Dec. 16, 1930. G. J. BARRETT 1,784,862

ADDING MACHINE

Original Filed Aug. 14, 1925 4 Sheets-Sheet 1

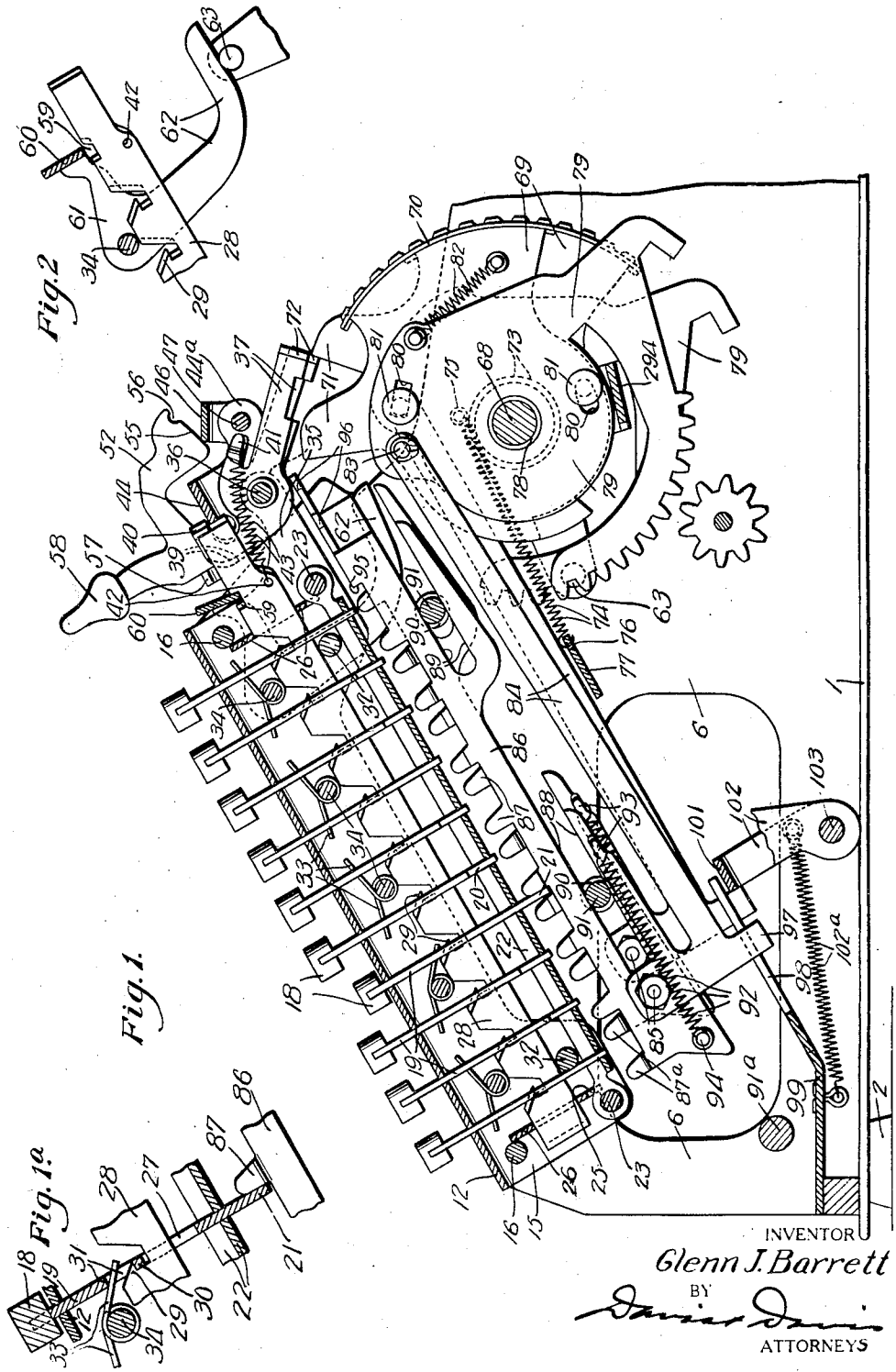


Fig. 1.

Fig. 1a.

Fig. 2.

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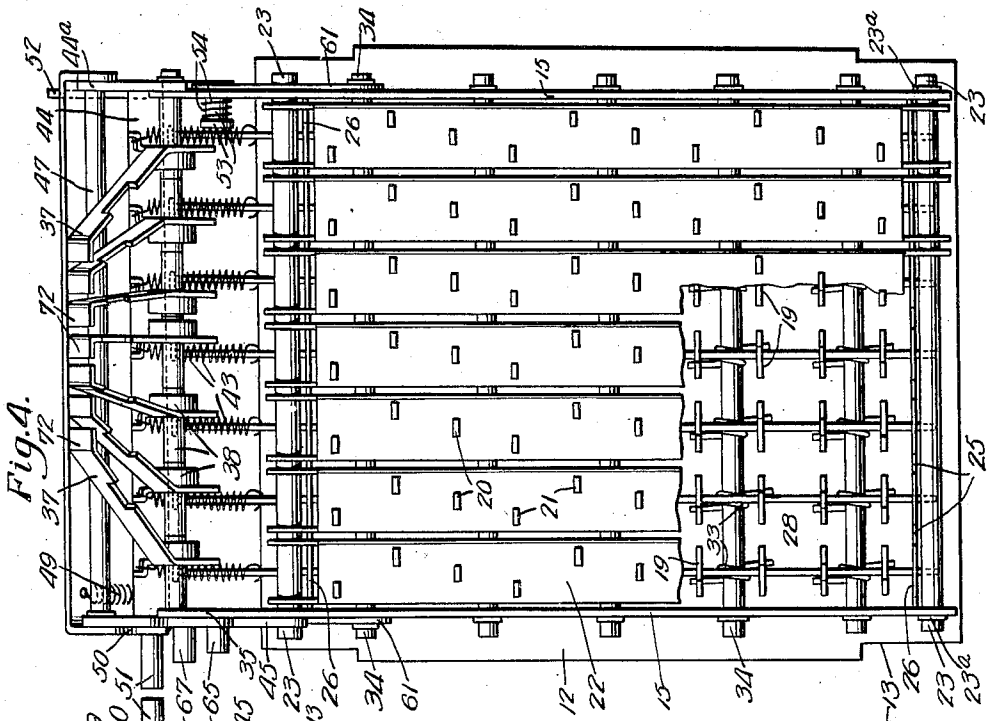


Fig. 4.

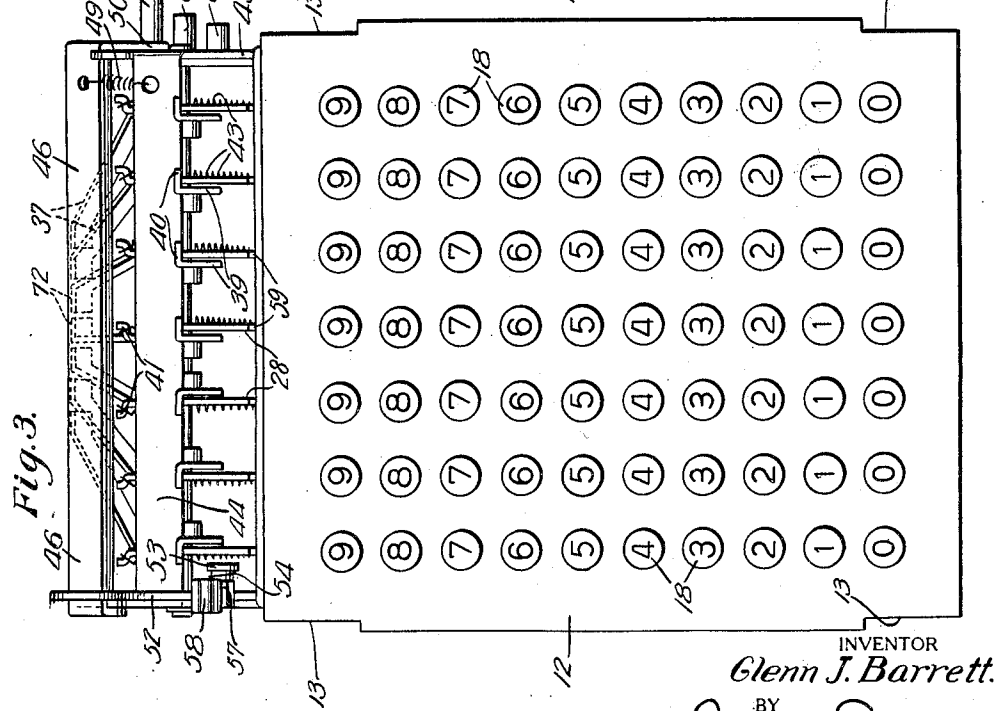


Fig. 3.

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Fig.5.

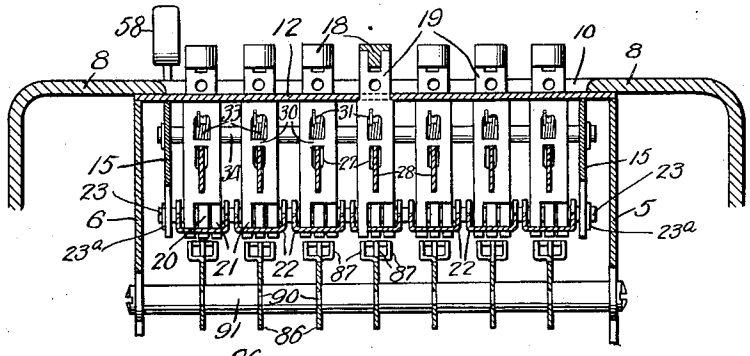


Fig.6.

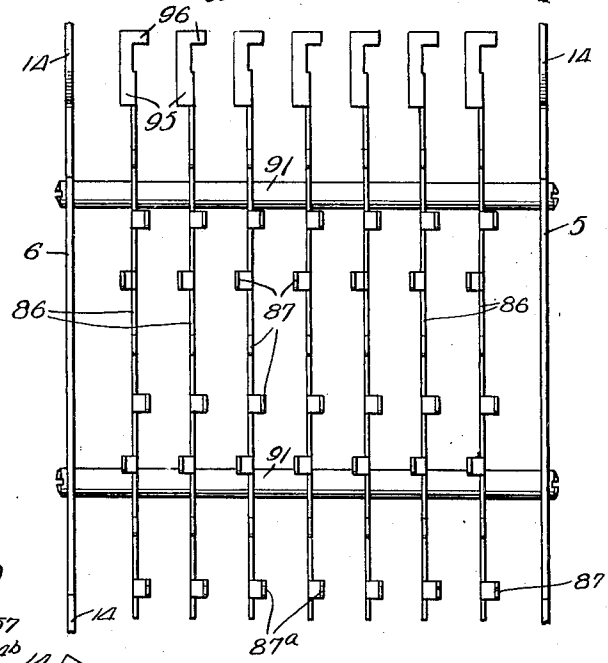
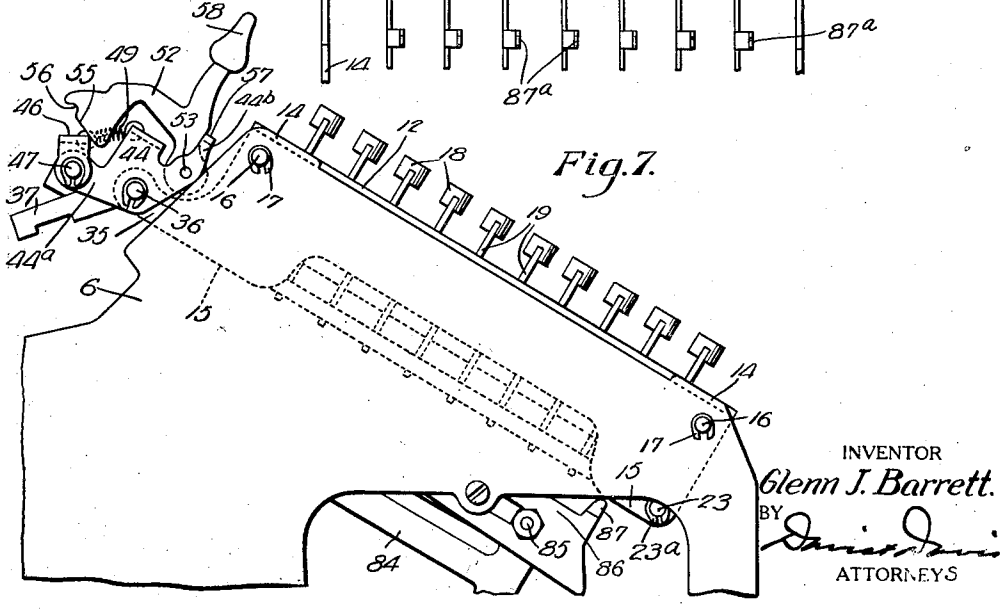


Fig.7.



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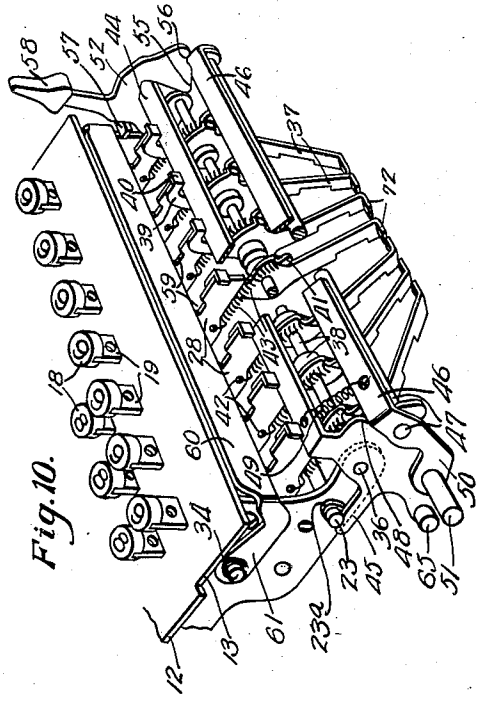


Fig. 10.

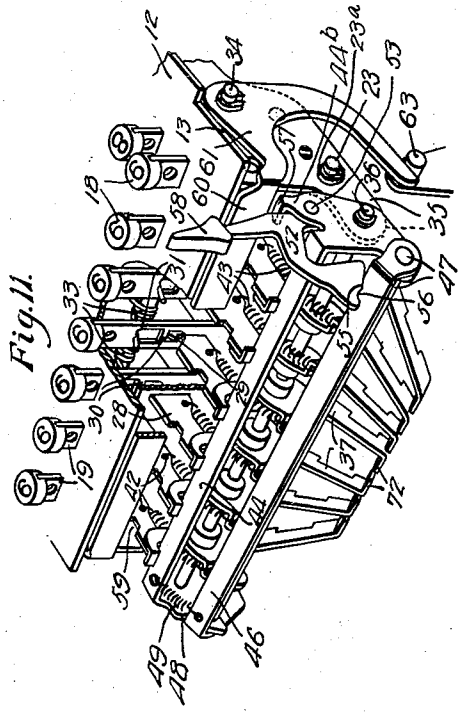


Fig. 11.

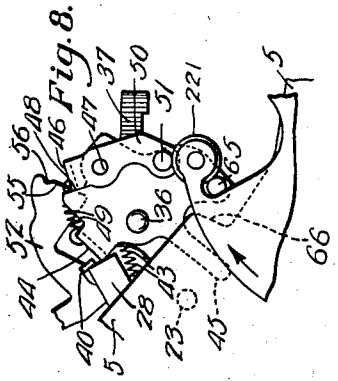


Fig. 8.

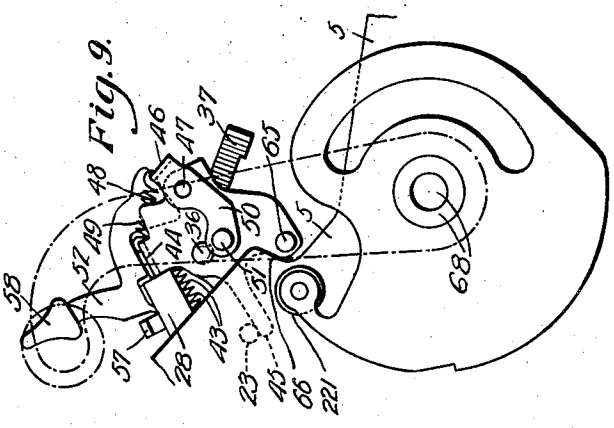


Fig. 9.

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Patented Dec. 16, 1930 1,784,862

UNITED STATES PATENT OFFICE

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ADDING MACHINE

Original application filed August 14, 1925, Serial No. 50,219. Divided and this application filed July 26, 1927. Serial No. 208,578.

This invention relates more particularly to improvements in the keyboard for a key-set adding machine of the type shown in my application for patent filed August 14, 1925, Serial No. 50,219, and of which this application is a division.

One of the main objects of the invention is to improve the keyboard unit; and particularly to condense the keyboard so that I am enabled to place the keys closer together and use key caps smaller than the usual standard keys, without interfering with the ease of operation of the keyboard.

Another important object of the invention is to so construct and assemble the entire keyboard unit in a sub-frame that it may be readily bodily removed from the machine frame without disarranging any of the remaining parts of the machine.

Another object of the invention is to include in the removable keyboard unit many associated parts which are ordinarily mounted in the main frame of an adding machine.

Another object of the invention is to arrange all of the associated elements carried by the keyboard unit sub-frame so that no positive connections are required between the various mechanisms of the keyboard unit and the mechanisms with which they cooperate in the body of the machine, such co-opating parts being subject to contact engagement only.

In the drawings:

Fig. 1 is a partial longitudinal vertical sectional view of an adding machine showing the invention applied thereto;

Fig. 1ª a detail sectional view showing one key depressed and latched;

Fig. 2 a detail sectional view showing the latch strip locking bail raised out of engagement with the latch strips;

Fig. 3 a plan view of the keyboard unit detached from the machine;

Fig. 4 a bottom plan view of the keyboard unit detached, parts being broken away to more clearly show the construction;

Fig. 5 a transverse sectional view of a part of the machine showing the keyboard unit in position in the machine frame;

Fig. 6 a detail plan view showing the arrangement of the stop slides which cooperate with the key stems;

Fig. 7 a partial side elevation of an adding machine showing the invention applied thereto;

Fig. 8 a detail view showing the operation of the latch strip releasing means;

Fig. 9 a similar view showing the latch strip releasing means adjusted for repeat operations;

Fig. 10 a perspective view of the rear end of the keyboard unit, parts being broken away to more clearly show the construction; and

Fig. 11 a view similar to Fig. 10, taken from the opposite side of the keyboard unit.

Referring to the drawings and particularly to Figs. 1 and 5, it will be seen that the machine is provided with a base plate 1, to which rubber feet 2, indicated in Fig. 1, are preferably secured, the base plate being, in the present instance, formed of thin sheet metal. This base plate is provided with transversely extending rectangular bars near the front and rear ends of the machine, one of which is indicated at the front of the machine in Fig. 1 of the drawings. Frame side plates 5 and 6 are secured to the ends of the respective transverse bars by suitable fastening means, the frame plate 5 being on the right side of the machine and the frame plate 6 on the left side. The frame plates 5 and 6 are adapted to support the entire keyboard mechanism, as hereinafter explained. The cover casing 8 is adapted to enclose the machine and is held in place by suitable fastening means. The side plates 5 and 6 preferably extend along the base plate 1 to support certain transverse rods and shafts, hereinafter referred to. The upper edges of the side plates incline upwardly and rearwardly at an angle of approximately 30° to the horizontal, thereby conforming to the plane of the keyboard, which is supported thereby as hereinafter pointed out. The upper edges of the side plates drop to a lower level back of the keyboard, the arrangement being such as to

bring the side plates below the level of the printing segments.

The cover or casing 8 follows the outline of the side plates 5 and 6, and is provided with a rectangular opening at 10 to expose the keyboard.

Keyboard unit.—The keyboard unit, which is removably attached to the front upwardly inclined portions of the side frame plates 5 and 6, is more particularly shown, detached from the machine, in Figs. 3 and 4. It comprises a top plate 12, the lateral edges of which are provided with notches 13 at its four corners adapted to cooperate with lugs 14 on the respective frame side plates 5 and 6, as indicated in Figs. 3 and 7. This mounting not only helps hold the keyboard unit in place but is adapted to position it in the machine in proper relation for the parts to cooperate with the adding unit and control mechanism. The top plate 12 of the keyboard unit is riveted or otherwise secured to side plates 15, which extend downward from the underside thereof, as indicated in Fig. 5 of the drawings, and are adapted for the support of various associated parts of the keyboard unit. The top plate 12 and the side plates 15 form a sub-frame designed to carry all of the parts of the keyboard unit and to be removably secured in the main frame. Two removable rods 16, extending transversely through the frame side plates 5 and 6 and the side plates 15 of the keyboard unit and located under the top and bottom edges of the top plate 12, are adapted to detachably secure the keyboard unit in place on the side plates of the machine, as indicated in Figs. 1 and 7 of the drawings. The rods 16 are preferably held in place in the frame by sealing clips 17 forced into annular grooves in the ends of the rods, as indicated in Fig. 7.

The keyboard comprises a plurality of rows of keys from zero to nine inclusive, provided with key caps 18 of relatively small diameter, secured to the upper ends of key stems 19, which pass through suitable transverse slots in the top plate 12 of the keyboard unit, as indicated in Figs. 1 and 5. In my improved construction, the key caps 18 are made smaller in diameter than in standard machines, so as to facilitate mounting the rows of keys, and the keys in each row, closer together, to thereby provide a condensed beyboard without interfering with the ease of fingering. The key stems 19 are preferably punched from sheet metal in two forms, one with a central tail or stop finger 20 and the other with a tail or stop finger 21, located at one edge, so that by reversing the latter type of key stems 19, the tails or stops 20—21 in each row of keys will be in three parallel lines, as indicated in Fig. 5. The lower tail ends of the keys 19 are supported in bridge strips 22, which are provided with three lines of perforations for the passage therethrough of the key stop fingers 20 and 21, as shown in Fig. 4 of the drawings. The bridge strips 22 which are U-shaped in cross section are preferably supported from the side plates 15 of the keyboard unit by transversely extending removable rods 23 passing through holes in the side plates and through holes in ears at the ends of the respective bridge strips. The ends of the rods 23 are formed with annular grooves in which are slipped spring clips 23^a similar in form to clips 17 (Fig. 7). These clips engage the outer sides of the plates 15. By removing the clip 23^a the rods 23 may be withdrawn and the bridge strip released. The bridge strips 22 are preferably held in proper spaced position transversely of the keyboard unit, by notches 25 in transversely extending comb or guide plates 26, mounted respectively between the front and rear ends of the side plates 15 and supported therein in any suitable manner.

The respective key stems 19 are provided with elongated central openings at 27, through which key latch strips 28 extend, the respective latch strips being provided with beveled notches and formed with latch dogs 29, cooperating with a detent 30, (see Fig. 5) formed in the respective keys 19 by another punched hole 31, above the opening 27. The latch strips 28 are properly spaced transversely of the keyboard unit by slidably mounting the ends thereof in slots in the guide plates 26. The latch dogs 29 are beveled on their upper edges and provided with undercut notches adapted to engage the key detents 30, when the keys are depressed. When a key is depressed the latch strip will be moved toward the front of the machine until the detent 30 is engaged by the underside of the latch dog 29. In this manner, the keys are held in depressed or set position, but if, after a key is depressed, another key is depressed in the same row, the first key will be released and returned by its spring to normal position, thus forming a "flexible keyboard."

The undercut notches of the beveled latch dogs 29 are of shallow depth so that when the notches engage the detents 30 of the keys, the latch strips 28 will not return fully to their original positions, thereby positioning the associated stop levers (37) hereinafter referred to out of engagement with the corresponding adding units.

The side plates 15 of the keyboard unit subframe are preferably secured together near their lower edges by two stay rods 32, which are preferably riveted in place and located below the latch strips 28 in position to support the latter and permit free sliding movement thereof. In order to restore depressed keys to normal position, springs 33 are provided. These springs are preferably coiled about rods 34, extending transversely of the

rows of keys, between alternate keys of the rows, and the ends of the springs extend in opposite directions and are adapted to pass through the holes 31 in adjacent key stems 19. In this manner, a single spring is adapted to operate two keys, thereby reducing the number of springs required.

The side plates 15 of the keyboard unit subframe are provided with rearwardly projecting arms 35 forming the support for a transversely extending shaft 36, lying below the rear ends of the latch strips 28, for supporting a plurality of stop levers 37, pivotally mounted thereon. The stop levers 37 are carried on hubs 38 (Fig. 4) which form spacing elements therebetween, on the shaft 36, and maintain the upper ends 39 of the levers in the same spaced relation as the latch strips 28 with which they are adapted to cooperate. The upper ends 39 of the stop levers 37 lie alongside the rear ends of the latch strips 28 and are provided with laterally projecting ears 40, which are adapted to engage with the ends of the latch strips, as indicated in Figs. 1 and 3. The stop levers 37 are also provided with rearwardly projecting fingers 41, between which and holes 42 in the respective latch strips 28, double acting springs 43 are connected for mutually holding the ears 40 in contact with the ends of the respective latch strips and for moving the latch strips toward the rear to effect latching of set keys or, when no keys are set, the springs will hold the latch strips 28 and stop levers 37 in normal position with the latter in position to engage the stops or detent teeth on the adding units.

The transversely extending rod or shaft 36, supporting the stop levers 37, forms the pivotal support for a yoke or rock bail 44, adapted to lie immediately back of the rear ends of the latch strips 28 and to limit the rearward movement of the latter under the action of their springs 43. The position of the bail 44 is determined by a forwardly extending arm 45 engaging the end of one of the bridge rods 23, see Fig. 10, thereby limiting the rearward movement of the bail 44 and of the latch strips 28, under the pressure of the springs 43.

The latch strip rock bail 44 is provided with rearwardly extending arms 44^a for pivotally supporting thereon a small auxiliary yoke or rock bail 46, pivoted on a shaft 47, as indicated in Figs. 1 and 7 of the drawings. The auxiliary bail 46 is normally held against a shoulder 48 on the right side of the latch strip bail 44, as shown in Figs. 8 and 10 of the drawings, by a spring 49, extending between the two bails, and the right end of the auxiliary bail 46 is provided with a depending arm 50, carrying a laterally extending pin 51, adapted to be engaged by a roller 221 hereinafter referred to in connection with the handle mechanism, for operating the latch strip rock bail 44 to move all of the latch strips forward, and thereby release any set keys at the end of the return stroke of the handle.

In the "repeat" operation on machines of this character, it is understood that the number set up on the keyboard is retained, while the handle is operated several times to repeatedly add the same number, and for this purpose, the auxiliary bail 46 is adapted to be moved toward the rear and held in that position for the "repeat" operation. In my improved construction this is accomplished by a simple mechanism comprising a bell-crank-shaped repeat key lever 52, pivotally mounted on a screw 53 (see Fig. 7) on a forwardly and upwardly projecting arm 44^b on the left end of the rock bail 44. The repeat key lever 52 is held in frictional contact with the bail arm 44^b by means of a spring 54, extending between the head of the pivot screw 53 and the side of the lever, as indicated in Figs. 3 and 4 of the drawings. The rearwardly extending arm of the lever 52 is provided with a cam surface at 55, adapted to engage the auxiliary rock bail 46 and force it rearward against the action of its spring 49, and at the upper end of the cam surface a notch at 56 is provided, which will limit the movement of the repeat key toward the rear and, by engaging the edge of the bail 46, will retain the latter in position for the repeat operation. In the "repeat" position of the repeat key lever 52, as shown in Fig. 9, the pin 51 on the arm 50 of the auxiliary bail 46 will be held out of operative position, and, therefore, the latch strip rock bail 44 will not be actuated by the handle mechanism to release any keys set in the keyboard.

In repeat operations it frequently happens that after the number set up in the keyboard has been repeatedly added the required number of times, the depressed keys remain in depressed position because the operator did not release the repeat key before the last repeat operation of the handle. Therefore, it is necessary to manually release the set keys, and this is adapted to be accomplished in a simple manner, in my improved machine, by mounting the repeat key lever 52, as previously explained, on the latch strip rock bail 44, and providing the arm 44^b, on which the repeat lever 52 is pivoted, with a laterally extending ear 57, adapted to be engaged by the upwardly extending arm of the repeat key which, as indicated in Figs. 1, 7 and 11 of the drawings, is provided with the finger button 58. Thus, by a continuing pull on the repeat key button 58, the lever 52 is moved to release the auxiliary bail 46 from the notch 56, thereby permitting the spring 49 to restore the bail to normal position, and the repeat lever, by engaging the ear 57 as the lever is drawn forward, will rock the latch strip bail 44 to release the set keys of the keyboard.

During the operation of the machine, adding unit stop slides, hereinafter referred to,

are adapted to engage the lower extremities or tail stops of the set keys and the impact, particularly during the repeat operation, is apt to jar the depressed keys so that there is a possibility of jarring the latch strips loose and permitting release of the keys. In order to prevent accidental release under these circumstances, the latch strips 28 are preferably provided with notches 59, near their rear ends, with which a locking bail 60 is adapted to cooperate for preventing movement of the latch strips, after the handle has been started on its forward stroke. The locking bail 60 is pivotally mounted by arms 61, see Figs. 1, 2 and 11, on the ends of the rearmost key spring supporting rod 34 mounted in the side plates 15 of the keyboard unit sub-frame, as will be seen in Fig. 4 of the drawings. The locking bail 60 is preferably provided with a downwardly and rearwardly extending arm 62, adapted to cooperate with a pin 63, carried on a lever arm forming part of the mechanism operated by the handle. The arrangement, as will be seen in Figs. 2, 4 and 11, is such that, in normal position of the handle, the pin 63, by engaging the lower end of the arm 62, lifts and holds the locking bail 60 out of engagement with the notches 59 in the latch strips 28, thereby permitting keys to be freely set. However, after the handle has started and is on its forward stroke, the pin 63 will be moved out of engagement with the arm 62, thus permitting the locking bail 60 to engage the notches of the latch strips and prevent accidental movement thereof. The bail 60 serves to also lock the keys that are not depressed and secures them against accidental operation when the handle movement is started. When a key is depressed its latch strip is forced forwardly slightly and it then snaps back over the cross bar in the key stem. This backward movement of the latch strip is sufficient to again position the locking notch directly under the locking bail. The locking notches are not long enought to permit the full forward movement of the unlocked latch strip when the bail is in locking position. The result of this is that when the bail is in locking position all of the keys, whether depressed or not, are locked against accidental movement until the handle operation is completed.

The parts and mechanisms thus far described constitute the complete keyboard unit, which, as previously stated, is readily removable from the frame of the machine by withdrawing the rods 16. In this connection, attention is called to an important minor improvement. The key stem tails or stop fingers 20 and 21 are rather delicate and, in removing the keyboard unit from the machine, these tail stops are likely to be bent, if any of the keys happen to be in depressed position when the attempt is made to remove the keyboard. Therefore, a depending arm 64 on the right side of the key latch releasing bail 44 is provided with a laterally projecting stud 65 (see Figs. 9 and 10) which is adapted to cooperate with a notch at 66 in the frame plate 5 on the right side of the machine, so that upon lifting the front end of the keyboard unit, which is necessary when removing the same from the frame of the machine, the stud 65, by engaging the frame plate, will move the rock bail 44 toward the front of the machine, thereby moving the key latch strips 28 to release any keys that may have been depressed.

Adding units.—The adding units are rotatably mounted upon the main shaft 68, to which the handle is secured, as hereinafter described, and each comprises a driver element 69, carrying type segments 70 which extend toward the rear of the machine, as indicated in Fig. 1 of the drawings. The type segments are formed as narrow rolled type strips, concentrically mounted on arcuate flanges on the driver elements 69, the type being fixed thereon and adapted to be printed by movement of the platen against the type segments, as described in my application, Serial No. 50,219. The type segments or driver elements 69 of the adding units are provided with upwardly projecting stop lugs 71, adapted to cooperate with ears 72 bent over on the ends of the stop levers 37, hereinbefore referred to, and adapted to be positioned by the latch strips 28 when keys in the keyboard are depressed. The arrangement is such that when the keys are set, the ears 72 are lifted sufficiently to clear the ends of the stop lugs 71, thereby permitting rotation of the adding units, when the handle is operated. The type segments and adding units are preferably mounted in condensed form, that is, to correspond to the spacing of the printed numbers, and, since the rows of keys are spaced further apart than is required from the type segments, the rear ends of the stop levers 37 are bent inward, as indicated in Figs. 3, 4 and 11, to bring the ears 72 thereof into cooperative relation with the adding unit stop lugs 71. The disc-like driver element type segments 69—70 are secured to hubs 73, which are preferably formed with pulley grooves, as will be seen in dotted lines in Fig. 1, and driving springs 74 pass over the hubs and engage pins 75, secured to the respective driving elements 69. The opposite ends of the springs 74 are carried forward and anchored in holes 76 in a cross bar 77, extending between the side plates 5 and 6, and supported thereby, as indicated in Fig. 1 of the drawings. By this arrangement, it will be seen that the driving elements 69, and hence, the adding units, are urged forward by the action of the springs 74, but are normally prevented from such forward movement by a bail as described in said application, Serial No. 50,219. The units may be

freed for such forward movement by the depression of the keys in the keyboard which would lift the stop levers 37.

The hubs 73 of the type segment driving elements 69 extend a short distance on the right side of the latter to form bearing shoulders 78, upon which adding sectors 79 are rotatably mounted. The adding sectors are preferably spaced slightly from the associated driver-type segment discs 69 and are provided with elongated slotted holes 80, through which headed rivets 81 extend, thereby securing the adding sectors to the respective driving elements for independent rotation to the extent of one unit. The driving elements 69 and the adding sectors 79 are resiliently connected together by springs 82, substantially as indicated in Fig. 1, the arrangement being such that the spring 82 is adapted to move the adding sectors for transfer of the tens, as fully described in my said application, Serial No. 50,219.

The movements of the adding units, after the stop levers 37 have been positioned by setting keys representing the number to be added, are adapted to be determined by the tail stops of the respective set keys. For this purpose, the adding sectors 79 are provided with pivot studs 83 to which links 84 are pivotally connected, as indicated in Fig. 1, the opposite ends of the links 84 being connected by bolts 85, with stop slides 86, which are provided with stop ears or lugs 87, adapted to engage the tail stops 20—21 of the keys 19. It has been previously pointed out that the adding units are mounted in condensed form, corresponding to the spacing required between the type segments and, therefore, the links 84 are bent or fan outwardly from their connection to adding sectors at their forward ends to their connections with the stop slides 86 which correspond with the spacing between rows of keys. The stop slides 86 are provided with elongated slots at 88 and 89 cooperating with annular grooves 90 in transversely extending rods 91, supported in the frame plates 5 and 6, as shown in Fig. 1; the arrangement being such that the stop slides 86 are held in proper spaced relation, and are freely slidable for differential positioning of the respective adding units according to numbers set up on the keyboard. A transverse rod 91^a is supported in the frame plates 5 and 6 forwardly of the forward ends of the links 84. This rod 91^a serves as an abutment for the links and prevents their being accidentally moved out far enough to disengage the slots 89 from the rod 91.

An important feature of my improvement in association with the link connections 84 and the stop slide strips 86, is to provide for independent resilient movement between these elements. This is accomplished by slidably mounting the pins or bolts 85 of the connecting links 84 in the forward ends of the slots 88 of the respective stop slides 86, so as to permit relative longitudinal movement therebetween. The pins or bolts 85 are held normally at the forward ends of the respective slots 88 by means of springs 92, connected to fingers 93 on the links 84, and to pins 94 in the forward ends of the respective stop slides 86, as will be seen more particularly in Fig. 1 of the drawings. This ararngement provides a safety device to prevent injury to the machine in case a key is accidentally depressed during the return stroke of the handle. Therefore, if this should occur, that is, a key is depressed before the full return of the stop slides, then one of the stop lugs 87 would engage the front side of a key tail stop 20—21, and thus prevent the return of the corresponding stop slide 86 with its associated adding sector 79, which, as hereinafter described, is adapted to be returned to normal position when the driving elements 69 are returned by the pick-up bail 294 (Fig. 1), but this would merely stretch the spring 92 and as soon as the return of the handle releases the key the spring will snap the stop slide back to normal position.

It has been previously pointed out that, in order to condense the keyboard and at the same time provide for a greater movement of the stop slides 86 than the distance between the keys in a row, the tail stops of the keys are arranged in three parallel lines. This arrangement is of advantage in that it requires less accuracy in adjusting the relation between the parts. Accordingly, the stop ears or lugs 87 on the stop slide strips 86 are correspondingly arranged in three lines, as indicated in Figs. 5 and 6 of the drawings, in order to bring the stops into proper cooperative relation with the three lines of tail stops 20 and 21 of the keys. The upper or rear stops on the stop slides 86, instead of being upwardly projecting lugs or ears as at 87, are preferably shoulders 95 and 96 on a folded-over angle projection on the stop slides, as will be seen in Figs. 1 and 6 of the drawings. This construction allows for a more compact arrangement between operating parts of the machine.

In order to guide and insure movement parallel to the stop slides 86 with which they are slidably connected, the forward ends of the links 84 are preferably provided with depending arms or lugs 97, engaging slots 98 in a comb plate 99, secured at the front of the machine. The depending lugs 97 are preferably adapted to cooperate with a universal bail 101, provided with rock arms 102 pivotally mounted upon a shaft 103 extending transversely of the machine near the bottom thereof and supported in the side frame plates 5 and 6, as shown in Fig. 1. A spring 102^a connected to the comb plate 99 and to one of the rock arms 102 tends to hold the bail

forward against the depending lugs 97. The operation of the bail 101 is fully set forth in my application, Serial No. 50,219, and need not be described herein. It will be seen that the stop slides 86 are mounted in the machine at an angle of about 30° to the horizontal, so as to slide in parallel relation to the underside of the keyboard unit, the stop lugs 87 being adapted to clear the tails or stop ends of the keys when the keys are in normal retracted position.

When the zero keys are depressed the stop fingers 21 are set directly forward of the stop lugs 87^a on the extreme forward ends of the stop slides 86, and are in position to block any movement of the stop slides 86 and the adding sectors. The detent dogs 72 will be lifted, however, and the type segments will be moved forward one space by springs 82 to bring the zeros on the type segments into printing position. This movement of the type segment is permitted by the pin and slot connection 80—81 between the type segments and the adding sectors 79, and takes place when the handle is rotated in the usual manner for the adding and printing operation.

What I claim is:

1. In a key-set adding machine, a keyboard comprising a row of keys; a zero key in said row; key stems formed with stop fingers; a depressed-key latch strip associated with said row of keys; a detent dog pivoted at the rear end of the latch strip and normally preventing movement of the associated adding sector and type segment; a spring yieldingly holding said detent dog in engagement with the latch strip, and said strip normally holding the said detent dog in operative position to prevent movement of the adding sector and type segment and permitting said dog to rise above the adding sector and type segment stop when the latch strip is moved forwardly; a stop slide connected to the adding sector; means whereby when the zero key is depressed the latch strip is moved forward to release the detent dog, and the stop slide and its connected adding sector is held against movement, the associated type segment being released from the detent dog; and means to permit the released type segment to move a single type space to place the zero type in printing position without movement of the adding sector.

2. In a key set adding machine, a keyboard mounted in the main frame; a plurality of rows of keys provided with stems slidably mounted in the keyboard; a depressed-key latch strip in said keyboard and associated with each row of keys; said latch strips being provided with locking notches in their upper edges near their rear ends; a locking bail extending across the tops of the latch strips; means for pivotally mounting said bail whereby it may drop into and be lifted out of the locking notches in the latch strips, said notches being considerably wider than the thickness of the locking bail whereby the notches of all of the latch strips will be in register to receive the locking bail regardless of whether keys are depressed in all of the rows.

3. In a key set adding machine, a keyboard mounted in the main frame; a plurality of rows of keys provided with stems slidably mounted in the keyboard; a depressed key latch strip in said keyboard and associated with each row of keys; said latch strips being provided with locking notches; a locking bail extending across the latch strips; means for pivotally mounting said bail whereby it may move into and be moved out of the locking notches in the latch strips, said notches being considerably wider than the thickness of the locking bail whereby the notches of all of the latch strips will be in register to receive the locking bail regardless of whether keys are depressed in all of the rows.

4. In a key-set adding machine, a keyboard unit comprising a rectangular box-like sub-frame supporting a row of keys and adapted to be placed in the main frame of the machine; a latch strip for said row of keys slidably mounted in the sub-frame and arranged for holding keys in depressed position; a universal rocking bail pivotally supported on the rear of said sub-frame for cooperation with the rear end of said latch strip; a second bail pivotally mounted on the universal rocking bail and provided with a tappet arm adapted to be actuated by handle-operated mechanism for operating said universal bail to move the latch strip and thereby release a depressed key upon the return stroke of the handle; and a manually operable lever pivotally mounted on said universal bail in position to cooperate both with said universal bail and with said tappet member, the arrangement being such that moving said lever in one direction swings the said universal bail to operate said latch strip to release a depressed key and moving it in the other direction moves said second bail and the tappet member to throw and lock the tappet out of operative position, to thereby permit repeat operations by preventing release of a depressed key by the handle operations.

5. In a key-set adding machine, a keyboard supporting a row of keys; a latch strip for said row of keys slidably mounted for fore-and-aft movement and arranged for holding keys in depressed position; a universal rocking ball pivotally supported at the rear of said keyboard for cooperation with the rear end of said latch strip; a second bail pivotally mounted on the universal rocking bail and provided with a tappet arm adapted to be actuated by handle-operated mechanism for operating said universal bail to move the latch strip and thereby release a depressed

key upon the return stroke of the handle; and a manually operable lever pivotally mounted on said universal bail in position to cooperate both with said universal bail and with said tappet member the arrangement being such that moving said lever forward swings the said universal bail to operate said latch strip to release a depressed key and moving it rearward moves said second bail and the tappet member to throw and lock the tappet out of operative position, to thereby permit repeat operations by preventing release of a depressed key by the handle operations.

6. In a key-set adding machine, a keyboard comprising a row of keys; key stems formed with stop fingers; a depressed-key latch strip associated with said row of keys; a detent dog pivoted at the rear end of the latch strip and normally preventing movement of the associated adding sector and type segment; a spring yieldingly holding said detent dog in engagement with the latch strip, and said strip normally holding the said detent dog in operative position to prevent movement of the adding sector and type segment and permitting said dog to rise above the adding sector and type segment stop when the latch strip is moved forwardly; a stop slide connected to the adding sector; means whereby when a key is depressed the latch strip is moved forward to release the detent dog, and the stop slide and its connected adding sector is free to move an extent determined by the depressed key, the associated type segment being released from the detent dog; and means to permit the released type segment to move a single type space before it moves with the adding sector.

7. In a key-set adding machine, the combination with a main frame; a keyboard unit in said frame and carrying keys having stop fingers at their lower ends; a pair of rods below the keyboard; a stop bar slidably mounted upon said rods and extending fore-and-aft of the keyboard, said stop bar being provided near its front and rear ends with elongated slots cooperating with the said rods; stop lugs formed on the upper edge of said stop bar; a link connected at its rear end to an adding sector; a pin and slot connection betwen the forward end of said link and the forward end of the stop bar; and a spring connected to the stop bar and to the link for normally holding the stop bar and link to move in unison but adapted to permit an interruption of the return movement of the stop bar while the link and adding sector are being restored to normal position.

In testimony whereof I hereunto affix my signature.

GLENN J. BARRETT.