

G. W. CAMPBELL.
TYPEWRITING MACHINE.
APPLICATION FILED JUNE 7, 1918.

1,332,972.

Patented Mar. 9, 1920.
4 SHEETS—SHEET 1.

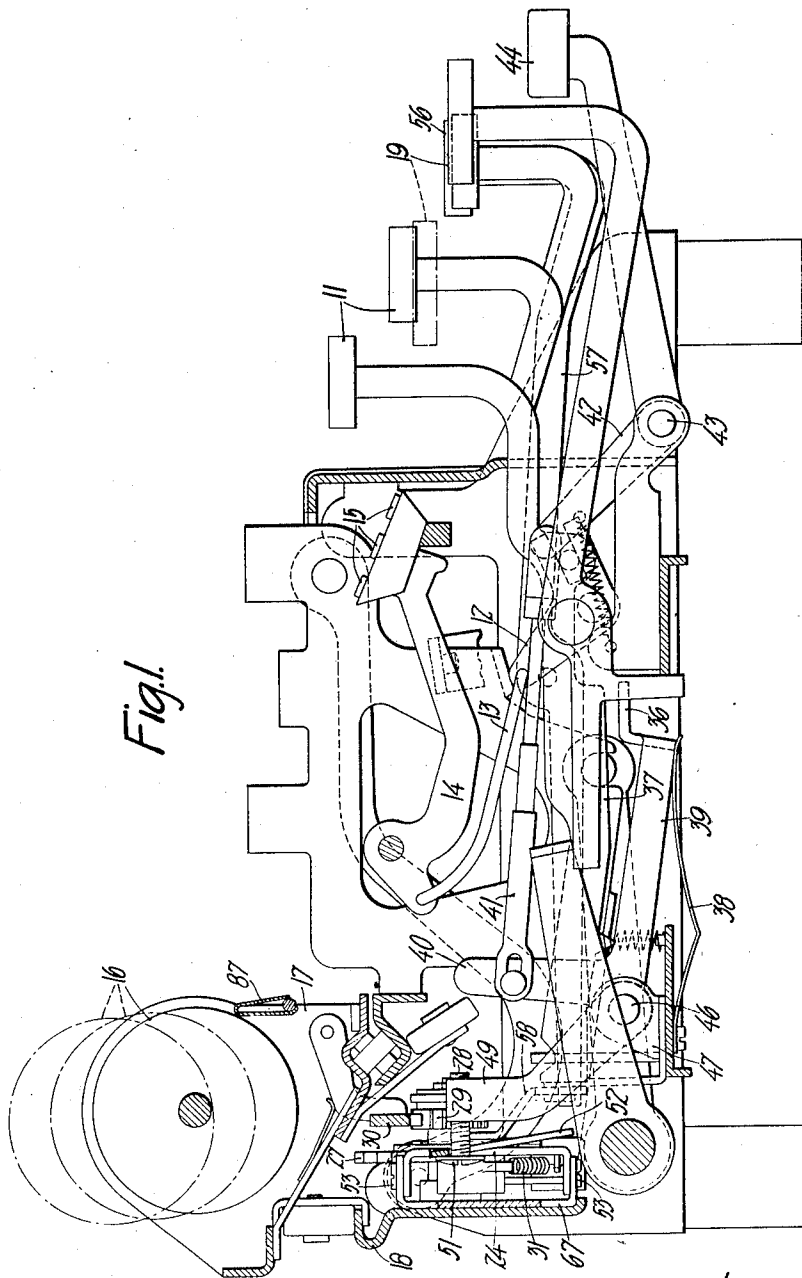


Fig. 1.

Witnesses:

Julius Ruckstine
John Waldheim

Inventor:

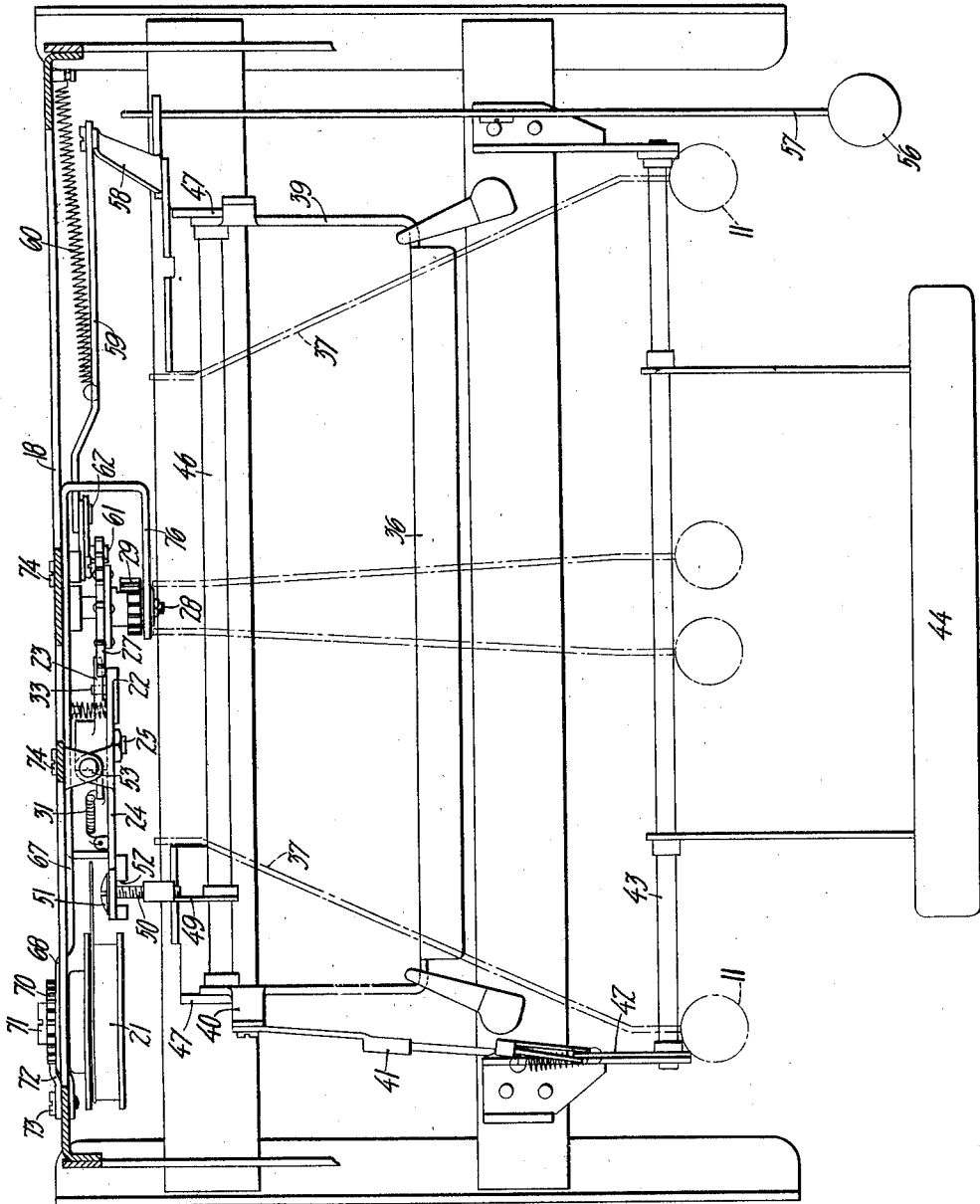
George W. Campbell
by D. C. Stickney
Attorney

G. W. CAMPBELL.
TYPEWRITING MACHINE.
APPLICATION FILED JUNE 7, 1918.

1,332,972.

Patented Mar. 9, 1920.

4 SHEETS—SHEET 2.



Witnesses:
Julius Kuckatine
John Waldheim

Fig. 2

Inventor:
George W. Campbell
by B. B. Stickney
Attorney

G. W. CAMPBELL.
TYPEWRITING MACHINE.
APPLICATION FILED JUNE 7, 1918.

1,332,972.

Patented Mar. 9, 1920.

4 SHEETS—SHEET 3.

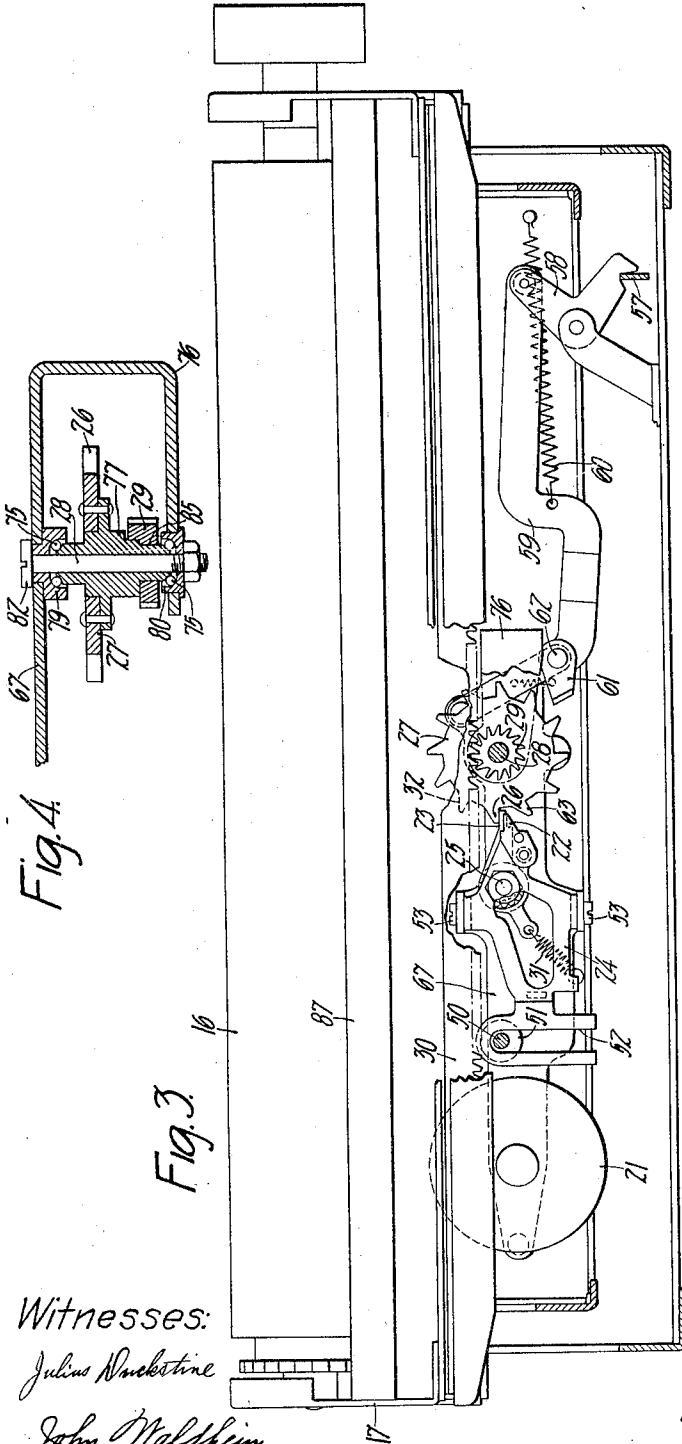


Fig. 4.

Fig. 3.

Witnesses:
Julius Nuckeltine
John Waldheim.

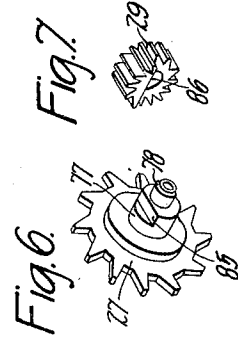


Fig. 6.

Fig. 7.

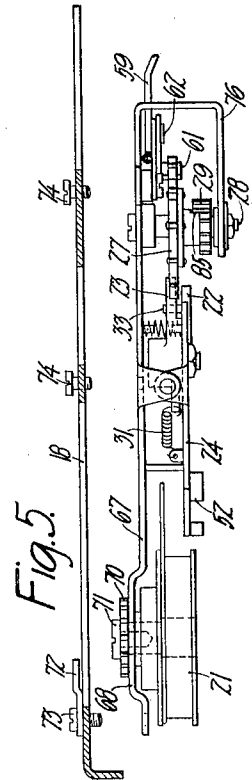


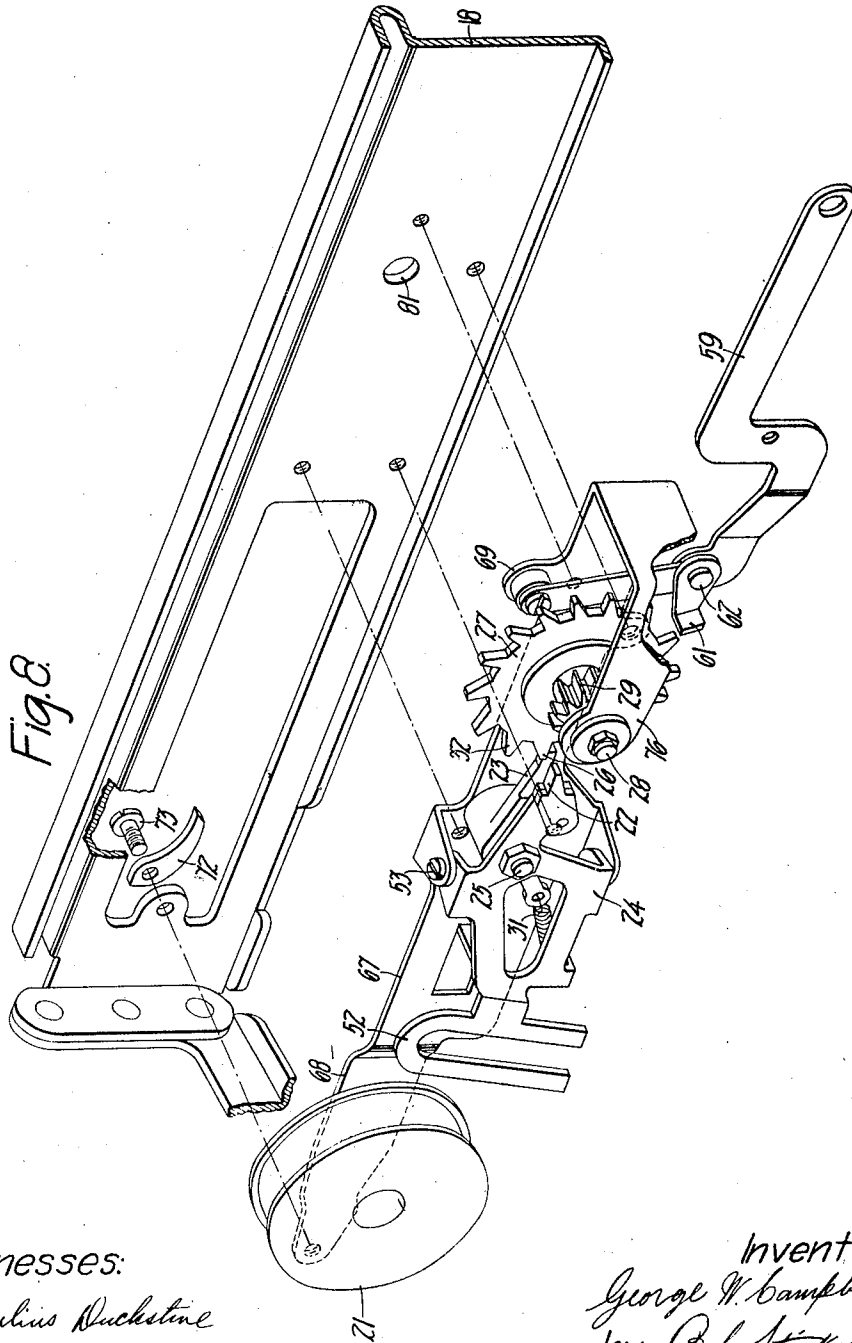
Fig. 5.

Inventor:
George W. Campbell
by O. B. Stickney
Attorney

G. W. CAMPBELL.
TYPEWRITING MACHINE.
APPLICATION FILED JUNE 7, 1918.

1,332,972.

Patented Mar. 9, 1920.
4 SHEETS—SHEET 4.



Witnesses:
Julius Buckstone
John Waldheim

Inventor:
George W. Campbell
by B. B. Stickney
Attorney

UNITED STATES PATENT OFFICE.

GEORGE W. CAMPBELL, OF HARTFORD, CONNECTICUT, ASSIGNOR TO UNDERWOOD
TYPEWRITER COMPANY, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

TYPEWRITING-MACHINE.

1,332,972.

Specification of Letters Patent.

Patented Mar. 9, 1920.

Application filed June 7, 1918. Serial No. 233,636.

To all whom it may concern:

Be it known that I, GEORGE W. CAMPBELL, a citizen of the United States, residing in Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Typewriting-Machines, of which the following is a specification.

This invention relates to typewriting machines of the portable class in which lightness, compactness, low cost and speed of production are sought; and relates particularly to the construction and manner of mounting the mechanism which controls the letter-feeding movements of the platen.

Even when much care is used in producing and fitting the parts, it is still usually found necessary to provide for final minute adjustments in order to bring the escapement mechanism into exact coöperative position. One feature of my invention is the avoidance of the great cost of fitting and adjusting, and to secure reliability of coöperation between the parts of the escapement mechanism.

It is also customary in present practice to mount the parts of the escapement mechanism within the framework, thereby causing difficulty in reaching said parts, and it often happens when adjusting one member of the escapement mechanism into exact coöperative relation with another that said first member will be thrown out of exact coöperation with still another, and so on. This practice often requires the dismantling of parts not related with the escapement mechanism in order to reach the desired parts of said mechanism. This practice requires repeated joining and disjoining of the parts, which greatly increases the cost of manufacture and is liable to injure the parts of the machine.

In carrying out my invention, I provide a single supporting member for all the parts of the escapement mechanism, integrally formed so that the parts will be in exact coöperative relation when once placed thereon. The operation of mounting the parts on said member to form a unit may be done without the framework of the machine and the unit

may be subsequently attached thereto, the supporting member being so formed that the parts of the escapement mechanism and the parts of the carriage, which engage with each other, will be in exact coöperative relation when said member is once placed on the framework.

Another feature is that the escapement mechanism may be easily and bodily removed from the machine for repairs or other purposes, in such a manner as to avoid the disjunction of unrelated mechanism and the transportation of the entire machine to and from the shop.

Another feature is that the portion of the back-spacing mechanism, which coöperates directly with the escapement mechanism, is mounted on the integrally-formed supporting member, thereby securing accuracy of coöperation between the back-spacing mechanism and the escapement mechanism when the parts are once placed on said member.

Another feature is that the spring drum which propels the carriage is mounted on a bracket integral with said supporting member. In this mode of construction, the entire mechanism which causes the letter-feed movements of the carriage is assembled as a unit on said supporting member. This permits a more advantageous sub-division of labor in the manufacture of the machine, and also facilitates attaching the spring drum to the machine.

Another feature is that the necessity for great accuracy in producing ball-bearings for the escapement wheel is avoided. Said wheel is mounted on an arbor, one end of which is supported in the main portion of said supporting member, and the other end of which is supported in a bracket integral with said supporting member. The hub of the escapement wheel has ball-races formed thereon, opposed ball-races being mounted in said supporting member and bracket. The arrangement is such that by manipulating the arbor, the lost-motion in said ball-bearings may be taken up until the escapement wheel is rigidly held in its plane of rotation.

Another feature is that the supporting member may be made of sheet-metal with the aid of blanking and forming dies, and the brackets which support the parts of the escapement mechanism and the spring drum and its adjusting mechanism, may by this method be integrally formed with said supporting member. This greatly reduces the cost of manufacture, and insures interchangeability of the parts, and reliability of their coöperation.

I gain lightness, compactness and simplicity of structure, and low cost of manufacture of the connections from the keyboard to the escapement mechanism. This is accomplished by forming many of the parts integrally of light sheet-metal in such a manner as to afford rigidity and accessibility and permit the use of simple blanking and forming dies.

Other features and advantages will hereinafter appear.

In the accompanying drawings,

Figure 1 is a general side view of a type-writing machine in section, showing my invention applied thereto.

Fig. 2 is a sectional top plan view of the machine, parts being omitted for clearness.

Fig. 3 is a sectional front view of the rear portion of the machine showing the escapement mechanism, a portion of the back-spacing mechanism coöperating therewith, and the carriage.

Fig. 4 is a sectional top plan view through the escapement wheel and adjacent parts, showing the manner of mounting.

Fig. 5 is a detail top plan view of the escapement mechanism detached from the shift-frame of the machine.

Fig. 6 is a detail perspective view of the escapement wheel.

Fig. 7 is a detail perspective view of the escapement pinion.

Fig. 8 is a detail perspective view of the parts shown in Fig. 5.

Type keys 11 (Figs. 1 and 2) are connected with bell-cranks 12, which, through links 13, swing upwardly and rearwardly type-bars 14 having types 15 at their forward ends, to strike against a work-sheet wound around a revoluble cylindrical platen 16 (Figs. 1 and 3), which is mounted on a carriage 17 and travels on a framework 18.

The framework 18 on which the carriage 17 travels is shiftable vertically at the depression of shift keys 19 (Fig. 1), to raise the platen 16 so that the writing line thereon will be brought opposite different case types 15 on said type-bars.

At each stroke of a type key 11, the carriage 17 is caused to move a letter-space, the keys 11 having connections to actuate the escapement mechanism at each key stroke.

The carriage is drawn in letter-feeding di-

rection by a spring drum 21 (Figs. 2, 3, 5 and 8) and is controlled by a pair of dogs 22, 23, one of which is fast on a dog rocker 24, and the other of which is journaled on ball-bearings at 25 on said rocker. The loose dog 23 is normally in engagement with a tooth 26 of an escapement wheel 27 mounted on an arbor 28, said wheel having a driving connection with an escapement pinion 29 normally meshing with a rack 30 (Figs. 1 and 3) on the carriage 17.

At the depression of a type key 11, the dog rocker 24 is swung by mechanism, hereinafter described, to move the loose dog 23 out of the plane of the escapement wheel 27 and to move the fast dog 22 into the plane of the escapement wheel. The escapement wheel and the carriage will then be held by the fast dog 22 against actuation by the spring drum 21, and the loose dog 23 will be swung by a spring 31 into engaging relation with a succeeding tooth 32 (Figs. 3 and 8) of the escapement wheel. At the release of the type key, the fast dog 22 will be swung out of the plane of said wheel and the loose dog 23 being returned will act to arrest the wheel 27 and the carriage when said succeeding tooth 32 moves the loose dog 23 into engagement with a stop 33 (Figs. 2, 3 and 5) provided on the dog rocker 24.

The mechanism for operating the dog-rocker 24 from the keyboard of the machine, to cause letter-feed movements of the carriage, includes a universal bar 36 (Figs. 1 and 2) underlying all the key-levers 37, which, when depressed, swing said bar downwardly against the tension of a spring 38 (Fig. 1), which continually tends to urge upwardly a bail 39, of which said bar forms a part. The bail 39 is integrally formed of sheet-metal and has an arm 40 integrally formed therewith, to which is connected an adjustable link 41, the forward end of which is connected with an arm 42 fast on a rock shaft 43, on which a space-key 44 is mounted.

The bail 39 is mounted on a rock shaft 46 journaled in brackets 47. At the depression of any character key, said bail will be swung and therewith an arm 49 (Figs. 1 and 2) fast on said rock shaft 46, said arm having a screw 50 threaded therein, the head 51 of which engages with a substantially vertical fork 52 (Figs. 1, 2, 3 and 8) of the dog-rocker 24, so that when the bail 39 is swung at the depression of a key 11, the arm 49 will be swung forwardly to swing the dog-rocker 24 about its pivots 53 and to move the loose dog 23 out of engagement with the tooth 26 of the escapement wheel. Said pivots 53, it will be noted, are provided in opposite ears bent over from the sheet-metal plate or member 67; the dog pivot being vertical, while the escapement

wheel axis is horizontal. The fork 52 permits the shift frame and the escapement unit to rise and fall while controlling the escapement of the carriage.

The carriage 17 may be moved in an anti-letter-feeding direction by a back-spacing mechanism provided with a key 56 (Figs. 1 and 2) on a key lever 57, at the actuation of which a bell-crank 58 (Figs. 2 and 3) is swung to thrust a link 59 (Figs. 5 and 8) leftwardly against the tension of a spring 60 and therewith a pawl 61, pivoted at 62 to the left end of said link 59, into engagement with a tooth of the escapement wheel 27, to actuate said escapement wheel in anti-letter-feeding direction and therewith the pinion 29 and meshing carriage-rack 30 against the tension of the spring drum 21 to move said carriage one letter-space backwardly. The loose dog 23 and its connections are such as to permit said backward rotation of the escapement wheel until an antecedent tooth 63 (Fig. 3) of said wheel is moved into engaging relation with the dog 23. At the release of the back-spacing key 56, the tooth 63 will be forced by the spring drum 21 against said loose dog until the latter is arrested by its stop 33 on the dog rocker, thus positioning the carriage one letter-space back.

For ease and economy of manufacture and for lightness and simplicity of construction, the parts of the escapement mechanism are mounted upon an integrally-formed supporting member 67 (Figs. 2, 3, 5 and 8) in such a manner that said parts will be in exact coöperative position when once mounted on said member, which is preferably formed of an originally flat sheet of metal.

This member 67 also carries the spring drum 21 on a bracket 68 integral with said member, and supports that portion of the back-spacing mechanism which co-acts directly with the escapement wheel 27 on a bracket 69 (Figs. 3 and 8) also integral with said member.

The tension of the spring drum 21, which drives the carriage 17, may be adjusted by the rotation of a toothed wheel 70 (Figs. 2 and 5) attached by a screw 71 to the hub of said spring drum and to the supporting member 67. Said wheel is locked in adjusted position by a pawl 72. The toothed wheel 70 is supported on the bracket 68 of said member, and the pawl 72 which locks said wheel is supported on a set screw 73 (Figs. 2, 5 and 8), which is used to fasten the left end of said member 67 to the shift frame 18, the pawl 72 being so formed as to be held against displacement by the shift frame 18.

The construction is such that the parts supported by the member 67 may be as-

sembled thereon, without the machine being in exact coöperative position, and subsequently attached to the shift frame 18, by means of set screws 74 (Figs. 2 and 5), in such a manner that the escapement pinion 29 will be in position to mesh exactly with the rack-bar 30 of the carriage when said member and the parts supported thereby are once placed on the shift frame 18.

To rigidly hold the escapement wheel 27 and pinion 29 in their respective planes of rotation, the ball-bearings 75 on which they run (Fig. 4) are made adjustable so that all lost-motion therebetween may be taken up.

For this purpose, the arbor 28 upon which the escapement wheel and pinion are mounted is in the form of a threaded bolt and nut, one end of which is supported in the main portion of said member 67, and the other end of which is supported in a bent-over portion 76 of said member or plate 67. The escapement wheel is provided with a hub 77 (Figs. 4 and 6), the ends of which are in the form of ball-races 78, opposed ball-races 79, 80 being mounted in said supporting member 67 and bent-over portion or bracket 76, respectively. The bracket 76, which supports said arbor 28, is made flexible so as to be drawn toward the main portion of said supporting member, when said bolt and nut 28 are tightened to take up all the lost-motion in said bearings 75. This may be done without the machine, or may be done after said supporting member 67 is attached to the shift frame 18; an opening 81 (Fig. 8) being provided in said frame through which the slotted head 82 of the bolt projects, so as to be accessible for manipulation.

It will be seen that with this simple form of adjustment, lightness of construction is attained, and lost-motion, due to wear, may also be corrected.

It will also be seen that the inaccuracies of manufacture in producing the hub 77 of the escapement wheel 27, the ball-races 78, 79, 80 and the bracket 76 for supporting the arbor 28, are overcome by making said bracket flexible and the ball-bearings adjustable.

To effect a driving connection between the escapement wheel 27 and the escapement pinion 29, the hub 77 of said wheel has a flat surface 85 formed thereon (Figs. 2, 4, 5 and 6), the plane of which is substantially parallel with the axis of the wheel 27 and is placed at a distance from said axis to correspond with a similar flat surface 86 (Fig. 7) formed on the pinion 29, so that when said pinion is slipped onto the hub of said wheel, the pinion and wheel will rotate in unison. Said surfaces 85, 86 are so placed relatively to the graduations or teeth of the wheel and pinion and to the rack 30 on the carriage, that when the escapement wheel is

arrested by the loose dog 23, an index on a platen-scale 87 (Figs. 1 and 2), provided at the front of the platen 16, will be at the writing point.

5 It will be noted that a single spring 31 for the loose escapement dog 23 serves to throw said dog into engaging relation with the succeeding tooth 32 of the escapement wheel 27 and to effect the throw of said dog in a letter-feeding operation, said spring 31 also 10 permitting said dog 23 to be moved into engaging relation with the anteceding tooth 63 of the escapement wheel.

15 It will be seen that with the herein-described form of construction, the entire escapement mechanism may be removed from the machine for repairs or other adjustments, by loosening the set screws 73, 74, and may be transported to a shop for the 20 purpose, without transporting the entire machine. This is a saving of expense in the cost of repairs, and decreases the amount of packing required and liability of breakage in transportation.

25 It will be noted among the features of improvement herein disclosed, that a unit comprising a carriage-controlling mechanism for attachment to a typewriting machine includes a sheet-metal main plate 67 having at 30 one end a carriage-driving spring and at the other end an escapement wheel and pinion, said other end being bent over at 76 to confine the wheel and pinion, both of the latter mounted upon a shaft; that the spacing dog devices are carried upon a rocker mounted on 35 said main plate between said escapement wheel and said spring, said plate having oppositely bent ears between which the rocker is held by pivots 53; that said rocker has at 40 one end a dog device to cooperate with the teeth of said escapement wheel, and at the other end a bar or part 52 by which it is operated; that said unit is mounted for case-shifting movement up and down, said 45 operating part 52 extending in an up-and-down direction, and said rocker 24 being pivoted on a vertical axis and said escapement wheel 27 being pivoted on a horizontal axis; that ball bearings are provided upon said main 50 plate for the ends of the shaft 28, means being provided for forcing the bent-over part of the main plate toward the body thereof for taking up the play in the ball bearings; that the spring barrel is provided with a 55 spring having an adjusting wheel 70; that a pawl or dog 72 is provided to lock said adjusting wheel; that said pawl is pivoted upon a screw 73; that a support 18 for said unit has an ear or part, Fig. 8, engageable 60 by said pawl to hold the same in position; that the shifting frame comprises a sheet-metal plate 18 on edge and formed with a carriage track at its upper edge, said unit being secured to said plate below said track,

and having a cut-away part, Fig. 8, to afford 65 access to said unit; that the unit plate has an outward bend, Fig. 2, to pass through the opening in said case-shifting frame 18 to carry said spring-adjusting wheel on the 70 outer or rear side of said frame 18; and that said screw 73 passes through said case-shifting frame and secures said unit-plate to the inner end of said case-shifting frame.

Variations may be resorted to within the scope of the invention, and portions of the 75 improvements may be used without others.

Having thus described my invention, I claim:

1. In a typewriting machine, the combination of a traveling carriage, an escape- 80 ment mechanism for causing letter-feed movements of said carriage, an escapement wheel forming part of said escapement mechanism, an escapement pinion forming part of said escapement mechanism, a flat 85 surface formed on the hub of said wheel, and a flat surface formed on said pinion, said surfaces being so placed that the teeth of said wheel and said pinion will be in correct cooperative position when said wheel 90 and pinion are once assembled.

2. In a typewriting machine, the combination with a platen, of a traveling carriage, a shift-frame therefor, an escapement mechanism including a pinion for causing letter-feed movements of said carriage, a rack 95 bar on said carriage normally meshing with said pinion, and an integrally-formed support on which the parts of said escapement mechanism are mounted in correct cooperative position when once placed on said support; said support being so formed that said pinion and rack will be in correct meshing position when said support is once placed on 100 said frame. 105

3. In a typewriting machine, the combination of a traveling carriage, means for causing letter-feed movements of said carriage, an escapement wheel forming part of said means, ball-bearings and an arbor on which 110 said wheel is mounted, an integrally-formed supporting member for said means, and a flexible bracket integral with said member for supporting one end of said arbor, said bracket being adjustable axially of said 115 arbor for adjusting said bearings.

4. In a typewriting machine, the combination of a traveling carriage, means for causing letter-feed movements of said carriage, an escapement wheel and pinion forming 120 part of said means, an integrally-formed supporting member for said means, and a bracket integral with said member for supporting said wheel and pinion, said bracket being flexible to take up axial lost-motion 125 of said wheel and pinion.

5. In a typewriting machine, the combination of a traveling carriage, means for caus-

ing letter-feed movements of said carriage, an escapement wheel forming part of said means, ball-bearings and an arbor on which said wheel is mounted, an integrally-formed supporting member for said means, a flexible bracket integral with said member for supporting one end of said arbor, said bracket being adjustable axially of said arbor for adjusting said bearings, and means on said arbor accessibly placed on the machine for adjusting said bracket.

6. A unit of carriage-controlling mechanism for attachment to a typewriting machine, comprising a sheet-metal plate having at one end a carriage-driving spring, and having at the other end an escapement wheel and pinion, said other end being bent over to confine the wheel and pinion, the wheel and pinion mounted upon a shaft, means being provided for forcing the bent-over part of the plate toward the body thereof for taking up the play in the shaft, and a rocker mounted on said plate between said escapement wheel and said spring, and having dog devices to cooperate with said escapement wheel.

7. A unit of carriage-controlling mechanism for attachment to a typewriting machine, comprising a sheet-metal plate having at one end a carriage-driving spring, and having at the other end an escapement wheel and pinion, said other end being bent over to confine the wheel and pinion, the wheel and pinion mounted upon a shaft, means being provided for forcing the bent-over part of the plate toward the body thereof for taking up the play in the shaft, and a rocker mounted on said plate between said escapement wheel and said spring, and having dog devices to cooperate with said escapement wheel, said plate having opposite bent ears between which said rocker is confined, and in which it is pivotally supported.

8. A unit of carriage-controlling mechanism for attachment to a typewriting machine, comprising a sheet-metal plate having at one end a carriage-driving spring, and having at the other end an escapement wheel and pinion, said other end being bent over to confine the wheel and pinion, the wheel and pinion mounted upon a shaft, means being provided for forcing the bent-over part of the plate toward the body thereof for taking up the play in the shaft, a rocker mounted on said plate between said escapement wheel and said spring, and having dog devices to cooperate with said escapement wheel, and an arm pivoted upon said plate in position to carry a back-spacing dog into engagement with said escapement wheel.

9. A unit of carriage-controlling mechanism for attachment to a typewriting machine, comprising a sheet-metal plate hav-

ing at one end a carriage-driving spring, and having at the other end an escapement wheel and pinion, said other end being bent over to confine the wheel and pinion, the wheel and pinion mounted upon a shaft, means being provided for forcing the bent-over part of the plate toward the body thereof for taking up the play in the shaft, a rocker mounted on said plate between said escapement wheel and said spring, and having dog devices to cooperate with said escapement wheel, an arm pivoted upon said plate, and a back-spacing dog mounted upon said arm in position to be guided thereby into engagement with said escapement wheel.

10. A unit of carriage-controlling mechanism for attachment to a typewriting machine, comprising a sheet-metal plate having at one end a carriage-driving spring, and having at the other end an escapement wheel and pinion, said other end being bent over to confine the wheel and pinion, the wheel and pinion mounted upon a shaft, means being provided for forcing the bent-over part of the plate toward the body thereof for taking up the play in the shaft, and a rocker mounted on said plate between said escapement wheel and said spring, said plate having opposite bent ears between which said rocker is confined and in which it is pivotally supported, said rocker having at one end a dog device to cooperate with the teeth of said escapement wheel, and having at the other end a part by which it is operated.

11. A unit of carriage-controlling mechanism for attachment to a typewriting machine, comprising a sheet-metal plate having at one end a carriage-driving spring, and having at the other end an escapement wheel and pinion, said other end being bent over to confine the wheel and pinion, the wheel and pinion mounted upon a shaft, means being provided for forcing the bent-over part of the plate toward the body thereof for taking up the play in the shaft, and a rocker mounted on said plate between said escapement wheel and said spring, said rocker having at one end a dog device to cooperate with the teeth of said escapement wheel, and having at the other end a part by which it is operated; the unit being mounted for case-shifting movement up and down, said operating part extending in up-and-down direction, said rocker being pivoted on a vertical axis, and said escapement wheel being pivoted on a horizontal axis.

12. A unit of carriage-controlling mechanism for attachment to a typewriting machine, comprising a sheet-metal plate having an escapement wheel and pinion, the wheel and pinion mounted upon a shaft, and said plate being bent over to confine

said wheel, ball-bearing devices being provided in said plate for the ends of the shaft, means being provided for springing or forcing said bent-over part of the plate for taking up the play in the ball-bearings, and an escapement dog rocker mounted on said plate.

13. A unit of carriage-controlling mechanism for attachment to a typewriting machine, comprising a sheet-metal plate having an escapement wheel and pinion, the wheel and pinion mounted upon a shaft, and said plate being bent over to confine said wheel, ball-bearing devices being provided in said plate for the ends of the shaft, means being provided for springing or forcing said bent-over part of the plate for taking up the play in the ball-bearings, and an escapement dog rocker mounted on said plate, and having dog devices to cooperate with said escapement wheel, said plate having opposite ears between which said rocker is confined and in which it is pivotally supported.

14. A sheet-metal plate having at one end a bearing for a carriage-driving spring, and having at the other end bearings for an escapement wheel and pinion, said other end being bent over to inclose the wheel and pinion, means being provided for forcing the bent-over part of the plate for taking up the play in the wheel bearings, and a dog rocker, said plate also having opposite bent ears between which said rocker is confined and in which it is pivotally supported.

15. A sheet-metal plate having at one end a bearing for a carriage-driving spring, and having at the other end bearings for an escapement wheel and pinion, said other end being bent over to inclose the wheel and pinion, means being provided for forcing the bent-over part of the plate for taking up the play in the wheel bearings, and a dog rocker, said plate also having opposite bent ears between which said rocker is confined and in which it is pivotally supported; said plate also having a bearing for an arm to carry a back-spacing dog into engagement with said escapement wheel.

16. A unit of carriage-controlling mechanism for attachment to a typewriting machine, comprising a metal plate having at one end a carriage-driving spring barrel, and having at the other end an escapement wheel and pinion, a rocker mounted on said plate between said escapement wheel and said spring barrel and having dog devices to cooperate with said escapement wheel, said barrel provided with a spring having an adjusting wheel, a pawl or dog to lock said adjusting wheel, a screw upon which said pawl is pivoted, and a support for said unit, the support having a part engageable by said pawl to hold the same in position.

17. A unit of carriage-controlling mechanism for attachment to a typewriting machine, comprising a sheet-metal plate having at one end a carriage-driving spring, and having at the other end an escapement wheel and pinion, a rocker mounted on said plate between said escapement wheel and said spring, and having dog devices to cooperate with said escapement wheel, and a frame shiftable up and down to different case positions, said frame comprising a sheet-metal plate on edge and formed with a carriage-guiding rib at its upper edge, said unit being secured to said plate below said rib, and having a cut-away portion to afford access to said unit.

18. A unit of carriage-controlling mechanism for attachment to a typewriting machine, comprising a metal plate having at one end a carriage-driving spring barrel, and having at the other end an escapement wheel and pinion, a rocker mounted on said plate between said escapement wheel and said spring barrel and having dog devices to cooperate with said escapement wheel, said barrel provided with a spring having an adjusting wheel, a pawl or dog to lock said adjusting wheel, a screw upon which said pawl is pivoted, and a support for said unit, the support having a part engageable by said pawl to hold the same in position, said support in the form of a frame shiftable up and down to different case positions, said frame comprising a sheet-metal plate on edge and formed with a carriage-guiding rib at its upper edge, said unit being secured to said plate below said rib, and having a cut-away portion to afford access to said unit, said unit plate having an outward bend to pass through an opening in said frame, to carry said spring-adjusting wheel on the outer side of said case-shifting frame, and said screw passing through said case-shifting frame and pawl, and securing said unit plate to the inner side of said case-shifting frame.

19. A sheet-metal struck-up case-shifting frame having a carriage-guiding rib, and having detachably secured upon its front face a sheet-metal plate carrying a spring barrel, an escapement wheel and pinion shaft, and also carrying a dog rocker for cooperation with said escapement wheel: said plate bent at one end to form supports for the ends of the escapement wheel shaft, and having ears bent over to afford bearings for the dog rocker, and said case-shifting frame having portions cut away for access to said plate and parts carried thereby.

20. A sheet-metal struck-up case-shifting frame having detachably secured upon its front face a unit comprising a sheet-metal plate carrying an escapement wheel and pinion shaft, and a dog rocker for cooperation

with said escapement wheel; said plate bent to form supports for the escapement wheel shaft, and having ears bent over to afford bearings for the dog rocker.

5 21. A case-shifting frame having detachably secured upon its front face a sheet-metal plate carrying a spring-barrel, an escapement wheel and pinion shaft, and a
10 dog rocker for coöperation with said escapement wheel; said plate bent at one end to

form supports for the ends of the escapement wheel shaft, and having ears bent over to afford bearings for the dog rocker, and said case-shifting frame having portions cut away for access to said plate and parts 15 carried thereby.

GEORGE W. CAMPBELL.

Witnesses:

W. A. DOBSON,
M. S. EAKIN.