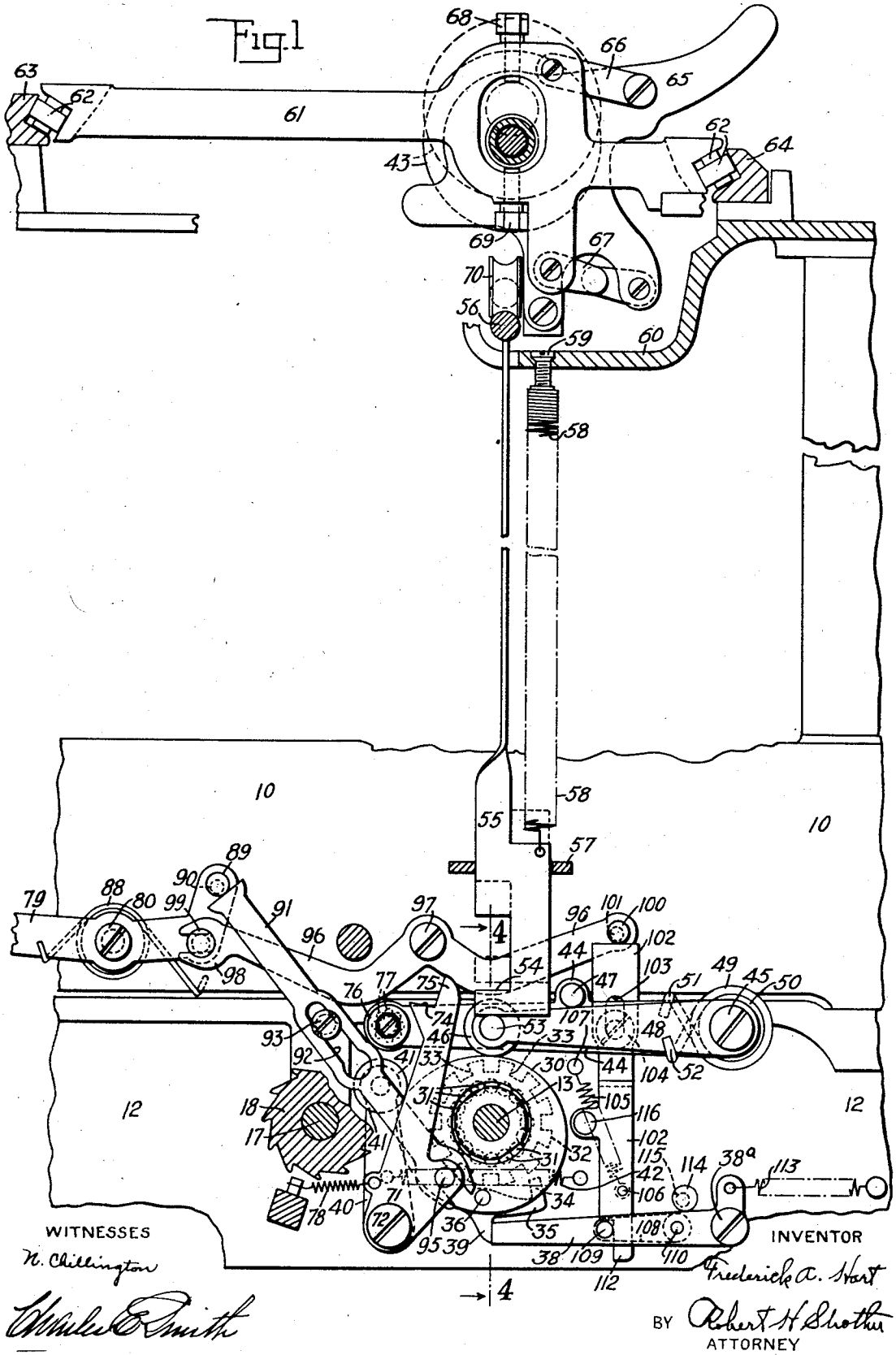
Oct. 3, 1933. F. A. HART 1,929,064

TYPEWRITING MACHINE

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Fig. 1



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TYPEWRITING MACHINE

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Fig. 2

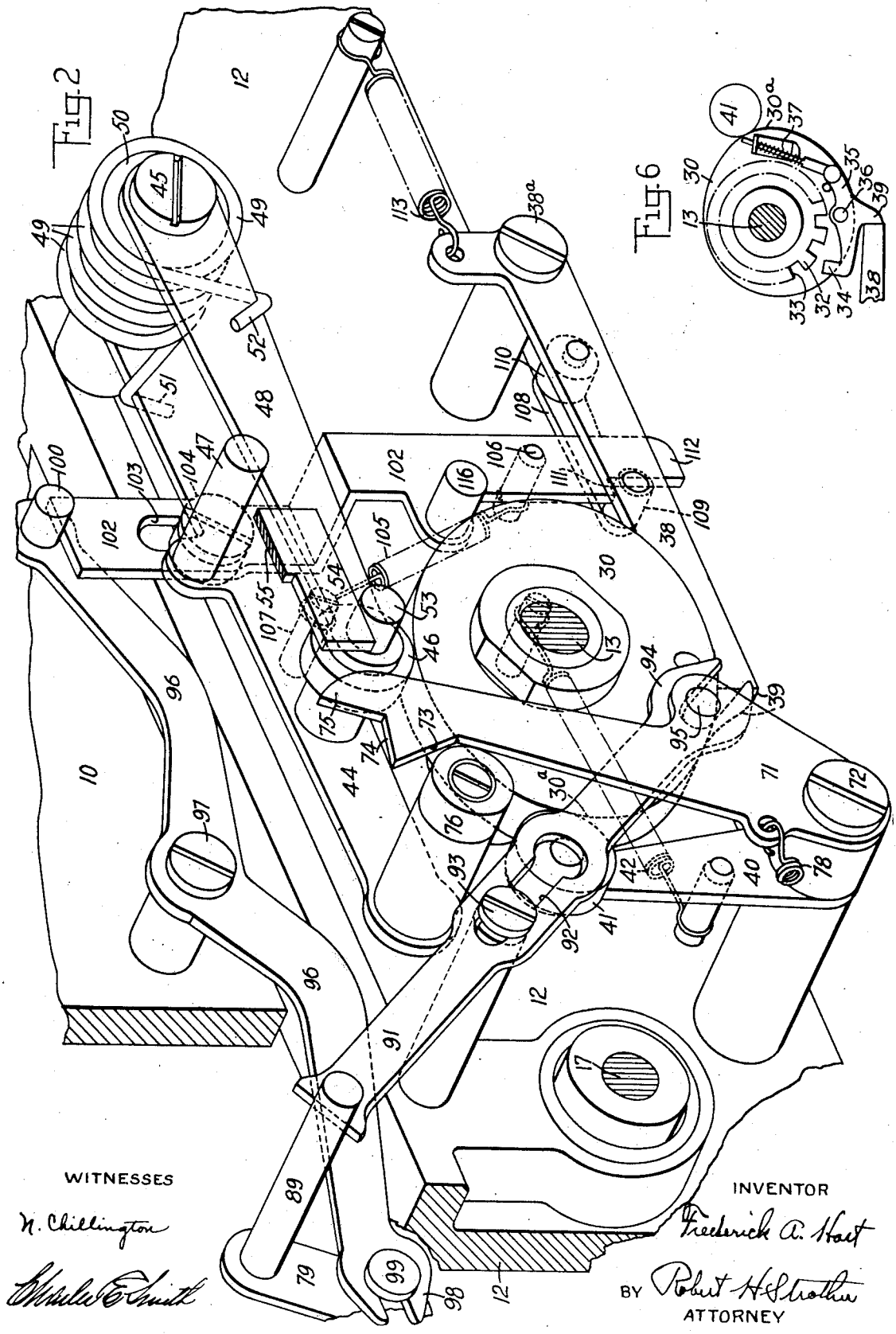


Fig. 6

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TYPEWRITING MACHINE

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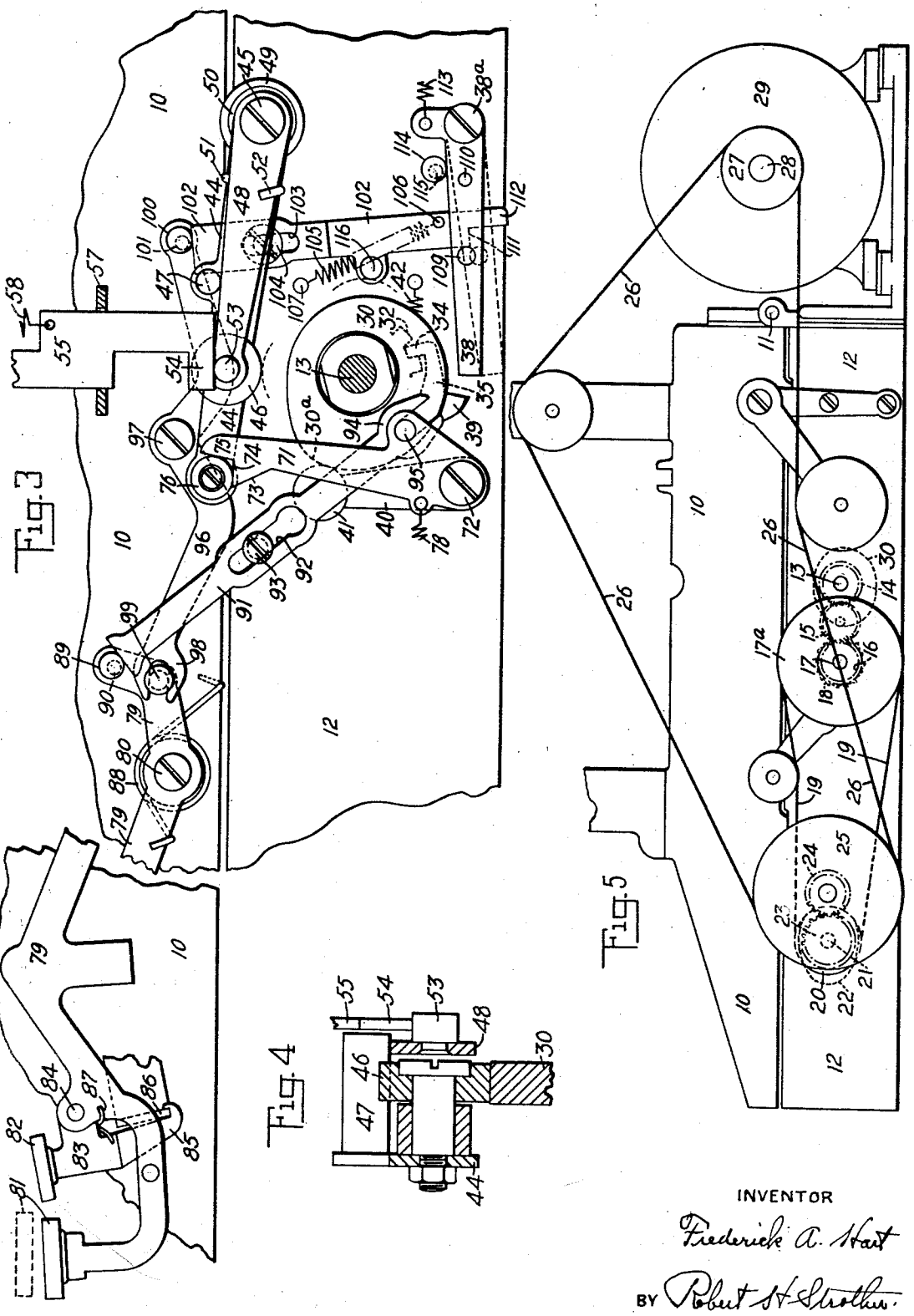


Fig. 3

Fig. 4

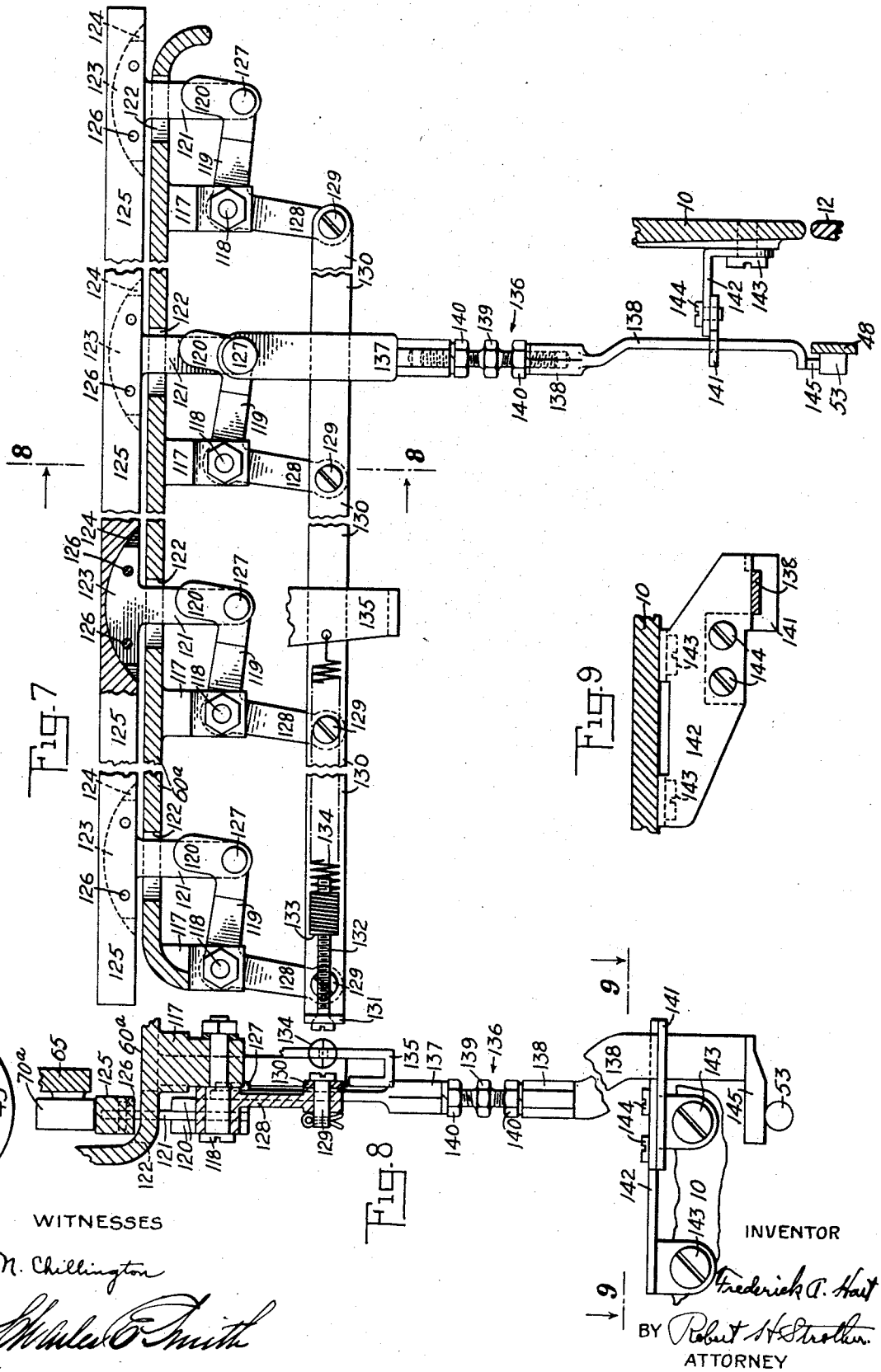
Fig. 5

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TYPEWRITING MACHINE

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UNITED STATES PATENT OFFICE

1,929,064

TYPEWRITING MACHINE

Frederick A. Hart, Stamford, Conn., assignor to Remington Typewriter Company, Ilion, N. Y., a corporation of New York

Application December 1, 1931. Serial No. 578,264

25 Claims. (Cl. 197—73)

My invention relates to typewriting and like machines and more particularly to case shift mechanism therefor.

One of the main objects of my invention, generally stated, is to provide improved and highly efficient power actuated case shift mechanism.

A further object of my invention is to provide power driven case shift mechanism which may be readily incorporated in existing machines without modifying, or materially modifying, existing structural features thereof.

To the above and other ends which will hereinafter appear, my invention consists in the features of construction, arrangements of parts and combinations of devices set forth in the following description and particularly pointed out in the appended claims.

In the drawings, wherein like reference characters indicate corresponding parts in the different views:—

Fig. 1 is a detail, fragmentary, side elevation, with parts in section, of as much of a typewriting machine as is necessary to illustrate my invention in its embodiment therein, the parts being shown in the normal position.

Fig. 2 is an enlarged, detail, perspective view of some of the parts of the case shifting mechanism shown in Fig. 1.

Fig. 3 corresponds in part to Fig. 1 but shows the parts in the actuated position as they appear when the case shift key is held depressed, but before the actuating cam has completed its cycle.

Fig. 4 is an enlarged, detail vertical sectional view taken on the line 4—4 of Fig. 1 and looking in the direction of the arrows at said line.

Fig. 5 is a diagrammatic side view illustrating the driving connections from the motor to the case shift mechanism.

Fig. 6 is a detail view of the actuating cam and associated parts as viewed from the left-hand side of the machine.

Fig. 7 is a detail, fragmentary rear elevation, with parts in section, of a modified form of means for mounting and transmitting movement to the case shiftable part or shift rail.

Fig. 8 is a detail vertical sectional view of the same taken on the line 8—8 of Fig. 7 and looking in the direction of the arrows at said line.

Fig. 9 is an enlarged, detail, transverse sectional view taken on the line 9—9 of Fig. 8 and looking in the direction of the arrows at said line.

I have shown my invention in the present instance embodied in a "Remington electrified bookkeeping machine" such as is disclosed in my application Serial No. 510,941, filed Jan. 24, 1931, and in which the present invention, or certain features thereof, may be readily incorporated without modifying, or materially modifying, the existing structural features of such machine.

In said machine the upper main frame section 10 of the combined typewriting and computing machine is hinged at 11 (Fig. 5) to the base section 12 of the frame. In accordance with my present invention the parts of the power actuated case shift mechanism are so constructed and arranged as not to interfere with the swinging back of the section 10 on its base section 12, and coacting parts on the two sections will, nevertheless, be brought into cooperative relation when the upper frame section 10 is lowered to effective position on the base section 12, as will hereinafter more clearly appear.

A driving shaft 13 is mounted in suitable bearings in the base section 12 of the frame, and at the left-hand end thereof where it extends beyond the base section, said shaft is provided with a gear 14. The gear 14 meshes with an idler 15 that in turn meshes with a gear 16. The gear 16 is carried by a shaft 17 on which a snatch roll 18 is fixed, said snatch roll actuating the alphabet printing type bars, not shown. The right-hand end of the shaft 17 has a pulley 17^a secured thereto. An endless belt 19 coacts with the pulley 17^a and with a smaller pulley 20 on the right-hand end of a shaft 21 on which cams 22 for actuating numeral printing type bars (not shown) are mounted. A gear 23 on the right-hand end of the shaft 21 meshes with a pinion 24 on a driving pulley 25. An endless belt 26 coacts with the pulley 25 and is driven from a pulley 27 on the shaft 28 of an electric motor 29 that runs continuously, in the present instance, when the machine is in use. Motion is thus transmitted from the motor shaft 28 through the belt 26 to the shaft 21 and from said shaft through the belt 19 to the snatch roll shaft 17 and from the latter to the shaft 13.

The shaft 13 is employed in the machine for other purposes than those about to be described, as will be understood, for example, from a consideration of my application Serial No. 575,345, filed Nov. 16th, 1931. I avail myself of the use of this shaft in the present instance on which to loosely mount a cam 30 by which the case shift mechanism is actuated. As will be understood from a consideration of Fig. 1 the cam 30 is preferably mounted through ball bearings 31 on the shaft 13. Arranged beside the cam 30 and

fixed on the shaft 13 is a locking wheel 32, as shown in Figs. 1 and 6. This locking wheel is notched at regular intervals, as indicated at 33, for the reception of the nose 34 of a locking pawl or latch 35. Said latch is pivoted at 36 on one side of the cam and a spring 37 coacts with the latch to force it into engagement with the locking wheel 32 and cause the cam 30 to turn with the motor driven shaft 13 on which the cam is mounted. A trip 38 normally coacts with a projection 39 on the latch 35 to hold the latter against the force of its spring 37 disengaged from the locking wheel 32, and to hold the cam against movement while the continuously moving shaft 13 turns independently thereof. At this time the reactive force of the spring 37 tends to turn the cam anti-clockwise as the parts are shown in Fig. 6. In order to overcome this difficulty I provide a high spot 30^a on the cam and provide a pivoted arm 40 that carries a roller 41 and is drawn by a spring 42 towards the cam 30. The roller 41 bears against the periphery of the cam and when the parts are in the normal position, shown in Fig. 6, the roller will bear against the cam above the high spot 30^a thereon and resist the tendency of the cam to turn in an anti-clockwise direction (as the parts are shown in this view) under the reactive force of its latch spring 37. For this purpose it will be understood of course, that the effective force of the spring 42 is such that it will overcome the effective force of the latch spring 37.

Motion is transmitted from the cam 30 to the part that receives a case shifting movement, the platen 43 in the present instance, by the following means:

An arm or member 44 is pivoted at 45 and carries an anti-friction roller 46 that bears against the periphery of the cam 30 to effect an upward movement of the arm when the cam revolves through the first half of its revolution. The second half of the revolution of the cam 30 brings the low portion thereof beneath the roller 46 and enables the arm 44 to return to its lowermost position when such arm is released from restraint of its latching means to be hereinafter described.

The arm 44 carries a laterally projecting pin 47 that overlies an independently movable shifting arm or member 48 arranged parallel with the arm 44 and mounted to turn on the same pivotal center 45 as said arm 44. A spring 49 is coiled about a spacing sleeve 50 supported on the pivot 45 and arranged between and separating the arms 44 and 48. One end 51 of this spring bears down on the arm 44, whereas the other end 52 of the spring bears upward against the arm 48. The effective force of the spring is therefore exerted to normally hold the arms 44 and 48 together to move as one part, and its force is sufficient to afford a lifting of the platen without flexing said spring or changing the relation of the arms until the shifting platen meets a positive resistance, or is arrested by the usual case shift stops, as will hereinafter more clearly appear. When this does occur the arm 48 will be arrested, whereas the arm 44 will continue its motion under the action of the cam 30 and the stressed spring 49 will apply its force to hold the shifted platen in its shifted position and against rebound, as will presently more clearly appear.

The arm 48 carries a laterally projecting pin 53 at the free end thereof. The forwardly projecting end 54 of an upright link or shifting member 55 overlies the pin 53, so that the member 55 is raised by and with the arm 48. In Fig. 1 I have shown the member 55 connected to the usual case shift rail 56, the member 55 being guided at its lower end in a slotted guide 57 on the frame section 10 and connected to the lower end of a counter balance spring 58, the upper end of said spring being adjustably connected to an adjusting screw 59 carried by the top plate 60 of the machine. In this figure the usual Remington carriage structure is shown comprising a truck 61 mounted on crossed bearing rollers 62 that coact with fixed front and rear guide rails 63 and 64 respectively to support the carriage in its movement over the top plate from side to side of the machine. A platen frame 65 supports the platen 43 and is connected to the truck by parallel links 66 and 67 to afford case shifting movements of the platen from and back to normal position, the platen being arrested in such movements by the usual case shift stops 68 and 69. A centrally disposed roller 70 on a cross bar of the platen frame bears on the shift rail 56, and as the latter is elevated to the dotted line position in Fig. 1 the platen will be elevated to the upper case position.

From certain aspects of my invention the character and construction of the parts to be shifted by the arm 48 is immaterial, it being immaterial whether the platen or type basket is shifted. However, I have devised a special form of construction shown in Figs. 7, 8 and 9 which I prefer to employ in combination with the power actuated case shift devices disclosed herein, but which may be employed in other constructions with or without power actuated means. Such features disclosed in Figs. 7, 8 and 9 are claimed herein and will be hereinafter described in detail.

It will be understood from what has been said that when the case shifted part, the platen 43 in the present instance, is arrested in its shifted position by the stops 68, a further elevation of the arm 44 by the cam 30 will cause said arm to move independently of the arrested arm 48, thus further stressing the spring 49 and exerting its force to hold the shifted platen in its shifted position and against rebound. It also will be understood that the interpositioning of the spring 49 between the cam actuated parts and the part which is arrested prevents injury and possible breakage and enables the parts to be made with less precision, and to function properly whatever may be the adjustment of the stops 68.

In order to lock the platen in its shifted position at each depression of the case shift key and to hold the platen thus locked until the key is released, even though the cam 30 has completed its cycle, I provide the following devices:

A latch, designated as a whole by the reference numeral 71, is pivoted at 72 to the base section 12 of the frame. This latch is provided with a cam edge 73 and a locking shoulder 74, and a finger or stop 75 extends up in the rear of the shoulder. The arm 44 carries an anti-friction roller 76, preferably mounted on ball bearings, as indicated at 77 in Fig. 1. There is a spring 78 connected to the latch 71 which tends to pull it forward and bring the shoulder 74 thereon beneath the roller 76, as shown in Fig. 3, when the arm 44 is elevated. If the latch in its forward movement should encounter the roller 76 before the latter reaches the uppermost shifted position the cam 73 will bear against the roller and hold the latch retracted until the roller is elevated to clear the cam 73. Then, in the event that the case shift

key is held depressed, the spring 78 will be effective to pull the latch 71 forward and bring the shoulder 74 beneath the roller 76 and lock the platen in the upper case shifted position.

I will now explain how the latch 71 is controlled by the case shift key.

As shown in Fig. 3 a case shift key lever 79 is pivoted at 80 to the upper frame section 10. This lever carries a case shift key 81 and a case shift lock key 82. The latter key is carried by a locking lever 83 pivoted at 84 of the lever 79 and provided with a depending engaging arm 85 adapted, when the key 82 is depressed, to engage a fixed abutment 86 and lock the lever 79 in its actuated position, as shown in Fig. 3. A spring 87 coacts with the lever 83 to free it from the abutment 86 when the key 81 is depressed, thus releasing the lever 79 and enabling it to return to normal position when the operator releases the key. A spring 88 coacts with lever 79 to return it to normal position and the effective force of this spring is greater than that of the spring 78 for reasons which will presently appear. The rear end of the lever 79 is provided with a laterally projecting contact on pin 89 preferably adjustably mounted on the lever as by an eccentric 90. This contact coacts with the upper end of a slide 91, slotted at 92 intermediate its ends to receive the stem of a headed supporting screw 93 that is threaded into the base section 12 of the frame. The lower end of the slide 91 is forked at 94 to straddle a pin 95 that projects laterally from the latch 71.

When the parts are in the normal position shown in Fig. 1, the excessive force of the spring 88 acting through the lever 79 and slide 91 will overcome the force of the spring 78 and hold the latch 71 in the ineffective position shown in said figure. When, however, either of the keys 81, 82 is depressed the force of the spring 78 is effective to move the latch 71 forward and when the roller 76 is elevated the shoulder 74 on the latch will be brought beneath said roller and lock the parts in shifted position. This condition will maintain as long as either of the keys 81, 82 is held depressed even though the cam 30 has no control of the arm 44, as indicated in Fig. 3. When the depressed key 81 or 82 is released, the return of the lever 79 to normal position will release the latch 71 and enable the case shifted parts to return to normal position, the roller 46 dropping down on the cam 30 which has completed its cycle.

The provision of ball bearings on which to mount the roller 76 enables the latch 71 to be easily moved to ineffective position by the action of the spring 88 notwithstanding the weight of the shiftable platen etc. exerted on the roller 76 and against the shoulder 74 of the latch.

I will now describe the means for controlling the trip 38 to enable the cam 30 to make one revolution, and only one revolution, at each depression of a case shift key.

A sub-lever 96 is pivoted intermediate its ends at 97 to the upper frame section 10. The forward end of this sub-lever is forked at 98 to straddle a head pin 99 that extends laterally from the rear end of the case shift key lever 79. The rear end of the sub-lever 96 carries a laterally projecting pin for contact 100 thereon. Said contact is preferably adjustable on the sub-lever, as for example by an eccentric 101 thereon received in an opening in the sub-lever. This contact 100 coacts with the upper end of a sliding and swinging releasing device 102 slotted at 103 to receive the stem of a headed screw 104 threaded into the base section 12. A contractile returning spring 105 is connected at one end to a pin 106 on the device 102 and at the other end to a pin 107 on the base section 12. The force of this spring is effective not only to move the device 102 upward but also to pull the lower end thereof forward. From an inspection of Fig. 2 it will be seen that the lower end of the device 102 extends through and is guided in a space between the trip 38 and a guide bar 108 spaced apart from but secured at its ends to the trip by shouldered rivets 109 and 110. The lower end of the releasing device 102 is notched to provide an engaging shoulder 111 and a depending finger 112 adjacent thereto.

In the normal disposition of the parts shown in Fig. 1 the trip 38 is held in its effective position by a returning spring 113, the trip itself being pivoted at 38^a to the base section 12. A stop 114 mounted on an eccentric 115 extends into the path of the trip 38 and limits its return movement. In the normal position of the parts the finger 112 on the releasing device 102 bears against the rivet 109 and limits a further forward swinging movement of the releasing device, the shoulder 111 on said device at the same time engaging the rivet 109. The releasing device also has a contact or pin 116 extending laterally therefrom in the path of the high portion of the cam 30.

From the foregoing description it will be understood that a depression of a case shift key 81 or 82 not only results in releasing the latch 71 to enable it to function, but through the sub-lever 96 depresses the releasing device 102 against the force of its spring 105. This results in moving the trip 38 down to disengage it from the latch 35. The latch spring 37 then becomes effective to bring about an engagement of the latch 35 with the locking wheel 32 and to cause the cam 30 to revolve with the shaft 13. In the first portion of the revolution of the cam the high portion thereof will be brought into engagement with the pin or contact 116 and swing it to the position shown in Fig. 3. This results in disengaging the releasing device 102 from the trip 38 to enable the latter to be immediately restored to normal position where it extends into the path of the projection 39 on the latch 35 even though the case shift key 81 or 82 be held depressed.

As the cam 30 continues to revolve in an anticlockwise direction (as the parts are shown in Fig. 3) the roller 46 will be elevated causing a case shifting of the platen, and the latch 71 will engage beneath the roller 76. Fig. 3 shows the parts as they appear after the operations above described have taken place and before the cam 30 has completed its revolution. In the continued movement of the cam from the Fig. 3 position the projection 39 will coact with the trip 38 thus shifting the latch 35 to releasing position and holding the cam against further movement while the shaft 13 continues its movement independently thereof. The parts will remain in the position indicated as long as the operator maintains pressure on the depressed key 81 or 82. When, however, the operator releases the depressed key the lever 79 will return to normal position causing the latch 71 to be shifted rearward to releasing position, thereby enabling the platen to return to lower case position; the roller 46 at this time dropping down and being arrested by the cam 30.

The same return movement of the key lever

79 elevates the contact 100 and enables the spring 105 to return the releasing device 102 to normal position ready to function as before on the next depression of a case shift key.

From what has been pointed out it will be understood that when the upper frame section 10 is turned back on its hinge 11 it carries with it not only the carriage, the shift rail 56 and link 55, but also the shift lever 79 and sub-lever 96 without any interference from the coacting parts. When the upper frame section 12 is swung down to operative position, said shift lever and sub-lever and parts 89 and 100 respectively carried thereby will be brought into cooperative relation with the parts with which they coact and the machine is in condition for operation.

Referring now more particularly to Figs. 7, 8 and 9 which illustrate a modified form of case shifting features that I prefer to employ in connection with the power actuated features hereinbefore described, it will be seen that the top plate 60^a is provided with depending lugs 117; in the present instance four in number. To each of these lugs is pivoted at 118 an angular lever. The horizontally disposed arm 119 of each of these levers is bifurcated at its end, each arm of the bifurcation having an upward extension 120. Received in each bifurcation and embraced by the extensions 120 is an arm 121 that extends through an opening 122 in the top plate and has its broadened upper end 123 received in a slot 124 in a case shift rail 125. Each arm 121 is riveted to the shift rail at 126 and may be regarded as a part of it. The lower end of each arm 121 is pivoted at 127 to the arm 119 of the associated angular lever. The depending arm 128 of each angular lever is pivoted at 129 to a link or bar 130 that extends transversely of the machine and connects all of the angular levers to move in unison. One end of the link 130 is bent at right angles to provide a laterally projecting lug 131. This lug is pierced to receive the stem of a headed screw 132 threaded into a nut 133, exteriorly threaded to receive one end of a coiled counter-balance spring 134. The other end of this spring is anchored to a fixed bracket arm 135. I am enabled by this arrangement to provide a long counter-balance spring 134 that extends transversely of the machine and effectively coacts with the shift rail and the parts supported thereby to partly counter-balance the weight thereof; an adjustment of the effective force of such spring being readily attained by the screw 132.

From an inspection of Fig. 8 it will be seen that a roller 70^a, corresponding to the roller 70 in the previously described construction, is carried by the platen frame 65 and bears on the shift rail 125, which in this instance is rectangular in cross section to give added rigidity thereto. It also will be seen that the angular levers 119, 128, all move in a vertical plane that extends transversely of the machine and is coincident, or substantially coincident, with the plane of movement of the shift rail 125. While the shift rail is located above the top plate 60^a, the angular levers are arranged below but in close proximity to the top plate, and are connected directly to the shift rail or the depending arms 121 thereon. It will be observed, moreover, that in the present instance I have provided four angular levers 119, 128 one located near each end of the shift rail and two located intermediate the ends of the rail. In this manner the shift rail is firmly supported and guided and is highly efficient in all cases but is of particular value in long carriage machines where long case shift rails are employed and where it is difficult to effectively actuate the shift rail and prevent it from bending.

Any suitable means may be employed for transmitting movement to the shift rail. In the present instance I pivot to one of the inner angular levers 119, 128 an upright link or actuating member 136 comprising two relatively longitudinally adjustable members 137 and 138 united by an intermediate adjustable connecting member 139 having a right and left-hand threaded connection therewith to draw the members 137, 138 together or move them away from each other to lengthen or shorten the link. Lock nuts 140 secure the parts in the positions to which they are relatively adjusted. In the present instance the upper end of the link 136 is pivoted on one of the pivots 127 which connects the associated angular lever to the companion arm 121. Upward movement of the member 136 will turn the angular lever to which it is attached, and through the link 130 will impart a corresponding movement to all of the other angular levers. The lower end portion 138 of the link 136 extends through a guide opening provided between two members 141, 142 of a two-part bracket. The member 142 is secured by screws 143 to the frame section 10, whereas the member 141 is detachably secured by screws 144 to the bracket member 142. The lower end of the member 138 is provided with a forwardly projecting contact 145 that bears on the pin 53 carried by the arm 48.

It will be seen, therefore, that when the frame section 10 is swung back on the frame section 12 the link 136 will be lifted off the pin 53 and swing with the frame section 10. When the frame section 10 is again swung down to effective position on the base section 12 the link 136 will be brought into cooperative relation with the pin 53 to be actuated thereby.

It also will be seen that the link 136 moves in the same plane, or substantially the same plane, as the shift rail 125 and the intermediate connections by which it is shifted, thus providing a highly effective compact construction and one which overcomes many disadvantages present in prior constructions, especially where long carriages are employed.

Various changes may be made in the construction, and parts thereof may be employed without others, without departing from my invention as it is defined in the accompanying claims.

What I claim as new and desire to secure by Letters Patent is:

1. The combination of a case shiftable part, and power actuated means for effecting a case shifting movement of said part comprising a power driven shaft, a cam loosely mounted thereon, a case shift key, means controlled thereby for fixedly connecting said cam and shaft to turn together, and automatically operating means other than the cam for holding said case shiftable part in its shifted position as long as said case shift key is held depressed.

2. The combination of a case shiftable part, and power actuated means for effecting a case shifting movement of said part comprising a power driven shaft, a cam, a spring returned case shift key, means controlled thereby for effecting a coupling of said cam to turn with said shaft, and automatically operating means other

than the cam for holding said case shiftable part in its shifted position as long as said case shift key is held depressed, said automatically operating means comprising a latch for holding the case shiftable part in its shifted position, a spring which tends to move said latch to effective position, and means controlled by the force of the spring of the case shift key for overcoming the force of the latch spring and for moving said latch to releasing position when the case shift key returns to normal position.

3. The combination of a case shiftable part, and power actuated means for effecting a case shifting movement of said part comprising a power driven shaft, a cam, a case shift key, means controlled thereby for effecting a coupling of said cam to turn with said shaft, a latch carried by said cam for coupling it to the shaft to turn therewith, and means controlled by said case shift key for releasing said latch, said last mentioned means including means actuated by said cam for affording an independent return of the latch releasing means to effective position even though the case shift key be held depressed.

4. The combination of a case shiftable part, and power actuated means for effecting a case shifting movement of said part comprising a power driven shaft, a cam, a spring returned case shift key, means controlled thereby for effecting a coupling of said cam to turn with said shaft including a pawl carried by said cam for coupling it to the shaft to turn therewith, means controlled by said case shift key for releasing said pawl, said last mentioned means including means actuated by said cam for affording an independent return of the pawl releasing means to effective position even though the case shift key be held depressed, a holding latch for holding the case shiftable part in its shifted position, a spring which tends to move said holding latch to effective position, and means controlled by the force of the spring of the case shift key for overcoming the force of the holding latch spring and for moving said holding latch to releasing position when the case shift key returns to normal position.

5. The combination of a case shiftable part, and power actuated means for shifting said part comprising a power actuated cam, an arm that is actuated thereby, a second arm that shifts said case shiftable part, both of said arms being independently mounted to turn on the same fixed pivotal center, and a spring intermediate said arms and through which motion is transmitted from the first to the second arm under the action of the cam, the construction and arrangement of the parts being such that the arms shift together under the action of said cam until the shiftable part is arrested in its shifted position and a relative movement of the arms is then afforded to hold the shifted part under pressure of said spring in shifted position.

6. The combination of a case shiftable part, and power actuated means for shifting said part comprising a motor driven shaft, a cam loosely mounted on said shaft, key controlled means for coupling said cam to turn with said shaft, an arm that is actuated by said cam, a second arm that shifts said case shiftable part, and a spring intermediate said arms and through which motion is transmitted from the first to the second arm under the action of the cam, whereby the arms shift together until the shiftable part is arrested in its shifted position and a relative movement of the arms is then afforded to hold the shifted part under pressure of said spring in shifted position.

7. The combination of a case shiftable part, and power actuated means for shifting said part comprising a power actuated cam, an arm that is actuated thereby, a second arm that shifts said case shiftable part, a spring intermediate said arms and through which motion is transmitted from the first to the second arm under the action of the cam, whereby the arms shift together until the shiftable part is arrested in its shifted position and a relative movement of the arms is then afforded to hold the shifted part under pressure of said spring in shifted position, a spring returned case shift key, a latch for holding the case shiftable part in its shifted position, a spring which tends to move said latch to effective position, and means controlled by the force of the spring of the case shift key for overcoming the force of the latch spring and for moving said latch to releasing position when the case shift key returns to normal position.

8. The combination of a case shiftable part, and power actuated means for effecting a case shifting movement of said part, comprising a power driven shaft, a cam, a pawl carried by said cam for coupling it to the shaft to turn therewith, a spring returned case shift key, means controlled thereby for releasing said pawl and including means actuated by said cam for affording an independent return of the pawl releasing means to effective position even though the case shift key be held depressed, a latch for holding the case shiftable part in its shifted position, a spring which tends to move said latch to effective position, and means controlled by the force of the spring of the case shift key for overcoming the force of said latch spring and for moving said latch to releasing position when the case shift key returns to normal position.

9. The combination of a case shiftable part, and power actuated means for effecting a case shifting movement of said part, comprising a power driven shaft, a cam, a pawl carried by said cam for coupling it to the shaft to turn therewith, a spring returned case shift key means controlled thereby for releasing said pawl and including means actuated by said cam for affording an independent return of the pawl releasing means to effective position even though the case shift key be held depressed, a latch for holding the case shiftable part in its shifted position, a spring which tends to move said latch to effective position, means controlled by the force of the spring of the case shift key for overcoming the force of said latch spring and for moving said latch to releasing position when the case shift key returns to normal position, two members through which movement is transmitted from said cam to said case shiftable part, and a spring which connects said members to move together and afford a relative movement between them when the shiftable part is arrested in its shifted position and exert its force against the shiftable part this time.

10. The combination of a case shiftable part, and power actuated means for shifting it comprising a motor driven shaft, a cam loosely mounted on said shaft and having a high spot thereon, a spring engaged pawl carried by said cam for coupling it to turn with the shaft, key controlled means for releasing said pawl, and a spring pressed member engaging said cam near the high spot thereon to prevent the reaction

of the pawl spring from turning the cam when the pawl is released.

11. The combination of a case shiftable part, and power actuated means for shifting it comprising a motor driven shaft, a cam loosely mounted on said shaft and having a high spot thereon, a spring engaged pawl carried by said cam for coupling it to turn with the shaft, key controlled means for releasing said pawl, a spring pressed arm, a roller carried by said arm and bearing against said cam and cooperative with the high spot thereon to prevent the reaction of the pawl spring from turning the cam when the pawl is released.

12. The combination of a case shiftable part, and power actuated means for shifting it comprising a motor driven shaft, a cam loosely mounted on said shaft, a spring engaged pawl carried by said cam for coupling it to turn with the shaft, a trip that is movable into and out of the path of said pawl to release it when the trip engages the pawl, a case shift key, a member actuated thereby to disengage the trip from the pawl, and means controlled by said cam for disengaging said member from said trip to enable the latter to return into the path of the pawl even though said key be held depressed.

13. The combination of a case shiftable part, and power actuated means for shifting it comprising a motor driven shaft, a cam loosely mounted on said shaft, an arm actuated by said cam, a second arm operating to shift said shiftable part, a spring intermediate said arms and through which motion is transmitted from the first mentioned arm to the second arm, a latch engaging said second arm and holding it in shifted position, a spring which tends to move said latch to engaging position, a spring-returned case shift key lever, and a controlling element intermediate said key lever and latch and by which the latch is moved to releasing position by said key lever when released and by the force of its returning spring which is sufficient to overcome the force of the latch spring.

14. The combination of a case shiftable part, and power actuated means for shifting it comprising a motor driven shaft, a cam loosely mounted on said shaft, an arm actuated by said cam, a second arm operating to shift said shiftable part, a spring intermediate said arms and through which motion is transmitted from the first mentioned arm to the second arm, a latch engaging said second arm and holding it in shifted position, a spring which tends to move said latch to engaging position. a spring returned case shift key lever, a controlling element intermediate said key lever and latch and by which the latch is moved to releasing position by said key lever when released and by the force of its returning spring which is sufficient to overcome the force of the latch spring, a locking pawl carried by said cam, means coacting therewith to lock the cam to revolve with said shaft. a trip coacting with said locking pawl to release it, and means controlled by said case shift key for controlling said trip.

15. The combination of a top plate, a case shift rail, a plurality of angular levers supported by the top plate and connected to said shift rail, the plane of movement of said levers extending transversely of the machine, a connecting link between said levers for causing them to move in unison, and an actuating element connected to one of said angular levers.

16. The combination of a top plate, a case shift rail arranged above the top plate, a plurality of angular levers connected to and arranged directly beneath said shift rail and arranged below and supported by the top plate, a longitudinally movable connecting bar or link between said levers for causing them to move in unison, and an upright actuating element connected to one of said angular levers.

17. The combination of a case shift rail, a plurality of levers positively connected to said shift rail and movable substantially in the plane of movement thereof, and means for connecting said levers to shift together and thereby shift said shift rail.

18. The combination of a case shift rail, a plurality of levers connected to said shift rail and having their planes of movement substantially in the plane of movement of the shift rail, a counter balance spring extending in the general direction of the length of said shift rail and operatively connected to said levers, and means for simultaneously shifting said levers to thereby shift said shift rail.

19. The combination of a case shift rail, levers connected to said shift rail intermediate the ends thereof as well as near its ends, said levers being movable substantially in the plane of movement of the shift rail, means for connecting said levers to move in unison, and means for actuating said links to shift said shift rail.

20. The combination of a top plate, a shift rail arranged above the top plate, angular levers connected directly to said shift rail and arranged below and fulcrumed on the top plate to move substantially in the plane of movement of the shift rail, means for connecting said levers to move in unison, a counter balance spring that is operatively connected to said levers and extends longitudinally in the direction of the length of the shift rail, and means for actuating said angular levers to effect a case shifting movement of the shift rail.

21. The combination of a top plate, a shift rail, arranged above the top plate, angular levers connected directly to said shift rail and arranged below and close to the top plate and fulcrumed thereon to move substantially in the plane of movement of the shift rail, a link that extends longitudinally in the same general direction as the shift rail and is connected to all of said angular levers to cause them to move in unison, a counter balance spring connected to said link, and means for actuating said levers to effect a case shift movement of said shift rail.

22. The combination of a top plate, a shift rail arranged above the top plate, angular levers connected directly to said shift rail and arranged below and fulcrumed on the top plate to move substantially in the plane of movement of the shift rail, such angular levers being connected to the shift rail intermediate the ends thereof as well as near its ends and each having a substantially horizontally disposed arm connected to the shift rail and a substantially vertically disposed arm, a link that connects said substantially vertically disposed arms, a contractile counter balance spring connected at one end to said link and anchored at the other end, and an upright actuating link connected to the horizontally disposed arm of one of said angular levers.

23. The combination of a frame comprising two relatively movable sections, a case shiftable part, and power actuated mechanism for effecting a case shifting movement of said shiftable part, said mechanism having separable members car-

ried by the two sections and which are brought into cooperative relation prepared to function when the sections are brought together.

24. The combination of a frame comprising two relatively movable sections, a case shiftable part, and power actuated mechanism for effecting a case shifting movement of said shiftable part, said mechanism comprising a motor driven cam and shifting means actuated thereby contained in one of said frame sections, and cooperative shifting means carried by the other of said frame sections, said shifting means in the two sections being separable when one section is displaced from the other and brought into cooperative relation to function when the two sections are brought together.

25. The combination of a frame comprising two relatively movable sections, a case shiftable part, and power actuated mechanism for effecting a case shifting movement of said shiftable part, said mechanism having separable members carried by the two sections and which are brought into cooperative relation prepared to function when the sections are brought together, said separable members comprising a case shift actuated link operatively connected to said shiftable part and carried by one frame section and a motor actuated arm cooperative with said link and carried by the other of said frame sections.

FREDERICK A. HART.

CERTIFICATE OF CORRECTION.

Patent No. 1,929,064. **October 3, 1933.**

FREDERICK A. HART.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 3, line 69, for "for" read or; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 9th day of January, A. D. 1934.

F. M. Hopkins

(Seal)

Acting Commissioner of Patents.