

1,044,285.

H. H. STEELE.
TYPE WRITING MACHINE.
APPLICATION FILED OCT. 24, 1910.

Patented Nov. 12, 1912.

3 SHEETS-SHEET 1.

FIG. 1.

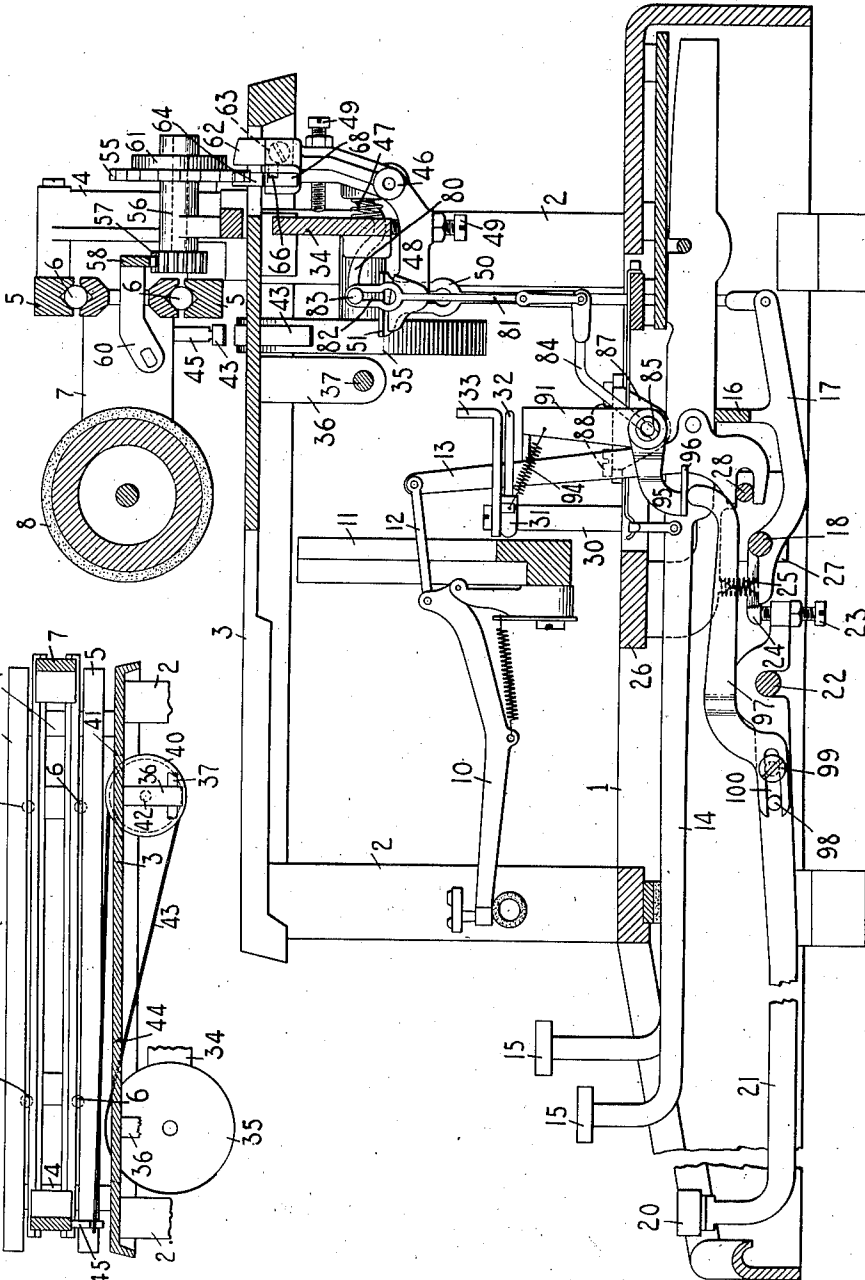
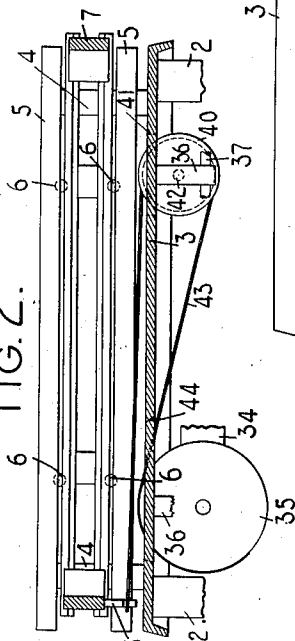


FIG. 2.



WITNESSES:

E. M. Wells.

R. H. Strother.

INVENTOR:

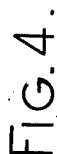
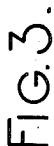
Herbert H. Steele

By Jacob F. Felt

HIS ATTORNEY

H. H. STEELE.
TYPE WRITING MACHINE.
APPLICATION FILED OCT. 24, 1910.

3 SHEETS—SHEET 2.



E. M. Wells.

R. H. Strother.

Herbert H. Steele

By Jacob Felber

HIS ATTORNEY.

1,044,285.

H. H. STEELE.
TYPE WRITING MACHINE.
APPLICATION FILED OCT. 24, 1910.

Patented Nov. 12, 1912.

3 SHEETS—SHEET 3.

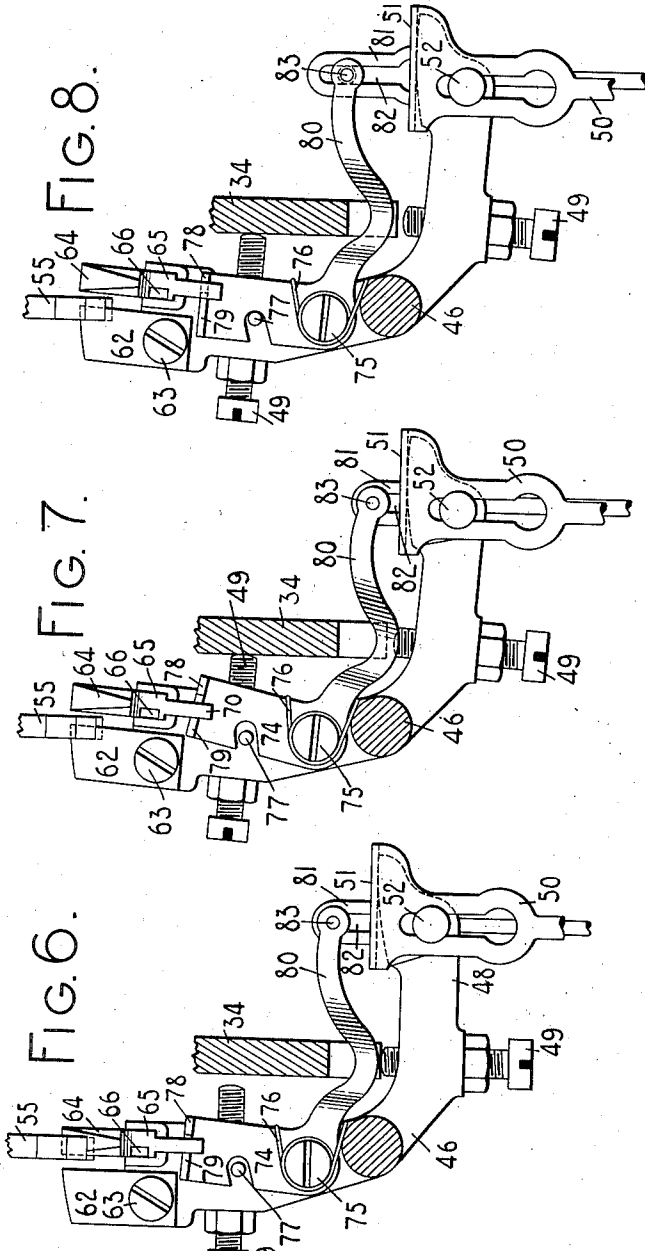


FIG. 12.

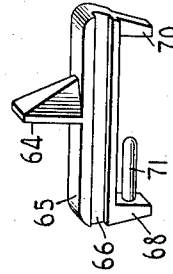


FIG. 11.

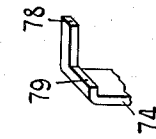
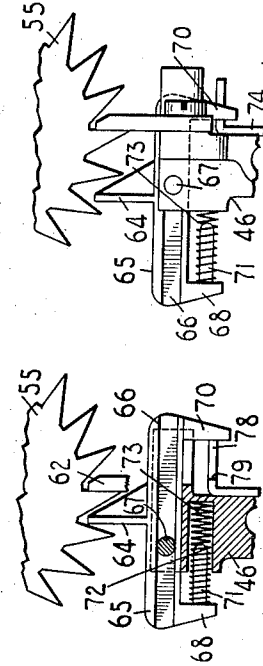


FIG. 9.



WITNESSES:

E. M. Wells.

R. H. H. H. H.

INVENTOR:

Herbert H. Steele

By Jacob Feld

HIS ATTORNEY

UNITED STATES PATENT OFFICE.

HERBERT H. STEELE, OF MARCELLUS, NEW YORK, ASSIGNOR TO THE MONARCH TYPE-WRITER COMPANY, OF SYRACUSE, NEW YORK, A CORPORATION OF NEW YORK.

TYPE-WRITING MACHINE.

1,044,285.

Specification of Letters Patent.

Patented Nov. 12, 1912.

Application filed October 24, 1910. Serial No. 588,682.

To all whom it may concern:

Be it known that I, HERBERT H. STEELE, citizen of the United States, and resident of Marcellus, in the county of Onondaga and State of New York, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

My invention relates to typewriting machines and more particularly to the carriage feed mechanism of such machines.

My invention has for its principal object to produce an efficient carriage feed mechanism for use in a typewriting machine designed for writing the Arabic and similar languages wherein the paper carriage is required to have its step-by-step movement from left to right instead of in the other direction and wherein some characters require a greater extent of carriage movement than others.

It is one of the objects of the invention to adapt an ordinary typewriting machine, built for the writing of English or other European languages, to use as an Arabic machine without any modifications that go at all extensively into the organization of the machine or that require different castings or the use of any considerable amount of special machinery to manufacture it. It is highly desirable in building a special machine of this sort that as much of the machine as possible may be of the ordinary standard form and of such a character that the special machines can run as far as possible through the ordinary course of manufacture for which the factory is organized and for which the tools are adapted. I have produced a carriage feed mechanism for the Monarch machine for writing Arabic with the minimum of change in the ordinary construction of the machine, and those changes of such sort that they can be applied to parts of the standard form of Monarch typewriter.

Some or all of the features of the invention can be readily adapted to other typewriters than the Monarch.

My invention also includes certain improvements in carriage feed mechanism generally.

My invention consists in certain features of construction and combinations and arrangements of parts, all of which will be

fully set forth herein and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation of a typewriting machine having my invention embodied therein, partly in front-to-rear vertical section but with said section taken on an irregular line. Fig. 2 is a front elevation showing part of the machine frame and carriage in section on a small scale and illustrating the manner of connecting the carriage with the spring drum. Fig. 3 is a fragmentary top plan view of part of the machine showing a certain special universal bar and showing some of the sub-levers in horizontal section. Fig. 4 is a left-hand side elevation with parts in section and showing the escapement mechanism in normal position. Fig. 5 is a rear elevation of the same. Figs. 6, 7 and 8 are side elevations, similar to Fig. 4, but showing the parts in different positions. Fig. 6 shows the parts at a certain point in the down stroke of a key but before the completion of said down stroke; Fig. 7 shows the parts in the position they occupy at the end of the down stroke of a key that imparts a double letter space movement to the carriage, and Fig. 8 shows the parts at the end of the down stroke of a key that imparts a single space movement to the carriage. Fig. 9 is a fragmentary rear elevation, partly in section, showing the feed dogs and part of the escapement wheel, the parts being in the same positions as in Fig. 8. Fig. 10 is a fragmentary rear elevation of the same, but with the parts in the same positions as in Fig. 7. Fig. 11 is an isometric view of the stop which determines the extent of carriage feed. Fig. 12 is an isometric view of the stepping dog detached from the machine. Figs. 4 to 12 inclusive are on an enlarged scale.

My invention is applicable or adaptable to various styles of typewriting machines and it is here shown applied to a Monarch front-strike typewriter. The main frame of the Monarch machine comprises a base 1, corner posts 2, and top plate 3, from which last rise standards 4 that support the stationary rails 5 which, through rollers 6, support the paper carriage 7 having a platen 8 mounted therein. Type bars 10, each carrying two types, are mounted on a shiftable segment 11 and are operated through links

12, upright sub-levers 13 and key levers 14 carrying printing keys 15. A universal bar 16, mounted on arms 17 projecting from a rock shaft 18, is adapted to operate the escapement and the ribbon vibrator. A space key or bar 20 is mounted on the forward ends of two levers 21 which are pivoted on a cross-bar 22 and each of which at its rear end is provided with an adjusting screw 23 that engages a forwardly directed arm 24 of the universal bar frame. Said universal bar is provided with a returning spring 25.

The base 1 comprises, among other things, a cross bar 26 from which depend two lugs or brackets 27, one near either side of the machine. These lugs have the rock shaft 18 of the universal bar frame pivoted therein and they also support the fulcrum rod 28 of the sub-levers.

Two posts 30, rising from the base 1, support a cross-bar 31 from which a series of pins 32 project toward the rear of the machine, said series of pins constituting a comb that guides the upper parts of the sub-levers 13.

Another plate or frame 33, supported by the posts 30 contains, in the ordinary Monarch machine, certain stop screws that limit the backward motion of some of the sub-levers.

A bracket 34, depending from the top plate, supports a spring drum 35 which, as shown in Fig. 2, is situated toward the left-hand side of the machine. Certain other brackets 36, also depending from the top plate, support the drive shaft 37 for the ribbon spools.

The parts thus far described are, in the specific embodiment of the invention shown in the drawing, of the ordinary Monarch construction, as are also most of the other parts of the machine, many of which other parts, however, are not shown in the drawing.

In order to cause the spring drum 35 to draw the carriage toward the right, I employ a pulley 40, Fig. 2, which pulley is situated near the right-hand side of the machine and extends up through a slot 41 cut for the purpose in the top plate 3. This pulley may be mounted in any convenient manner but as here shown it is journaled on a shouldered and headed screw 42 threaded into the rear side of the right-hand bracket 36. A tape 43 is led around the spring drum 35 in the same direction that it is in the standard machine but it comes down through a slot 44 in the top plate to the underside of the pulley 40 and passes from the upper side of said pulley toward the left where it is connected to a post 45 secured to the left-hand end of the carriage 7. The only change that it is necessary to make in the frame-work of the machine in order to effect this reversal in the direction of the carriage movement, is to cut in the top

plate the slot 41 and perhaps to elongate somewhat the usual slot 44 and also to drill a hole for the screw 42.

A dog rocker 46 is mounted in the usual way in the bracket 34 and this dog rocker differs but little from the standard form. In fact the restoring spring 47 and the forward arm 48, by which the dog rocker is operated, and also the stop screws 49 and the link 50 which connects the dog rocker with the universal bar, are, as here shown, identical with the standard construction. At its upper end said link 50 has a flange 51 bent off therefrom and overlying the curved upper edge of the arm 48, and said link is, as usual, loosely connected with said arm by a headed pin 52 passing through a key-hole slot in the link. The flange 51 is normally out of contact with the arm 48, as shown in Figs. 1 and 4, so that there is a certain amount of lost motion between the universal bar and the dog rocker, as there is in the standard Monarch construction. The dog rocker is pivoted as shown in Fig. 5 on center screws 53 threaded through ears 54 of the bracket 34.

The feed dogs carried by the dog rocker 46, cooperate with an escapement wheel or rack 55 loosely mounted on a shaft 56, which, at its forward end, has a feed pinion 57 that meshes with a feed rack 58 carried by pivoted arms 60. At its rear end the shaft 56 has a housing 61 rigidly mounted thereon and this housing has a pawl pivoted therein for cooperation with a ratchet wheel formed or mounted on the rear face of the escapement wheel 55. The feed rack, the feed pinion, the escapement wheel and this pawl and ratchet mechanism are all similar to the corresponding parts of the standard machine except that the parts are pitched in the opposite direction, the escapement wheel being designed to control the feed of the carriage toward the right and the pawl and ratchet mechanism being designed to allow the said carriage a free motion toward the left instead of in the opposite direction. The escapement wheel also has more teeth than usual, twenty teeth being shown in the present instance, and the parts are preferably so proportioned that a feed of one tooth of the escapement wheel allows the carriage to step one-sixteenth of an inch, this being a somewhat shorter feed movement than it is usual to give to the carriage in writing European languages.

It will be noted the feed rack 58, feed pinion 57 and escapement wheel 55 and also the ratchet wheel have to be specially cut for this machine; but as this is ordinary milling machine or gear cutting work, that fact is of no particular disadvantage.

The dog rocker has a rigid dog or fixed dog 62 secured thereto by a screw 63. The stepping dog consists of a tooth 64 integral

with and projecting upward from a slide bar 65 which is mounted in a slot cut horizontally and transversely of the machine in the forward part of the upper end of the dog rocker. This slide bar has a slot 66 cut in one side thereof and a pin 67, Figs. 9 and 10, inserted in the upper end of the dog rocker, has its inner end projecting into said slot 66 to retain the slide bar 65 in place in the slot in the dog rocker. It will be seen that this bar 65 is free to slide in a right and left-hand direction. The extent of its motion is limited by two ears 68 and 70 projecting down from either end of the slide bar and each adapted to be arrested by the dog rocker. The right-hand one of these ears 68 has a pin 71 projecting therefrom into a hole 72 bored into the dog rocker, and a compression spring 73 is mounted in said hole and surrounds said pin. The tension of this spring is exerted to move the stepping dog 64, 65 toward the right. Said stepping dog is normally in engagement with the escapement wheel and is held by the carriage spring in its left-hand position shown in Fig. 5, but when a key is depressed it moves either to the position shown in Fig. 9 or to that shown in Fig. 10, depending, as will hereinafter appear, on which of the keys is operated. It will be seen that in Fig. 9 the dog 64 has moved back far enough to allow the escapement wheel or rack to step one tooth and that in Fig. 10 it has moved back far enough to allow the escapement wheel to step two teeth. This variation in the operation of the loose dog is controlled by a stepped stop which is shown in detail in Fig. 11 and which is also shown in most of the other figures. A bell-crank 74 is pivoted to the side of the upper arm of the dog rocker on a screw 75 and said bell-crank is acted on by a spring 76, the tension of which is exerted to move the vertical arm of the bell-crank toward the rear of the machine. Its motion in that direction with relation to the dog rocker is limited by a pin 77 projecting from the side of said dog rocker. The upper end of the vertical arm of the bell-crank 74, is bent toward the left, as best shown in Fig. 11, where it will be seen that the bent-off part of this arm is formed with one long step 78 and one short step 79. As appears in Fig. 4, which shows the parts in normal position, the long step 78 is normally in the path of the depending ear 70 of the slide bar 65 and limits the motion of said slide bar to the extent indicated in Fig. 9. By rocking the bell-crank to the position shown for example in Fig. 6, however, the long step 78 is withdrawn from the path of the ear 70 and the slide bar is thus left free to move to the extent indicated in Fig. 10 so as to allow to the escapement wheel a motion of two teeth. The slide bar is ar-

rested in that position, either by the step 79, or by the dog rocker itself. The bell-crank is controlled from the printing keys and the space key by means which will now be described. Said bell-crank has a forwardly directed arm 80 which is bent to avoid various parts of the mechanism and which at its forward end has a link 81 connected therewith by means of a key-hole slot 82 in said link, which slot engages a headed pin 83 in the lever arm 80. At its lower end the link 81 is pivoted to an arm 84 projecting from a rock shaft 85 mounted just back of the series of sub-levers 13. Said rock shaft is pivoted on center screws 86, Fig. 3, threaded through two brackets 87 detachably mounted on the side bars of the base 1 of the typewriter by means of screws 88. Said rock shaft 85 has a universal bar 90 mounted thereon by means of arms 91 rigidly secured to the rock shaft and extending upward therefrom. The universal bar 90 lies back of the series of sub-levers 13, as shown in Figs. 1 and 3, and said universal bar is formed on its forward edge with a series of tongues 92 and slots or notches 93. Some of the sub-levers 13 stand in front of the tongues 92 and some of them stand in front of the notches 93 and the former of said sub-levers are adapted to operate the universal bar and the latter are inoperative on said universal bar. In Fig. 3 the tongues and notches are shown so disposed that every other sub-lever is operative on the universal bar and the intermediate sub-levers are inoperative thereon, but the arrangement is not necessarily as regular as there shown. Some of the Arabic characters require single letter spacing and some of them require double letter spacing and in practice whatever type actions control types that require double letter spacing have tongues 92 standing back of their respective sub-levers.

It will be noted that the link 50 has a lost motion connection with the dog rocker 46 but the link 81 does not have this lost motion connection. The result is that if a key is struck to write a character requiring a double letter space and whose sub-lever 13 therefore stands in front of one of the tongues 92, the universal bar 90 will be operated early in the key-stroke and the arm 80 will be drawn down to the position shown in Fig. 6 before the dog rocker begins to turn about its pivot, and when the dog rocker does begin to turn the arm 80 moves downward with it until the parts reach the position shown in Fig. 7. In said position it will be seen that the stepping dog 64 is free of the escapement rack and the stop 78 has been withdrawn from the path of the ear 70. The stepping dog therefore snaps back to the position shown in Fig. 10 and when the key is released and the parts resume their nor-

mal position, the carriage steps two spaces. When a key is operated whose sub-lever stands in front of one of the notches 93, the link 81 is not drawn down, and when the key is at the bottom of its stroke the escapement assumes the position shown in Fig. 8. The bell-crank 74 has been rocked forward, not by the link 81 but by the stop pin 77, and the stop 78 is in the path of the lug 70 and arrests the loose dog at the position shown in Fig. 9. When the key is released, therefore, the carriage steps a single step.

In a type action like that of the Monarch machine the sub-levers 13 turn through different angles. The links 12 operated by these sub-levers are all required to move to substantially the same extent and as the sub-levers near the ends of the system are considerably longer than those at the middle, said end sub-levers turn through smaller angles than the middle sub-levers. It will thus be seen that the universal bar 90 is operated through a greater angle by the middle sub-levers than it is by the end sub-levers. This makes no difference, however, in the operation of the escapement because it is immaterial whether the longer stop 78 moves only a short distance away from the ear or lug 70 or whether it moves away a greater distance, the said lug 70 being arrested in the same position in both cases. It will thus be seen that the construction is such as to require no nice adjustment and no provision for having all of the sub-levers operate the universal bar 90 to the same extent.

I preferably mount a light spring 94 on one of the arms 91 of the universal bar frame and connect said spring to the stop frame 33 or to any other suitable stationary part of the machine.

In an Arabic machine it is desirable that the space key always give a double space step to the carriage. To this end I have provided a connection from the space key of the machine to the differential device so that said space key operates the rock shaft 85 and the connected parts to effect a double spacing. To this end an arm 95 is mounted on one end of said rock shaft, said arm being preferably made of sheet metal and having a flange or contact part 96 bent off therefrom into a horizontal plane. A lever-arm 97 is mounted on one of the arms 21 of the space key by means of a pin 98 and a screw 99 extending through an open slot 100 in the forward end of said lever arm 97, said slot being parallel to the flange 96. The rear end of the lever arm 97 lies beneath the horizontal plate 96 and the construction is such that the extent of motion imparted by the space key to the arm 95, can be regulated by moving the arm 97 toward the front or toward the rear of the machine, thus bringing its point of contact with the plate 96 farther

from or nearer to the axis of the shaft 85. When the right adjustment has been obtained the arm 97 is secured in adjusted position by tightening the screw 99. As here shown the arm 97 is mounted on the outside of the right-hand arm 21 and said arm 97 and also the arm 95 are bent toward the right in order to avoid the right-hand lug 27. In Fig. 1 this lug is sectioned away to avoid hiding some of the other parts but the left-hand lug 27 is shown.

It will be seen that all of my escapement mechanism, including the differential devices for controlling the extent of feed, consists of a few comparatively simple parts added to the standard construction. Even the stepping dog 64 requires but a slight modification of the standard dog rocker. Said stepping dog offers comparatively little resistance to the motion of the escapement wheel, and the escapement is faster than some of those in common use.

It will of course be understood that various changes can be made in the details of construction and arrangement without departing from my invention.

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

1. In a typewriting machine having a top plate, the combination of a carriage, a spring drum situated near the left-hand side of the machine and projecting through said top plate, a pulley journaled below said top plate near the right-hand side of the machine and projecting through said top plate, and a tape running from said spring drum beneath the top plate to said pulley, thence over said pulley and toward the left above said top plate and connected to the left-hand part of said carriage.

2. In a typewriting machine, the combination with a carriage, an escapement, printing key levers, sub-levers operated by said key levers, and type bars operated by said sub-levers, of a universal bar operated by said printing key levers and operating said escapement, a second universal bar mounted as an attachment to the machine and arranged to be operated by certain only of said sub-levers, and means controlled by said second universal bar for varying the action of one of the members of said escapement.

3. In a typewriting machine, the combination of a dog rocker having a groove therein, a stepping dog arranged to slide in said groove and having a groove in one side thereof, and a pin engaging in the last mentioned groove to retain said dog against displacement.

4. In a typewriting machine, the combination of a dog rocker having a groove therein, a stepping dog arranged to slide in said groove and having ears to limit its sliding motion, and a spring acting on said dog.

5. In a typewriting machine, the combination of a series of printing keys, a series of upright sub-levers operated by said keys, a universal bar operated by said keys, an auxiliary universal bar mounted as an attachment to the machine and arranged to be operated by said sub-levers and having a series of tongues and cut-outs whereby it is operated by certain only of said sub-levers, an escapement operated by the first universal bar, and means operated by the auxiliary universal bar for varying the action of said escapement.

6. In a typewriting machine, the combination of printing keys, a universal bar operated by said keys, a space key, and a connection between said space key and said universal bar comprising an arm projecting from said universal bar and having an extended contact surface, a lever arm for the space key, and an adjustable arm arranged to engage said surface and mounted on said lever arm by means including a slot parallel to said extended surface, whereby said adjustable arm can be set to contact with said surface at different points to give different leverages.

7. An attachment to a typewriting machine having a series of printing key levers, a series of sub-levers, and a universal bar operated by said key levers, said attachment

comprising an auxiliary universal bar arranged to be operated by said sub-levers, and brackets detachably secured to the framework of the typewriting machine and having said auxiliary universal bar pivoted thereto.

8. In a typewriting machine, the combination of an escapement rack, a dog rocker, a holding dog and a stepping dog, a stop for said stepping dog movably mounted on said dog rocker, a spring for holding said stop in one position with relation to said dog rocker, means on said dog rocker for limiting the motion of said stop under the impulse of said spring, printing keys, means operated by said keys for operating said dog rocker, means operated by certain only of said keys for moving said stop against the tension of its spring, and a connection between said stop and said moving means, said connection being arranged to allow said stop to be moved with the dog rocker independently of said moving means.

Signed at Syracuse, in the county of Onondaga and State of New York this 20th day of October, A. D. 1910.

HERBERT H. STEELE.

Witnesses:

BESSIE G. KITTELL,
IRENE M. FRITZ.