calculating typewriting machine, a calculating mechanism, a typewriting mechanism, a power drive for said typewriting mechanism, a power drive for said calculating mechanism, transmission members between said second mentioned power drive and said calculating mechanism, and a coupling mechanism operated by said transmission members for coupling said typewriting mechanism with said first mentioned power drive.

The foregoing specification signed at Berlin this 24 day of March, 1923.

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