May 5, 1942. T. O. MEHAN 2,281,851

PRINTING MECHANISM FOR ADDING MACHINES

Filed Feb. 1, 1937 3 Sheets-Sheet 1

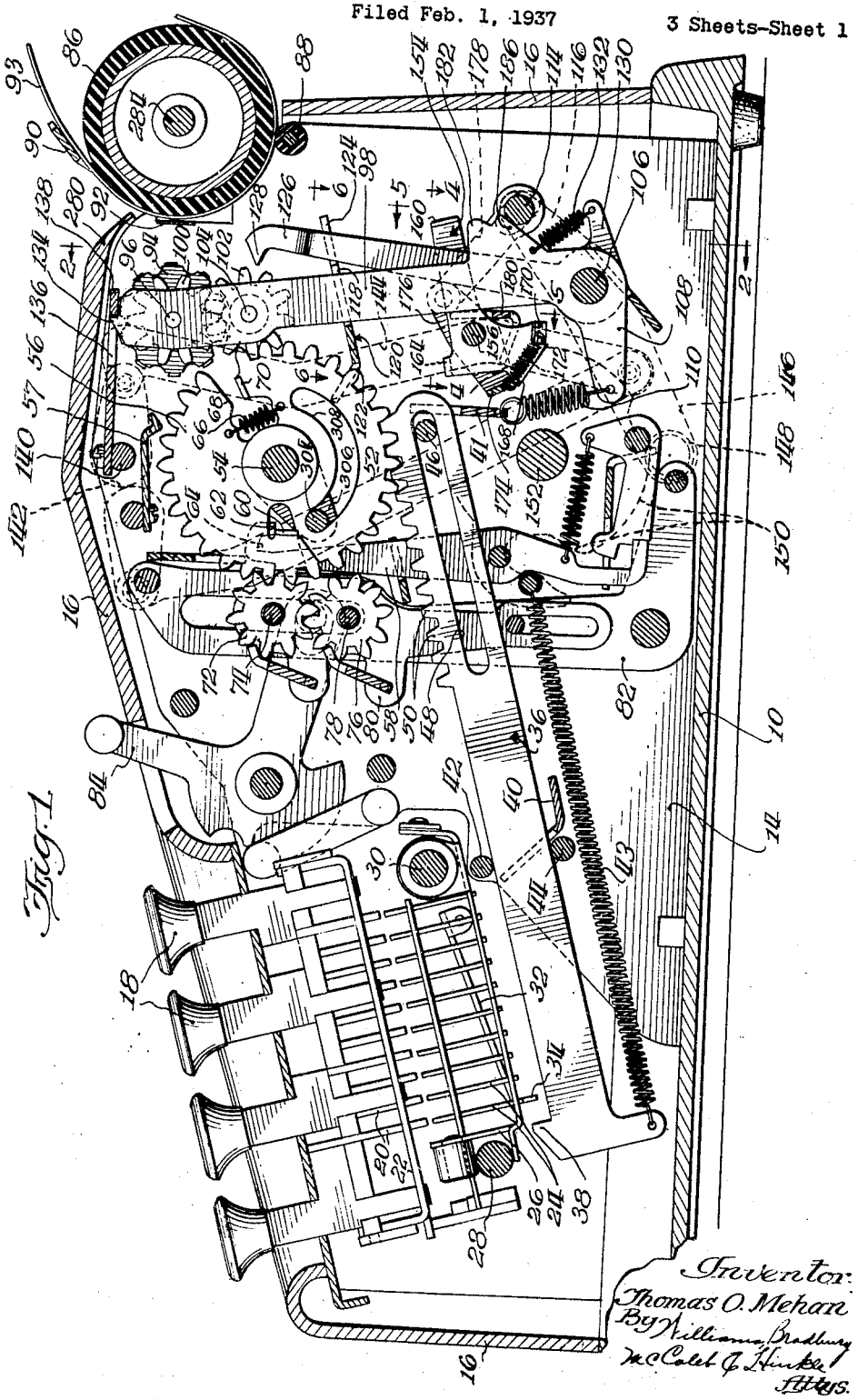

Fig. 1

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Fig. 2.

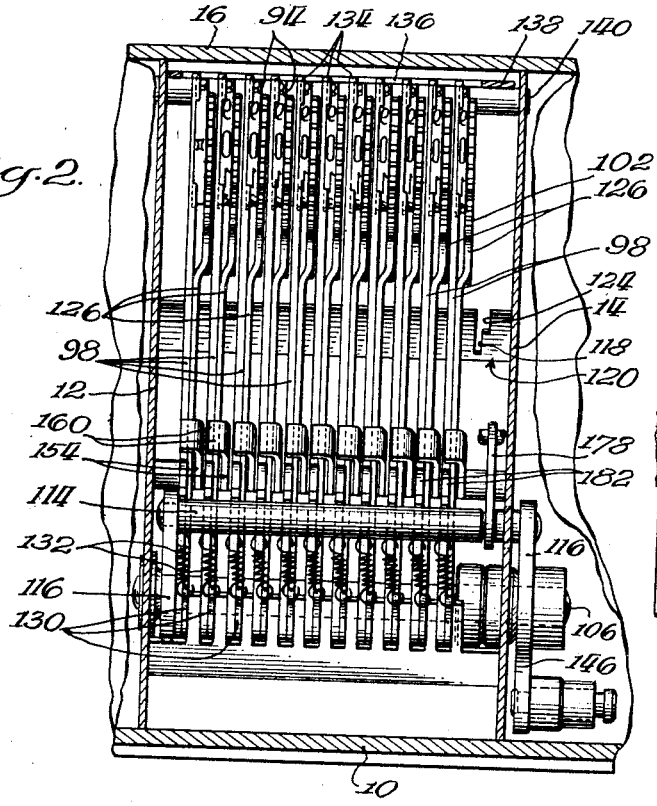

Fig. 6.

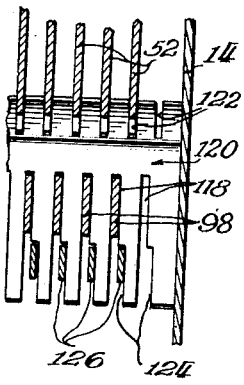

Fig. 3.

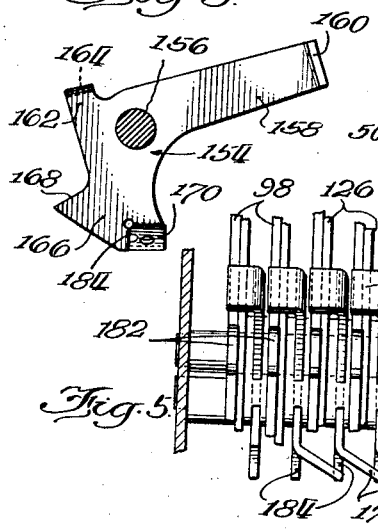

Fig. 4.

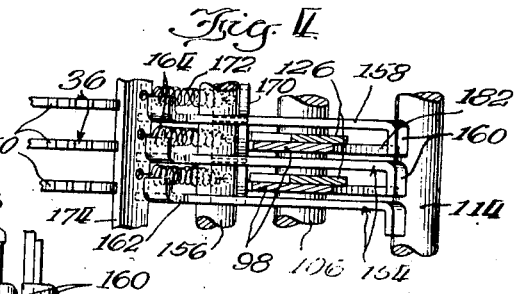

Fig. 5.

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Filed Feb. 1, 1937 3 Sheets-Sheet 3

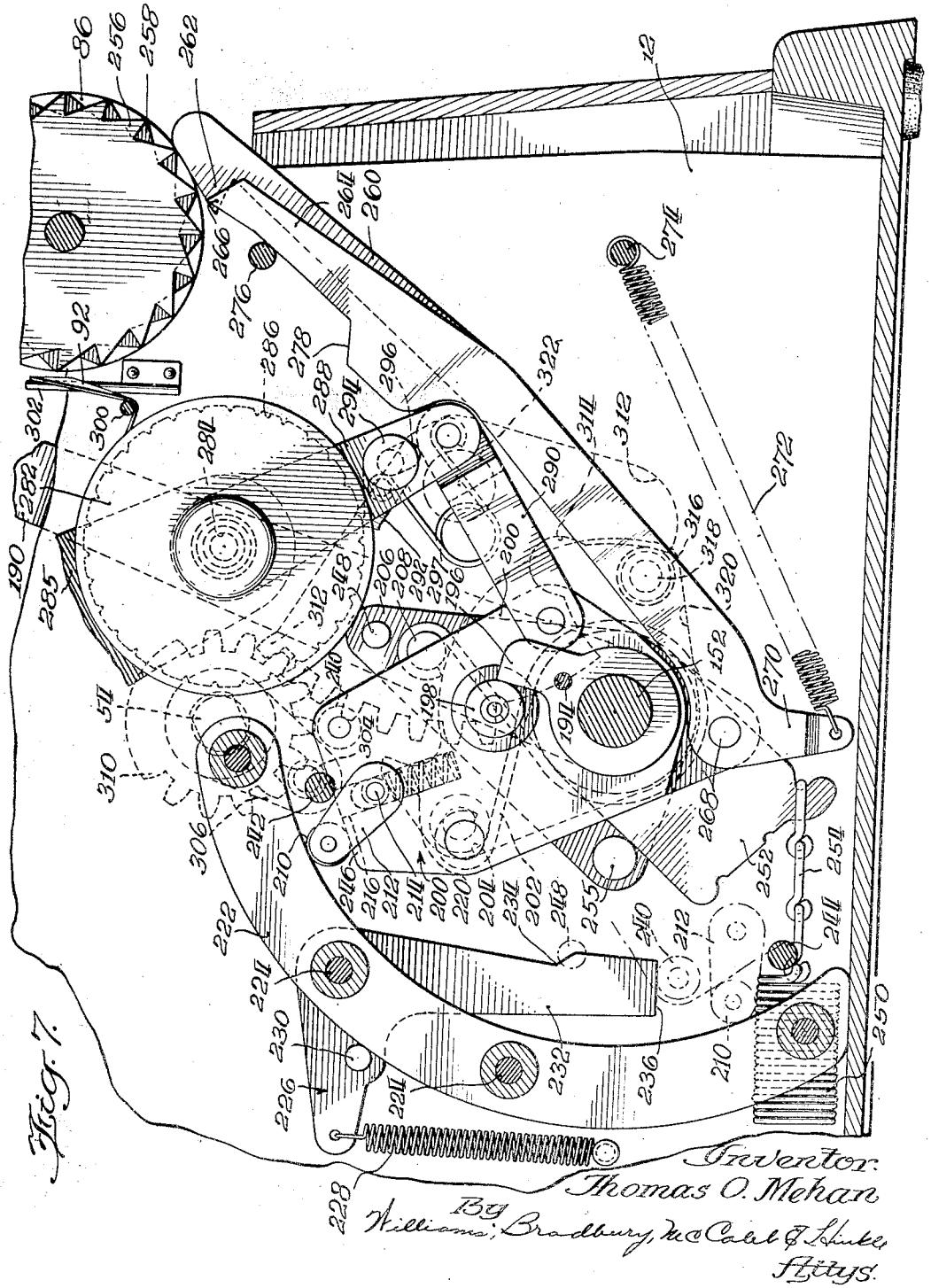

Fig. 7.

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UNITED STATES PATENT OFFICE

2,281,851

PRINTING MECHANISM FOR ADDING MACHINES

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Application February 1, 1937, Serial No. 123,320

10 Claims. (Cl. 101—96)

My invention relates generally to adding and listing machines, and more particularly to improvements in the printing mechanism used in such machines.

It is an object of my invention to provide an improved adding machine having a printing mechanism of very simple and economical construction.

A further object of my invention is to provide an improved visible "printing mechanism" for adding machines, using rotatable type carrying wheels as the impression members.

A further object is to provide an improved paper feeding mechanism for adding machines.

A further object is to provide an improved full stroke mechanism for adding machines and the like.

Another object is to provide an improved printing mechanism for adding machines which is substantially noiseless in operation.

A further object is to provide a printing mechanism for adding machines and the like in which the type are moved seriatim against the paper upon which the impression is to be made, thereby decreasing the noise of operation.

A further object is to provide an improved printing mechanism for adding machines, in which the use of hammers for striking the type has been obviated.

Other objects will appear from the following description, reference being had to the accompanying drawings, in which:

Fig. 1 is a central longitudinal sectional view of the machine;

Fig. 2 is a sectional view taken on the line 2—2 of Fig. 1;

Fig. 3 is a side elevational view of one of the type arm restraining latches;

Fig. 4 is a fragmentary sectional view taken on the line 4—4 of Fig. 1;

Fig. 5 is a fragmentary sectional view taken on the broken sectional line 5—5 of Fig. 1;

Fig. 6 is a fragmentary horizontal sectional view taken on the line 6—6 of Fig. 1; and

Fig. 7 is a longitudinal sectional view of the rear portion of the machine showing particularly the full stroke mechanism and the platen actuating means.

My present invention is illustrated as embodied in an adding and listing machine of the ten key, traveling carriage type, although many features of the invention may be utilized in machines of other types. The adding machine is shown as comprising a base 10 to which a right side frame plate 12 and a left side frame plate 14 are suitably secured. The major portion of the mechanism is enclosed in a casing 16 which is preferably an integral die casting. The adding machine features are not completely illustrated, since they may be of any well-known construction and include the usual control keys and mechanisms. I have, however, shown the most important elements of the adding machine as comprising a set of numeral keys 18 having offset and aligned key stems 20 mounted for sliding movement in suitable slots formed in a key plate 22. Each of the key stems is provided with a suitable return spring not shown in the drawings. The ends of the key stems 20 are cooperable with stop pins 24 mounted for longitudinal movement in a pin carriage 26 which is suitably mounted for slidable movement upon rods 28 and 30. A zero stop plate 32 is pivotally connected to the carriage and has a downwardly projecting flange 34 to serve as a zero stop for such of the actuating racks as are not to be moved from their normal positions, in the manner well-known in the art, and disclosed in my prior Patent No. 1,899,444, dated February 28, 1933.

It will be understood that upon successive depression of selected numeral keys 18, stop pins 24 corresponding to the keys depressed, will likewise be depressed and resiliently or frictionally held in depressed position, and that after each successive operation of one of the keys 18, the carriage 26 will be moved to the left (looking at the front of the machine) by a suitable escapement mechanism. Actuator racks 36, each having a stop lug 38 formed at its forward end, are mounted for longitudinal sliding movement in slotted comb members 40 and 41, being guided also by cross rods 42, 44 and 46, the latter projecting through a longitudinal slot 48 formed in each of the actuators. Long tension coil springs 43 are provided to move the actuators 36 rearwardly. Each of the actuators is provided with a rack 50 normally meshing with a toothed segment 52 pivoted upon a segment shaft 54. Also mounted upon the shaft 54 is a segment 56 complementary to the segment 52, but which is capable of movement relative thereto through an angle corresponding to the pitch of the teeth on these segments to effect a transfer or carryover. For the latter purpose, the carrying pawl 58 is swung counter-clockwise sufficiently to permit the sidewardly extending lug 60 formed upon the segment 56 to clear the end of the hook 62 formed at the upper end of the carrying pawl 58 and permit the segment 56 to move clockwise (Fig. 1) until the lug 60 is arrested by the contact with the

bight portion 64 of the carrying pawl. The segment 56 is influenced to effect such carrying movement by a tension coil spring 66 which connects the segments 52 and 56 and is adapted to rotate the segment 56 counterclockwise with respect to the segment 52 until such relative movement is arrested by contact of the end surface 68 of the segment 56 with a sidewardly bent lug 70 formed on the segment 52. An aligner 57 is operated by suitable means to hold the segments 56 during the portions of the cycle when they are stationary.

A set of accumulator wheels 72 mounted on an accumulator shaft 74 are adapted to be brought into mesh with the segments 56 and are respectively in mesh with subtracting pinions 76 mounted upon subtracting pinion shafts 78. The shafts 74 and 78 are carried by a movable frame consisting of two similar arms 80 which are suitably mounted for longitudinal sliding movement upon a tiltable frame 82. The frame 82 is oscillated upon each operation of the machine to bring the accumulator pinions 72 (or the subtracting pinions 76) into engagement with their respective actuating segments 56. The mechanism for accomplishing such engagement and disengagement of the accumulator pinions with the actuator may be of any suitable well-known construction, for example an adaptation of the wipe pawl mechanism shown in my aforesaid patent. When the accumulator pinions 72 are not in mesh with the segments 56, the frame in which they are mounted may be raised (from the position in which it is shown in Fig. 1) by means of a control bell crank 84, to bring the subtracting pinions 76 into position such that they will mesh with the segments 56 when the frame 82 is oscillated toward the segments 56.

A platen 86 is suitably mounted upon the machine, preferably in a manner so that it may be readily detached to permit the removal of the casing 16, the platen being provided with the usual friction roller or rollers 88 and a serrated tear strip 90. Any suitable means for carrying a paper roll may be provided, the paper strip 93 being fed in the usual manner between the platen and the friction roller 88 and beneath the tear strip 90. A ribbon 92 is fed transversely across the machine in front of the platen 86 by a suitable ribbon feeding mechanism, one form of which will be hereinafter described.

The type, bearing the characters 0 to 9 inclusive, are formed upon the periphery of a type wheel 94, each of which is suitably mounted for rotation upon a stud 96 secured to its associated type wheel carrying arm 98. Each of the type wheels 94 has a pinion 100 formed integrally therewith, or rigidly secured thereto. The pinions 100 mesh with idler pinions 102 mounted upon studs 104 which, like the stud 96, are supported by their respective type wheel carrying arms 98. The idler pinions 102 are normally in mesh with their respective toothed segments 52.

The type wheel carrying arms 98 are mounted for pivotal movement upon a transverse rod 106 which is suitably supported in the side frame plates 12 and 14, and each of the arms has a forwardly extending ear 108 to which a tension coil spring 110 is secured, the other ends of the coil springs 110 being anchored to the transverse comb member 41 which also serves as a guide for the rearward ends of the actuator racks 36. The type wheel carrying arms 98 are restrained from clockwise pivotal movement under the influence of their respective tensioned coil springs 110 by a rod 114 carried by bail arms 116, the latter being pivoted upon the shaft 106. The type wheel carrying arms 98 are, as best shown in Figs. 1 and 6, guided in slots 118 formed in a comb 120 which is secured between the frame plates 12 and 14. The comb 120 is also provided with slots 122 properly to space the segments 52. Further, the comb 120 is provided with guide surfaces 124 formed by widening the open end portions of the slots 118, for engagement with the aligner arms 126. The aligners 126 are pivoted upon the shaft 106, and each has a tooth 128 adapted to engage between the teeth of the pinions 102 respectively when the latter are moved from meshing engagement with the teeth of the segments 52. The engagement of the aligner teeth 128 with their respective pinions takes place prior to the complete disengagement of the pinions from the selectors so that the pinions 102 (and hence the type wheels 94) are at all times either under the positive control of the segments 52, or are nonrotatably locked by the teeth 128 of the aligner pawls 126. Each of the aligner pawls 126 has a rearwardly extending ear 130 forming an anchorage for a tension coil spring 132, the other end of which is connected to the adjacent type wheel carrying arm 98.

Each of the type wheel carrying arms 98 has, at its upper extremity, a saw-tooth projection 134 normally in engagement with the rearward edge of a slot 136 formed in a sear plate 138 which latter is secured to a shaft 140 pivotally mounted in the side frame plates 12 and 14. An actuating arm 142 is secured to the left hand end of the shaft 140 and has its free end pivotally connected to a link 144, the lower end of which is pivoted to the forwardly projecting arm 146 which is preferably integral with the arm 116 (Figs. 1 and 2). The forward end of the arm 146 carries a roller 148 which is cooperable with the edge of a plate cam 150. The cam 150 is secured to the main operating shaft 152 and is so shaped that the forward end of the lever 146, 116 will be raised (the lever swung clockwise) just prior to the end of the forward stroke of the operating handle, and will be lowered (swung counterclockwise) at the beginning of the return stroke of the operating handle.

Means are provided to prevent the rearward swinging movement of type wheel carrying arms 98 which are in denominational orders higher than that of the highest significant figure in the amount to be printed. In other words, although the machine illustrated is provided with ten number type wheels and carrying arms, when an amount having less than ten digits is to be imprinted, it is desirable to restrain the type wheel carriers for the unused higher denominational orders to prevent the printing of zeros to the left of the highest significant figure of the number being printed. This means comprises a plurality of restraining latches 154 pivotally mounted upon a cross shaft 156. Each of the latches 154 has a relatively long rearwardly extending arm 158 (Figs. 1, 3, and 5) terminating in a sidewardly bent lug 160, an upwardly extending ear 162 having a sidewardly extending lug 164 and a downwardly projecting arm 166 provided with a stop shoulder 168 and a diagonally bent tail portion 170. Each of the tail portions 170 has a tension spring 172 secured thereto, the other end of the spring being anchored to a bail bar 174 which is secured to, or formed integrally with, a pair of bail levers 176 pivoted upon the rod 156 and having their rearwardly

projecting arms connected by links 178 with the rod 114. The springs 172 normally hold the stops shoulders 168 of the latches in engagement with the lower edge of the bail bar 174. The arms 158 and 166 of the latches 154 are respectively guided in slots formed in a guide comb 180 which is secured to the side frame plates 12, 14. The sidewardly bent lugs 164 of the latches 154 lie beneath the path of movement of the lower edges of their respective actuators 36, so that if such actuator is moved beyond its zero position, the lug 164 will abut against the lower edge of the actuator and the latch thus held in substantially the position in which it is shown in Fig. 1. If, however, the actuator 36 is not moved beyond its zero position, its associated latch 154 will be free to swing clockwise when the bail bar 174 is swung clockwise just prior to the end of the forward stroke of the operating handle. When a latch is thus swung clockwise (under the influence of its tension spring 172), the sidewardly extending lug 160 at the rear end of the arm 158 of the latch will drop behind a projection 192 formed on its associated type wheel carrying arm and thus prevent clockwise swinging movement of the latter to its printing position when the type carrying arms are released by the raising of the sear 138. Furthermore, as best illustrated in Fig. 5, the tail portions 170 of each of the latches 154 overlie the adjacent edge 184 of the next adjacent higher denominational order latch, with the result that any latch in the tens or any higher denominational order which is held from clockwise movement (by virtue of the engagement of the lug 164 with the lower edge of the actuator rack 36) will be effective similarly to hold all of the latches of lower denominational order in their normal positions substantially as shown in Fig. 1, so that their associated type wheel carrying arms 98 will not be restrained from swinging movement by the lugs 160.

The edge of the slot 136 formed in the sear plate 138 is preferably so conformed, or the sear plate so shaped, that when the plate is raised the type wheel carrying arms 98 will not be released simultaneously, but will be released successively or seriatim and will be swung by their respective springs 132 to cause their selectively positioned type forcibly to strike the ribbon 92 and make a printing impression upon the paper strip 93. With a printing mechanism of this character, the use of the usual hammers for striking the type to cause the printing impression upon the paper is obviated and thus one of the principal causes of noise in the operation of adding machines eliminated. The arrangement of the sear 138 by virtue of which the type wheel carrying arms are successively released further reduces the amount of noise produced during the operation of the machine. It will be noted that at the time that the sear 138 is raised to release the type wheel carrying arms, the bail rod 114 will have swung clockwise through an angle of about fifteen degrees so that the bail rod will not interfere with the clockwise swinging movement of the type wheel carrying arms. However, after the printing has been effected, and during the initial portion of return stroke of the operating handle, the levers consisting of arms 146 and 116 will be swung counterclockwise by means of the cam 150, and the bail rod 114 thus brought into engagement with the heel portions 186 of the type wheel carrying arms 98 and swing such of the latter as have been released back to their normal positions (as shown in Fig. 1) with their saw-tooth projections 134 in latching engagement with the sear plate 138.

In addition to the quietly operating printing mechanism, I have provided a substantially silent full stroke mechanism to replace the usual noisy pawl and ratchet type of full stroke mechanism generally used on adding machines and thus further reduce the noise. This mechanism is best shown in Fig. 7, wherein the operating handle 190 is freely pivoted upon the main operating shaft 152 and has an arm 196 rigidly secured thereto, by means of a screw 194, or other suitable means. This arm 196 is engageable with a roller 198 suitably mounted upon a full stroke plate 200 which may pivot freely upon the main operating shaft 152. A relatively powerful torsion coil spring 202 has one end anchored by a suitable stud 204 to the full stroke plate 200, the coil of the spring being wound about the shaft 152 and its other end anchored to a triangularly shaped plate 206 by means of a stud 208. A full stroke clutch roller 210 is mounted for rotation at the end of the arm 212, the latter having a pin and roller 214 capable of sliding in a slot 216 formed in the full stroke plate 200. A compression coil spring 220 is provided to push the pin and roller 214 outwardly in its slot 216 (away from the axis of the main operating shaft 152). The full stroke roller 210 is adapted to roll upon the inner edge of an arcuate rail 222 which is secured by means of studs 224 to a secondary frame plate positioned to the right of the right side frame plate 12, and omitted from the drawings for the sake of clarity.

Pivotally mounted upon the rail 222 is a bell crank latch 226, the forwardly extending arm of which is normally held downwardly by a tension coil spring 228, such downward movement (counterclockwise, Fig. 7) being limited by a pin 230 which is engageable with the outer edge of the rail 222. The downwardly extending arm 232 of the bell crank latch 226 has a camming surface 234 formed on its rearward edge, and its lower end edge 236 is adapted to serve as a latch stop engageable with a stud 240 secured in the full stroke plate 200, under circumstances hereinafter to be described. A pair of pins 242 and 244 secured to the auxiliary frame plate at the right of the machine project into the path of movement of the arm 212 which carries the full stroke roller 210 and are adapted to be engaged thereby at the respective ends of the stroke of the latter so as to shift the roller 210 to opposite sides of the slot 216. In other words, upon the end of the return stroke, the arm 212 engages the pin 242 and swings the latter counterclockwise to the position in which it is shown in full lines in Fig. 7. At the end of the forward stroke of the operating handle, the arm 212 engages the pin 244 and the arm is thereby swung clockwise from its former position relative to the full stroke plate 200 to the position in which it is shown in dotted lines in Fig. 7. From this description, it will be apparent that during counterclockwise swinging or rotary movement of the full stroke plate 200 the roller 210 will roll freely along the inner edge of the rail 222 since any tendency for the roller to bind between the inner edge of the rail 222 and the upper edge 246 of the full stroke plate 200 will result in slight clockwise pivotal movement of the arm 212, but with the roller rolling freely upon the rail, such movement of the arm 212 will not be sufficient to throw the arm past its dead cen-

ter against the compressive force of the spring 220. If, however, after completion of a portion only of the forward stroke of the operating handle, it is attempted to move the handle in the direction of its return stroke, the roller 210 will bind between the inner edge of the rail 222 and the upper edge 246 of the full stroke plate and lock the full stroke plate 200 against return movement in a manner similar to that employed in roller clutches. When the full stroke plate 200 reaches the forward limit of its stroke, the stud 240 will engage beneath the stop surface 236 of the bell crank latch 226 if, due to some irregularity in the operation of the adding machine, the triangular plate 206 has not followed exactly the movement of the full stroke plate. If, however, the adding machine mechanism is operating properly, and the operating handle has not been pulled too rapidly, a stud 248 projecting from the upper end of the triangular plate 206 will engage the cam surface 234 of the depending arm 232 of the bell crank latch 226 and swing the latter clockwise against the tension of its spring 228, thereby to shift the stop surface 236 thereof out of the path of the stud 240, and thus permitting the stud 240 and its full stroke plate 200 to commence its return stroke.

The main shaft 152 is operated upon its return stroke by means of a relatively strong tension coil spring 250 which is secured to a plate 252 by means of a chain 254, the plate 252 being pivotally secured to the main shaft 152. A driving connection between the triangular plate 206 and the plate 252 is effected by means of a stud 255 which projects sidewardly from the plate 206 forming an abutment for the edge of the plate 252. Any suitable form of dashpot may be provided to control the speed of operation of the machine.

As best shown in Fig. 7, the platen 86 is provided with a pair of ratchet wheels 256, 258, the teeth of which face in opposite directions. A pawl 260 having a tooth 262 is provided for engagement with the ratchet wheel 258 while a pawl 264 having a tooth 266 cooperates with the ratchet wheel 256. The pawls 260 and 264 are pivotally secured to an arm 268 which is secured to the main shaft 152. Each of the pawls is provided with an ear 270 to each of which one end of a tension coil spring 272 is attached, the other ends of these springs being anchored to a stud 274. The springs 272 normally hold the pawls in the positions shown in Figure 7, the pawl 264 being in engagement with a stud 276. Thus, upon counterclockwise movement of the operating shaft 152, the pawl 264 will engage the ratchet wheel 256 and rotate the platen in a counterclockwise direction through an angle corresponding to the pitch of two teeth of the ratchet wheel 256, whereupon the inclined camming surface 278 formed on the pawl 264 will engage the guide stud 270 and disengage the tooth 266 of the pawl 264 from the ratchet wheel 256. During this rearward and upward movement of the pawls 260 and 264, which continues during the forward stroke of the operating handle, the retracting pawl 260 will, of course, slide over the teeth of the ratchet wheel 258. Upon the commencement of the return stroke of the operating handle (clockwise movement of the main shaft 152), the tooth 262 of the pawl 260 will engage the ratchet wheel 258 and rotate the platen 86 clockwise through an angle represented by three times the pitch of the teeth on the ratchet wheel 258, thus bringing the amount printed upon the record strip above the edge 280 of the casing 16 so that it will be clearly visible. It will thus be seen that the amounts printed upon the record strip 93 will be spaced one beneath another with the usual close spacing and yet the last amount printed will be made visible above the edge 280 of the casing shortly after the completion of the printing operation. If the platen were not rotated backwardly prior to the printing operation, the printing line would be several spaces below the line of sight at which the amount printed would be visible.

To secure inking of the type wheels, I provide a pair of ribbon spools 282, detachably secured at each of the inner sides of the outer frames (not shown) upon suitable rotatable stub shafts 284 carried by brackets 285. A notched wheel 286 is nonrotatably secured to the right hand shaft 284. An arm 288 is pivotally mounted upon the right hand stub shaft 284, the outer end of the arm 288 being connected by a link 290 with the full stroke plate 200. A double acting pawl 292 has its pivot stud 294 mounted for sliding movement in a slot 296 formed in the arm 288, the pawl 292 being normally held in resilient engagement with the notched wheel 286 by a spring 297. The left hand ribbon spool 282 is similarly mounted upon the left side frame plate 14 and is provided with an ordinary pawl end ratchet friction drive feed which is operable to rotate the left hand ribbon spool in one direction only. The right hand ribbon spool is, however, capable of being driven in either direction by the double acting pawl 292. Whenever the tension upon the ribbon becomes sufficient, due to the fact that the full length of the ribbon has been wound upon the right hand spool 282, the pawl 292 snaps over to a position such that its point will project toward the opposite side of the arm 288 from the position in which it is shown in Fig. 7. In this way the direction of the ribbon feed is automatically reversed whenever all of the ribbon has been wound upon one of the spools. From the above, it will be understood that the ribbon will alternately wind upon each of the spools first in a clockwise and then in a counterclockwise direction. The ribbon 92 is fed from the spool past suitable guide posts 300 and 302 so as to lie in proper position between the type wheels 94 and the platen 86. The casing is provided with suitable apertures to permit insertion and removal of the ribbon spools 282 whenever it is found necessary to replace the ribbon. Other usual means, such as the means for detachably holding the ribbon spools upon the shafts 284, as are common in the art may be employed.

The segments 52 and thus the actuating racks 36 are returned to normal position by means of a bail rod 304 carried by a pair of bail arms 306 mounted upon the shaft 54. The bail rod 304 projects through suitable arcuate slots 308 formed in the segments 52. The shaft 54 is rotated by means best shown in Fig. 7, wherein the end of the shaft 54 is provided with a mutilated pinion 310, the teeth of which are in engagement with the teeth of a gear sector 312. The gear sector has a generally U-shaped notch 314 formed therein for engagement by a roller 316 rotatably mounted on a stud 318 which in turn is secured to a cam plate 320 rigidly secured to the main operating shaft 152. The roller 316 through engagement with the edges of the notch 314 formed in the sector 312 causes the latter to have an oscillatory movement about its pivot

stud 322 near the beginning and near the end of the operating cycle.

Shortly after the commencement of the forward stroke of the operating handle, the gear sector 312 is swung clockwise and the shaft 54 thus turned counterclockwise so as to permit movement of the sectors 52 and actuator racks 36 under the influence of the springs 45. Then shortly prior to the completion of the return stroke of the operating handle, the gear sector 312 will be swung counterclockwise, and hence the shaft 54 rotated clockwise thereby, through the bail 304, restoring the segments 52 and actuator racks 36 to normal position as shown in Fig. 1.

The machine of my invention is operated in the usual manner of a ten-key adding machine. Upon depression of the keys 18, the amount desired to be added and printed is set up in the pin carriage 24, 26, whereupon the operating handle is swung forwardly to permit the springs 45 to move the actuator racks 36 rearwardly until their respective stop lugs 38 abut against such of the pins 24 as may have been set in depressed position. The type wheels 94 are geared to the actuator racks 36 through the segments 52 and idler pinions 102 so that the item set up by means of the keyboard will be likewise set up in the type wheels 94. Near the forward end of the operating stroke, the bail rod 114 will be swung clockwise, thereby conditioning such of the type wheel carrying arms 98 as are not restrained from movement by their associated lugs 160 of the latch members 154 will be released by the sear 138 and will swing rapidly to printing position under the influence of their respective springs 110. Due to the relatively great weight of the type wheels 94 and the parts which swing therewith when the type are moved to printing position, a relatively sharp blow resultant in a good printing impression will occur as the type wheels strike the ribbon. However, since the blow is against the relatively soft material of the ribbon, backed by the record strip and platen, there will be very little noise and the usual relatively loud noise of metallic hammer striking metallic type as is found in the prior art adding machines of this general character is thereby avoided.

After the item has been printed upon the record strip, the platen is advanced a sufficient distance to bring the printed item above the upper edge 230 of the casing 16 so that the amount imprinted will be visible to the operator. Thereafter the type wheel carrying arms 98 will be returned to normal position by means of the bail rod 114 in which position they are latched by the sear 138. Thereafter, the idler pinions 102 will again be brought into mesh with the segments 52 which will not have moved from their set positions during the printing operation. To assure that there shall be no movement of the segments 52, 54, an aligner 57 is moved into mesh with the sectors 56 just prior to the time that the idler pinions 102 are disengaged from the segments 52. Upon remeshing of the idler pinions 102 with the segments 52, either the accumulator pinions 82 (or in the case of subtraction, the subtractor pinions 76) are brought into mesh with the sectors 52. Thereafter, the shaft 54 is rotated clockwise to return the sectors 52 together with their actuating racks 36 to normal positions and the amount entered into the accumulator. During this operation, the type wheels 94 will likewise be brought to normal or zero position, and the transfer or carry-over mechanism will be operated as may be necessary.

While I have described the machine as being hand operated, it will be apparent to those skilled in the art that a suitable electric motor drive might be substituted for the operating handle, and while I have shown and described a particular embodiment of the invention, many variations and modifications may be made without departing from the basic principles thereof, and coming within the scope of the claims which follow.

I claim:

1. In an adding machine, the combination of pivoted arms, a numeral type wheel carrying pinion and an intermeshing idler pinion rotatably mounted upon each of said arms, said type wheels having type characters upon the peripheral faces thereof, a platen, means for selectively rotating said type wheels to position a predetermined type thereof for cooperation with said platen, springs for moving said arms and type wheels toward said platen, a sear for holding said arms and type wheels from movement under the influence of said springs, means to move said sear to release said arms and type wheels for movement toward said platen under the influence of said springs, normally ineffective latching means individual to each of said arms and means to move said latching means prior to releasing movement of said sear to positions to restrain their respective arms from movement toward said platen, said latching means having parts cooperable with said type wheel rotating means to prevent movement of said latches to arm restraining position when their associated type wheel rotating means have been operated.

2. In an adding machine, a casing, the combination of a pivoted arm, a type wheel rotatably mounted upon said arm, said type wheel having type characters upon the peripheral face thereof, said type wheel and arm being located within said casing at all times, a platen, means for selectively rotating said type wheel to position a predetermined type character thereof for cooperation with said platen, a spring for moving said arm and type wheel toward said platen, a sear for holding said arm and type wheel from movement under the influence of said spring, and means to move said sear to release said arm and type wheel for movement toward said platen under the influence of said spring.

3. In an adding machine, the combination of a plurality of pivoted arms, a type wheel mounted for rotation upon each of said arms, a spring on each of said arms for moving said arm and type wheel from type adjusting position to printing position, a sear common to all of said arms for holding said arms against movement by their respective springs, means cooperable with said type wheels when they are in type adjusting position selectively to set the wheels for making a predetermined impression, and individual means movable respectively with said arms to hold said type wheels in set position during their movement toward and away from printing position while they are not in cooperative engagement with said selective type wheel setting means.

4. In an adding machine, the combination of a plurality of pivoted arms, one for each denominational order, a type wheel mounted for rotation upon each of said arms, a spring on each of said arms for moving said arm and type wheel from type adjusting position to printing position, a sear common to all of said arms for holding

said arms against movement by their respective springs, means cooperable with said type wheels respectively when they are in type adjusting position selectively to set the wheels for making a predetermined impression, means individual to and movable with said arms respectively to hold said type wheels in set position during the periods of their movement toward and away from printing position while they are not in cooperative engagement with said selective type wheel setting means, and means controlled by the type wheel setting means of the highest denominational order which has been actuated to condition the arms of said denominational order and the arms of all lower denominational orders for actuation by their respective springs.

5. In an adding machine having a housing, the combination of a plurality of type carrying members, a type wheel mounted for rotation on each of said members, said type wheels having numeral type on their peripheral faces and being located within said housing at all times, a platen, resilient means engageable with said type carrying members to swing the latter toward said platen, a plurality of differentially movable elements for selectively rotating each of said type wheels, latches for respectively holding said type wheels in engagement with one of said differentially movable elements, a restraining latch for each of said type carrying members cooperable with one of its associated differentially movable elements to hold its associated type carrying member from movement toward said platen, a sear common to all of said type carrying members for holding them against movement toward said platen, and means to operate said sear to release such of said type carrying members for such movement as are not held by their restraining latches.

6. In an adding machine, the combination of a plurality of type carrying arms, an integral type wheel and idler pinion meshing therewith mounted for rotation on each of said arms, said type wheels having numeral type on their peripheral faces, a platen, resilient means engageable with said type carrying arms to swing the latter toward said platen, differentially movable members for differentially rotating said type wheels, a common sear for holding all said type carrying arms with their type wheels in engagement with said differentially movable means, a restraining latch for each of said type arms cooperable with said differentially movable members to hold its associated type arm from movement toward said platen, additional means common to all of said type arms for holding them against movement toward said platen and for restoring said type arms from positions adjacent said platen to positions for rotation by said differentially movable members, and means to operate said latch to release said type arms for movement.

7. In an adding and listing machine, the combination of key controlled actuator racks, segments meshing with said racks, type wheels normally geared to said segments, a platen, pivoted arms each carrying one of said type wheels, resilient means acting upon said arms to move said type wheels against said platen to make a printing impression, a sear for holding said type arms against movement by their respective resilient means, latching means operable to restrain movement of said arms, each of said latching means being cooperable with one of said arms and being controlled by the actuator rack associated with its arm, means to operate said sear to release said arms after the type wheels have been moved to selected positions by said racks, and means to restore said arms to normal position in latching engagement with said sear and with said type wheels geared to said segments.

8. In an adding machine, the combination of an actuator rack, a gear meshing with said rack, a type wheel rotatable by said gear, an arm normally holding said type wheel in position for operation by said gear, a sear engaging said arm to hold the type wheel in such position, a platen, means to swing said arm to bring the type wheel thereon into printing engagement with said platen, a restraining latch having means engageable with said arm to hold it against movement toward said platen, and means on said latch engageable with said actuator rack to prevent said latch from restraining said arm.

9. In an adding and listing machine, the combination of key controlled actuators, toothed segments operable by said actuators, type wheels normally geared to said segments, a platen, a plurality of elements each carrying one of said type wheels, resilient means acting upon said type carrying elements to move said type wheels against said platen to make a printing impression, a sear for holding said type carrying elements against movement by their respective springs, latching means operable to restrain movement of said elements, each of said latching means being cooperable with one of said elements and being controlled by the actuator associated with its element, means to cause movement of said latching means to restraining positions unless their associated actuators or a higher denominational order actuator has been operated, means to operate said sear to release said elements after the type wheels have been moved to selected positions by said actuators, and means to restore said elements to normal position in latching engagement with said sear.

10. In an adding machine, the combination of an actuator, a type wheel rotatable by said actuator, an arm normally holding said type wheel in position for operation by said actuator, a sear engaging said arm to hold it in such position, a platen, resilient means to swing said arm to bring the type wheel thereon into printing engagement with said platen, a restraining latch having means engageable with said arm to hold it against movement toward said platen, means on said latch engageable with said actuator to prevent said latch from restraining said arm, and means to return said arm from the position in which its type wheel is in printing engagement with said platen to the position in which said arm is latched by said sear.

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