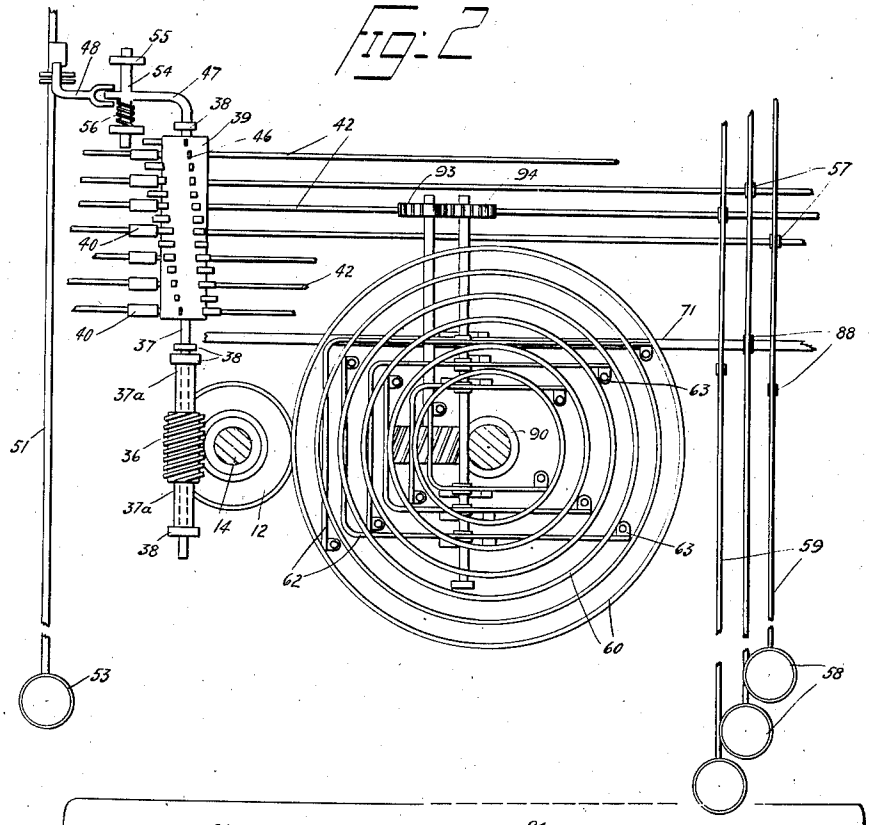
May 7, 1946. A. COLOMBO 2,399,788

TYPEWRITING MACHINE

Filed Oct. 19, 1944 4 Sheets-Sheet 1

Fig. 2



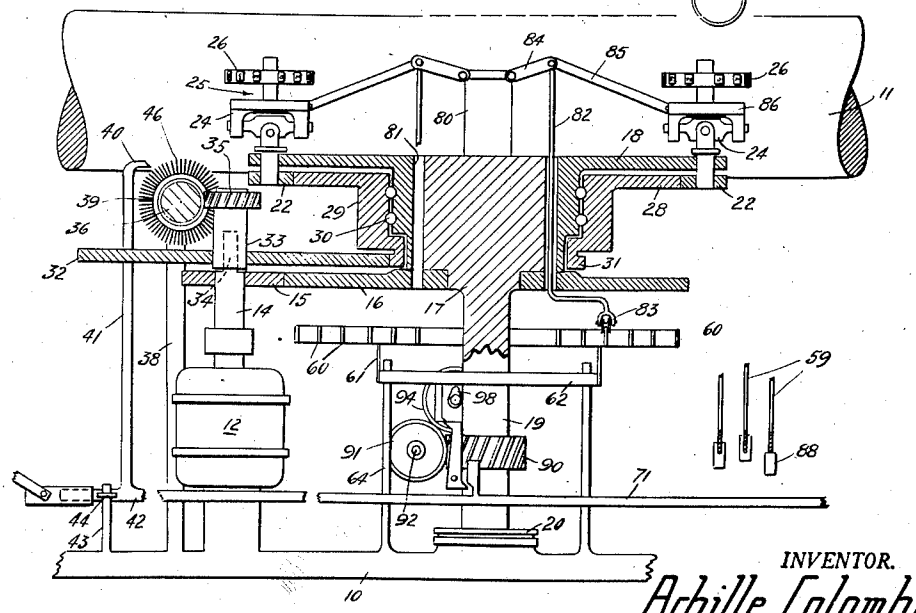


Fig. 1

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May 7, 1946. A. COLOMBO 2,399,788

TYPEWRITING MACHINE

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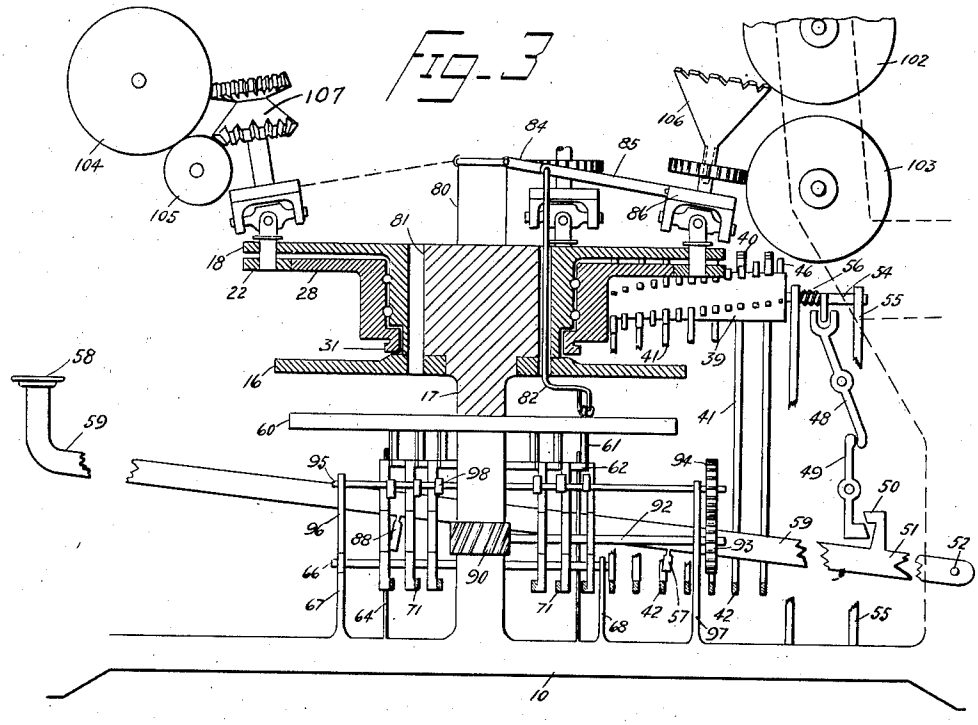
Fig. 3



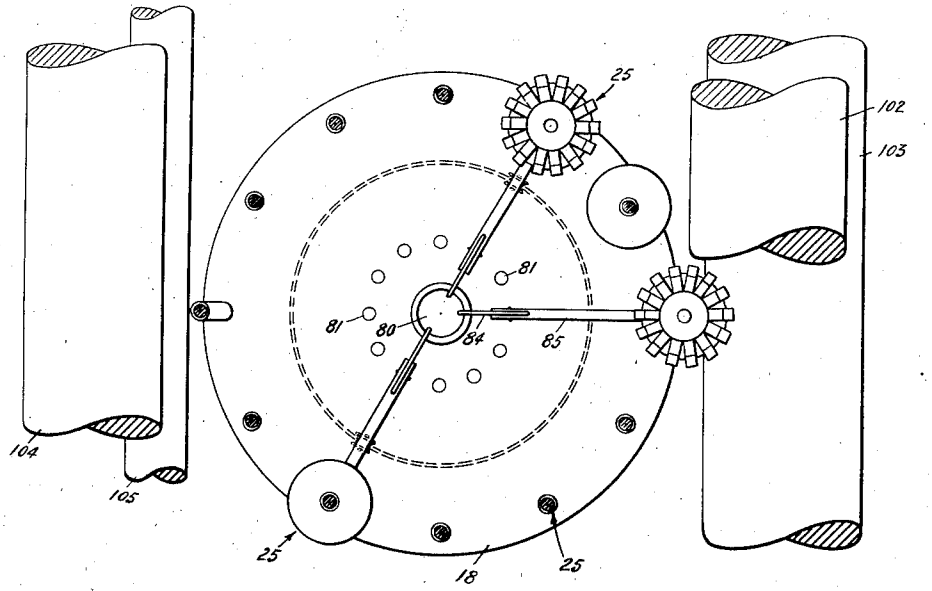


Fig. 4

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May 7, 1946. A. COLOMBO 2,399,788

TYPEWRITING MACHINE

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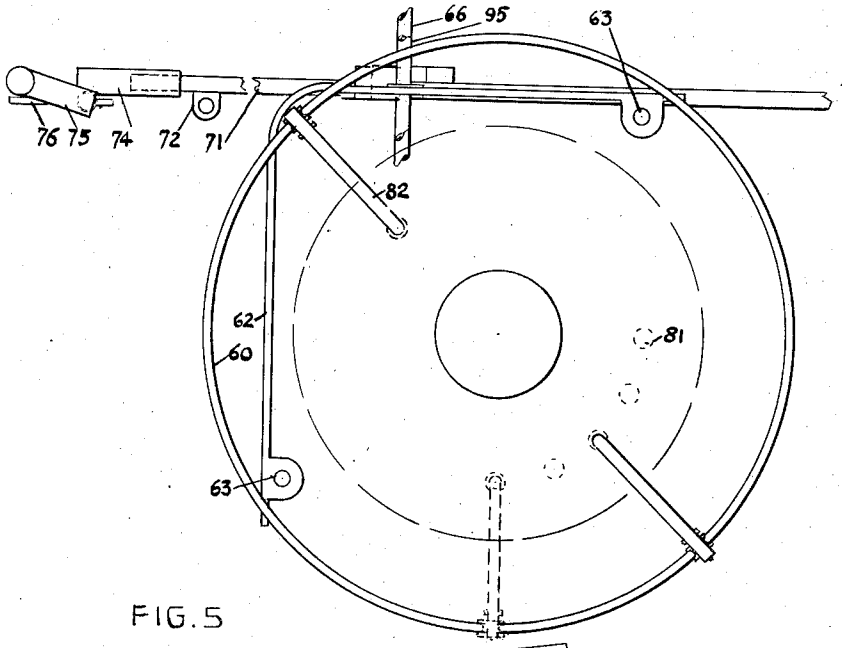

FIG. 5

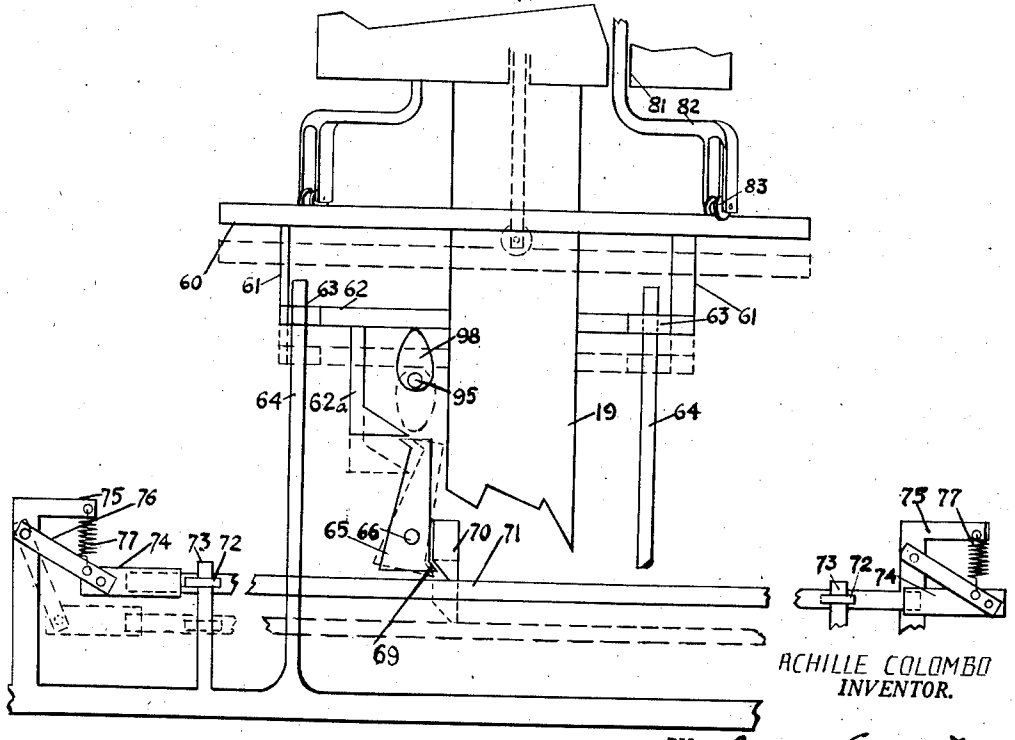

FIG. 6

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May 7, 1946. A. COLOMBO 2,399,788

TYPEWRITING MACHINE

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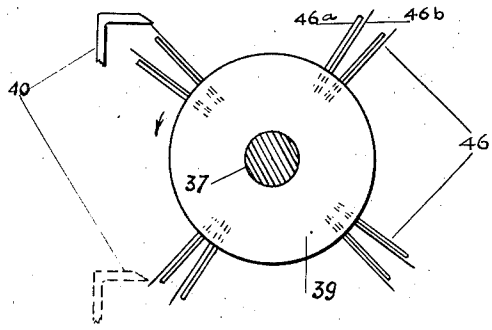

FIG. 7

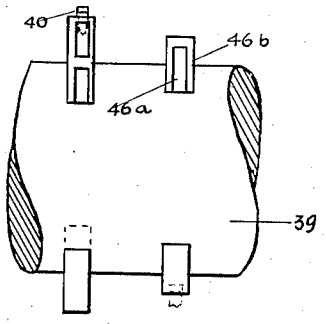

FIG. 8

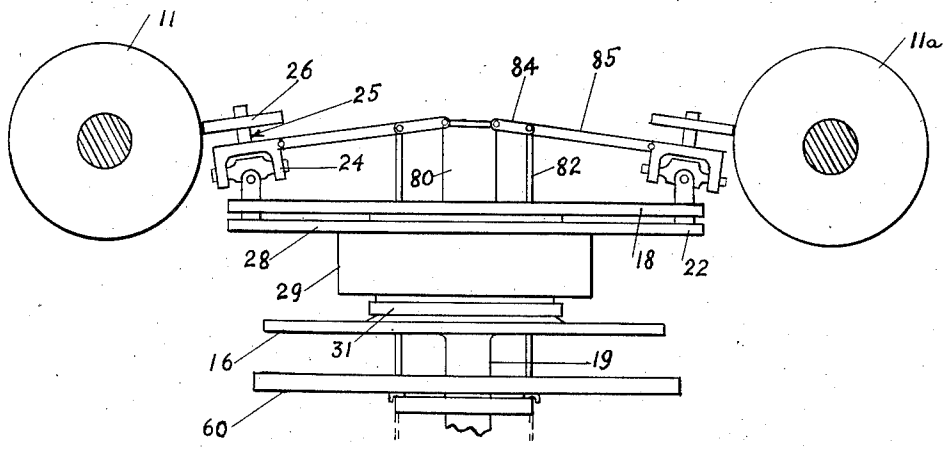

FIG. 9

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Patented May 7, 1946

2,399,788

UNITED STATES PATENT OFFICE

2,399,788

TYPEWRITING MACHINE

Achille Colombo, New York, N. Y.

Application October 19, 1944, Serial No. 559,353

18 Claims. (Cl. 197—5)

This invention generally relates to typewriters, and more specifically to noiseless power driven typewriters of the class in which the types are given a planetary motion and a rolling impression on the paper is obtained.

The general principles on which such machines are based have been fully disclosed in my U. S. Patent No. 2,311,737, and will therefore be restated only very briefly, for the sake of clarity.

In order to obtain a rolling impression of the types on the paper, each type is caused to follow a cycloidal path and is fastened on a cylindrical surface adapted to roll over, for a suitable period and with the desired contact pressure, on a paper-carrying platen. Said surface must therefore be integral with a planetary member having a rolling motion caused by driving means and suitable kinematic connections, and touching the paper-carrying platen only at the point of impression. Different types of kinematic connections may be employed for this purpose leading to different constructions of machines of this class; however, one of the principal characteristics will consist in that the typing unit will be always in movement, being connected to a driving shaft rotating continuously in one direction.

The general object of the present invention is to provide a typewriter of the aforementioned character wherein the types are grouped on a limited number of planetary members and the selection of any desired type and the actuation thereof into rolling contact with the paper are effected through the operation of a single keyboard of the kind used in standard typewriters.

A further object of the invention is to provide a typewriter as aforesaid having a keyboard incorporating a conventional shift key, to be depressed for the printing of capital letters and the like, as in standard typewriters, the construction however being such as to eliminate the necessity of vertically shifting the platen.

Another object of the invention is to provide a typewriter in which pairs of members, carrying identical types, are simultaneously actuated to printing position, so as to permit simultaneous printing of the same matter on a plurality of sheets of paper carried by platens arranged in suitable positions. The invention also contemplates the use of type-carrying members, functioning in pairs, as aforesaid, and each provided with series of identical types, whereby each of the members may concurrently effect the printing of identical matter on a plurality of sheets of paper.

It is a further object of the invention to provide a structure whereby a high typing speed may be attained, while maintaining a comparatively low speed of the continuously rotating elements of the mechanism, thereby eliminating objectionable noise and other shortcomings inherent in the use of high speeds of revolution.

The invention also aims at the provision of a typewriter having the above-mentioned characteristics, which can be operated with the lightest pressure of the typist's fingers on the keys so as to permit a fast and continued typing without fatiguing the operator.

These and other related objects will become apparent in the following description of the invention illustrated in the drawings, wherein:

Fig. 1 is a side elevational view, partly in section, of a typewriter according to the invention.

Fig. 2 is a plan view of the typewriter of Fig. 1, with the upper structure thereof removed to illustrate the mechanism for selecting anyone of the types carried by the planetary members, and to show the rings and other elements of the mechanism for actuating the planetary members to operative or printing position.

Fig. 3 is a side elevational view, at 90° to the view of Fig. 1, illustrating the actuating mechanism aforementioned and modified forms of planetary members and platens associated therewith.

Fig. 4 is a fragmentary plan view of the machine, showing the arrangement of the planetary members.

Fig. 5 is a fragmentary enlarged plan view of the mechanism for actuating the planetary members.

Fig. 6 is an enlarged side elevational view of the structure of Fig. 5.

Fig. 7 is an enlarged end elevational view of the device designated as "selector roller" and shown in Figs. 1 to 3.

Fig. 8 is a fragmentary side elevational view of the same device.

Fig. 9 is a diagrammatical view of the typewriter, illustrating the operative or printing position of the planetary members.

Referring now in detail to the drawings which illustrate a preferred embodiment of the invention, numeral 10 indicates the frame of the typewriter, and 11 one of a pair of conventional paper-carrying platens provided in the machine. An electric motor 12 drives a shaft 14 which carries a gear 15 fast thereon and meshing with a gear 16 of larger diameter. This latter gear is secured to the underside of the hub 17 of a disc 18, which is therefore continuously driven at a reduced speed relative to the motor 12. The hub 17 is

formed with a downwardly extending portion or shaft 19, which is rotatably supported on the frame of the machine through the medium of a thrust bearing 20.

Rotatably carried at the periphery of the disc 18 are a plurality of pinions 22, in this embodiment twelve in all. To each of said pinions there is connected, for rotation therewith, by means of a universal joint 24, a planetary member 25 embodying a type wheel 26 (see Fig. 1). The twelve pinions 22 and associated planetary members 25 are arranged along the periphery of the disc 18 at uniform angular intervals, that is two successive planetary members subtend on said periphery an angle of 30°, so that there are formed two diametrically opposed sets of planetary members, each consisting of six such members. The arrangement is illustrated in Fig. 4.

Each of the type wheels has fourteen types arranged along the periphery thereof at uniform angular intervals, and the type wheels of the two sets of planetary members are provided with identical types, identically distributed thereon.

A normally stationary gear 28 may be made integral with a sleeve 29 supported between the gear 16 and the disc 18, and freely mounted on the hub 17 which is provided with a ball bearing 30. The gear 28 meshes with the pinions 22 imparting to these latter a planetary motion, as the disc 18 rotates. The number of teeth of the gear 28 and of the pinions 22 is a matter of judicial choice; in the present embodiment, the gear has 168 teeth and the pinions 14.

Coaxially with stationary gear 28 there is provided another normally stationary gear 31, which also may be integral with the sleeve 29 and which meshes with a larger gear 32 fastened to a vertical shaft 33; this latter is freely mounted at its lower end on an extension of motor shaft 14, as shown at 34. Said shaft 33 further carries a worm wheel 35, which meshes with a worm 36 mounted, for rotation therewith, on a shaft 37 which is loosely supported in horizontal position in a plurality of bearings 38 and has fastened thereto a roller 39, hereinafter designated as the "selector roller" by reason of its function. The shaft 37 is longitudinally movable in its bearings, for the purpose that will later become apparent, and suitable means, such as a key-keyway arrangement, are provided for permitting longitudinal displacement of the shaft relative to the worm 36 and conjoint rotation of said elements. The worm 36 is maintained in fixed longitudinal position by a pair of sleeves 37a mounted on the shaft in abutting engagement with the ends of the worm and the adjacent bearings 38.

The selector roller 39 faces seven fingers 40, formed at the upper end of as many vertical members 41 which extend upwardly from seven horizontal bars 42. These latter are movable in a downward direction in a vertical plane, and are guided and maintained horizontal in such movement by suitably spaced uprights 43 (one of which is shown at the left in Fig. 1) secured to the frame of the machine and received within eyes 44 carried by the bars near the ends thereof. Suitable devices embodying spring means (not shown) support the ends of the bars in a normal uppermost position, and return the bars to such position after they have been depressed, in the manner and for the purpose to be later described.

The selector roller 39 is provided with a plurality of sets of blades, each consisting of four composite blades 46 mounted at 90° from each other along the periphery of the selector roller; two of such sets are shown in detail in Fig. 7. Each blade comprises two plates: a rigid plate 46a and a flexible plate 46b, slightly longer than plate 46a and following this latter in a clockwise direction. There are fourteen such sets of blades 46, as many as the types on each planetary member, uniformly spaced from each other longitudinally of the selector roller and angularly staggered by an angle of 90°÷14, that is, the four blades of any one set are mounted on the periphery of the selector roller in correspondence of four generatrices that are staggered by 90°÷14 from the four generatrices of the preceding set. As shown in Fig. 2, the seven fingers 40 are spaced from each other by intervals equal to twice the distance between adjacent sets of blades 46, so as to be alined with alternate such sets.

The shaft 37 is formed, at its end opposite the worm 36, with a bent extension 47, which is associated with the forked end of a rockable member 48 pivoted to a stationary element of the machine; a similarly pivoted rockable member 49 (see Fig. 3) has one end abutting against the member 48 and its other end, which is formed with an inclined face, associated with a hook 50 provided with an oppositely inclined face and carried by an arm 51; this latter is pivoted to the frame of the machine, as at 52, and carries at its free end a key 53 (see Figs. 2 and 3).

As will be apparent, upon depression of the key 53 (hereafter termed "shift key") the inclined face of the hook 50 will engage, in the downward movement of the hook, the oppositely inclined end face of the associated member 49 and rock this latter; therefore, member 48 will also be rocked and the forked end thereof will act upon the bent extension 47 of the shaft 37, to laterally displace this latter and the selector roller fastened thereto. The amount of displacement is such as to bring the seven sets of blades 46 normally out of alinement with the fingers 40 into registration with the same; action of the fingers on all the sets of blades is permitted in this manner. The bent extension 47 is provided with a transverse 54, slidably mounted in supports 55 and carrying a spring 56 which returns the shaft 37 and the associated elements 48, 49 to their initial position upon release of the shift key 53 and ensuing return of the arm 51 to normal position under the action of suitably arranged spring means (not shown). Conventional means may be provided for locking the shift key after it has been depressed, as in standard typewriters.

Assuming that one of the horizontal bars 42 is depressed to its lowermost position in the manner to be later described, the corresponding finger 40 concurrently moves to a lowermost position, shown in broken lines in Fig. 7. The space travelled by the finger in its downward movement is such that the finger must meet one, and only one, of the blades 46 of the set it faces, since two lines drawn from the uppermost and the lowermost position of the tip of the finger to the axis of the selector roller will make an angle of 90° with one another. Therefore, no matter what the initial position of the set of blades was prior to such downward movement of the finger, this latter will always bring the set of blades to the same final position, or to one of four possible positions differing from each other by an angle of 90°. The construction of the blades is such that the finger 40 during its downward movement will act on the set of blades as described, but, during its return

upward movement, following the return of its bar **42** to its initial position, the flexible plate **46b** will bend upwardly and allow the finger to pass without affecting the angular position assumed by the selector roller.

In conclusion, and disregarding any multiple of 90°, it may therefore be said that whenever a bar **42** is depressed, the dependent finger **40** moves the selector roller to a fixed angular position corresponding to the particular finger that has been actuated, and the two positions of the selector roller corresponding to two adjacent fingers differ by a fixed angle, in this instance by 90°÷7, as two adjacent sets of blades are angularly staggered by 90°÷14 but the fingers are alined with alternate sets of blades only, that is are alined with sets staggered by 90°÷7 relative to one another. Since, however, the selector roller is longitudinally movable upon operation of the shift key, as explained, to bring the intermediate sets of blades into registration with the fingers, it will be apparent that the selector roller may be moved by the depression of the fingers into fixed positions differing by 90°÷14, or, in other words, each finger may cause the selector roller to move into the fixed position corresponding thereto or to a further fixed position differing therefrom by an angle of 90°÷14 depending upon whether the shift key has been previously actuated, or not.

In the embodiment illustrated, the gear ratio of the complex of gear couplings **31—32—35—36** has been made three to one. Therefore, whenever the selector roller rotates by 90°÷14, the gear **28** rotates by 90°÷42, or by one tooth since said gear has 168 teeth; likewise, each of the planetary pinions **22** rotates by one tooth, or 360°÷14, since the pinion has fourteen teeth. As 360°÷14 is the angular interval of two adjacent types on the periphery of each type wheel, as a result of this rotation each type moves into the position previously occupied by the next one.

Any point on the periphery of a type wheel **26** forming part of a planetary member **25** describes a cycloidal trajectory. Such a cycloidal trajectory may be an "inner trajectory" if it is contained within a circle concentric with disc **18** and tangent outwardly to all type wheels when these latter are maintained in a normal or inoperative innermost position away from the platen (position of the type wheels in Fig. 1); or it may be an "outer trajectory" if it is contained within a circle concentric with disc **18** and tangent to the platen and to the type wheels when these latter are moved to an outermost or operative position, as illustrated by the type wheels of Fig. 9.

The arrangement of the gears is such that, when one of the pinions **22** has moved by 30° along the circumference of the gear **28**, due to the rotation of the disc **18**, its type wheel **26** will have completed one revolution. Thus, with every rotation of the disc **18** by 30° each type wheel is replaced by the following one with its types in exactly the same angular position. As will be readily understood, there are therefore only fourteen "inner trajectories" followed by the types; numbering these trajectories from 1 to 14 (and considering only one of the two sets of six planetary members that are identical and carry identical types), we can give the roman numeral I to all of the six types that at a certain initial time, arbitrarily chosen, follow the trajectory 1, and so on. Likewise, to each "inner trajectory" there corresponds an "outer trajectory." For instance, the "outer trajectory" 1 will be that followed by any type which followed the "inner trajectory" 1, when the type wheel that carries it moves to its outermost position.

Of all the outer trajectories, only one touches the paper carried by the platen, that is, only one can be utilized for the typing and need therefore be considered. If this "operative trajectory" be the outer trajectory 1, it is evident that in order to cause a type to leave its impression on the paper it will be necessary: first, to shift said type to the inner trajectory 1, unless it followed already that trajectory; and, second, to shift then the type wheel which carries said type to its outermost or operative position. The first operation is effected by the fingers **40** acting on the selector roller, and the second by a separate mechanism, but both are controlled through a single set of keys, as will later become apparent.

Let us assume that at a given time, arbitrarily chosen, the relation between types and trajectories was as follows:

Types	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV
Trajectories	1	2	3	4	5	6	7	8	9	10	11	12	13	14

The types that follow the inner trajectory corresponding to the operative trajectory will be said to be "in phase"; therefore, the six types I are initially in phase and the types having the same roman numeral other than I are out of phase by the same amount. If now it is desired to use, for instance, one of the types III, it will be necessary to transfer all said types to the trajectory 1, or, in other words, to shift all the types by two places. As explained above, this is accomplished by causing the gear **28** to rotate through the space of two teeth, which corresponds to an angular displacement of the selector roller by 90°÷7. Such a displacement will be obtained through the operation of the appropriate finger **40**, and the resulting distribution of types and trajectories will be as follows:

Types	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	I	II
Trajectories	1	2	3	4	5	6	7	8	9	10	11	12	13	14

It will be clear from the foregoing description that a rotation of the selector by 90° will cause a shift of fourteen places in the sequence of types, bringing back each type to its starting position. Rotation of the selector roller by multiples of 90° has therefore no effect whatever, and may be disregarded.

The foregoing considerations obviously apply also to the types of the second set of planetary members, it being evident that the actuation of the fingers **40** will simultaneously put in phase the types of both sets, so that pairs of identical types on diametrically opposed type wheels will be concurrently available for typing.

In the embodiment illustrated, the typewriter is provided with a keyboard comprising forty-two keys **58** carried by as many arms **59**, suitably pivoted to the frame of the machine and conveniently disposed, only three of such arms and keys being shown in Fig. 2, for the sake of clarity. The arms **59** carry dependent studs **57** (see Figs. 2 and 3) adapted to engage the horizontal bars **42** and to move the same to their lowermost posi-

tion, to cause the respective fingers 40 to act on the selector roller in the depression of the keys 58.

The forty-two arms 59 are divided into seven groups of six arms, and each of these groups is associated with a different one of the seven bars 42. As the actuation of each bar 42 results in simultaneously putting in phase six types, one for each type wheel, it is apparent that the forty-two keys 58, through the seven groups of arms, will control the putting in phase of forty-two types, seven for each type wheel (and the forty-two corresponding types of the duplicate set of planetary members). These types will be alternate types of the type wheels, that is types angularly spaced from each other on the type wheels by 360°÷7, since adjacent fingers 40 in the normal position of the selector roller act on seven alternate sets of blades 46 angularly staggered by 90°÷7 relative to each other and cause the selector roller to move to fixed positions angularly differing by that amount, to which there corresponds a rotation of the type wheels by 360°÷7, as described. Said forty-two types will be ordinary letters or signs, and, marked on the keys, will provide a keyboard of standard type.

The remaining forty-two types, arranged on the type wheels intermediate the ordinary letters at an angular interval of 360°÷14 relative thereto, will be capitals, or other signs usually requiring the operation of a shift key in standard typewriters, and the putting in phase thereof will be accomplished by depressing the key 53, to longitudinally displace the selector roller, and then operating the keys 58. As will be evident, the displacement of the selector roller will aline the remaining seven sets of blades 46 with the fingers 40, and since these sets are staggered by 90°÷14 relative to the adjacent sets normally registering with the fingers, the actuation of these latter will result in a displacement of the type wheels by 360°÷14 with respect to the angular position determined by the action of the fingers on the adjacent sets, and therefore in the putting in phase of types intermediate the ordinary letters.

Summing up:

The depression of a key 58 results in the operation of one of the seven bars 42. This operation causes the selector roller to rotate by a fixed amount and puts in phase all the types (ordinary letters or signs) having a given angular position on the various type wheels; one of these types will be marked on the key. If the shift key 53 has been previously depressed, then the operation of the bar 42 will cause the selector roller to rotate by a different fixed amount, and will put in phase other predetermined types, one of which will be the capital letter corresponding to the ordinary letter marked on the key, or another sign marked thereon as in conventional typewriters.

To effect the printing of the ordinary or capital letter corresponding to the key which has been depressed, the type wheel that carries it must be shifted to its outermost or operative position. This is accomplished through the same key, which, immediately after operation of the selector mechanism, acts through its arms 59 on the shifting or actuating mechanism that will now be described.

The machine comprises six concentric horizontal stationary rings 60. To each of these rings there are secured, at two diametrically opposed points, two vertical supports 61, which are fastened to a horizontal bracket 62 in proximity of the ends thereof. The various brackets are of different sizes in accordance with the diameter of the respective rings, and the general arrangement of the elements is illustrated in Fig. 2.

Each bracket has, at its opposite ends, apertured portions 63 (as best shown in Figs. 5 and 6) which are adapted to receive fixed uprights 64 and are slidable therealong to permit vertical displacement of the brackets. Each bracket has a downward extension 62a having a wedge-shaped end portion, which engages the inversely wedge-shaped upper end of a member 65, pivotally mounted on a bar 66 supported by fixed uprights 67, 68. The member 65 also embodies a further wedge-shaped portion 69 at the lower end thereof, which is engaged by a member 70 carried by a horizontal bar 71 provided with depending eyes 72 slidable along uprights 73. Each end of the bar 71 carries a sleeve 74, which is longitudinally slidable relative thereto in an outward direction, and which is connected to a bracket 75 by means of a lever 76 pivoted to the sleeve and to the bracket. Springs 77 connecting the levers with the brackets maintain the bar 71, and therefore the member 65, the extension 62a, the bracket 62 and the ring 60, in a normal position shown in full lines in Fig. 6. Only one of the bars 71 is shown in Fig. 1, but all six can be seen in section in Fig. 3.

To this normal position of the assembly described, there corresponds a normal inoperative position of the planetary members, which is insured through the following mechanism.

The hub 17 is provided with a coaxial upward extension 80 and twelve vertical bores 81, angularly spaced by 30° from each other, as the planetary members with which the bores are radially alined. A rod 82 extends through each of said bores and has a lower portion carrying a roller 83, supported by and travelling on one of the rings 60 during the continuous rotation of the hub. The lower end of the rods is suitably bent to bring the respective rollers in registration with different rings, and diametrically opposed rods are associated with the same ring.

The upper end of each rod 82 projects from the hub 17, and has pivoted thereto the opposed ends of two arms 84, 85 forming a toggle, the shorter arm 84 being pivoted at its other end to the hub extension 80 and the longer arm 85 pivotally carrying a ring 86, which surrounds the base of the corresponding planetary member. The length of the rods is such that, in the normal position of the respective rings 60, the toggles will maintain the planetary members in an innermost position, and no types will be allowed to leave their impression on the paper.

The actuation of the planetary members to printing position is effected in the following manner. Each of the arms 59 that carry the keys 58 is provided with a second stud 88, suitably spaced from the stud 57. The position of the studs is such that, when the key is depressed, the stud 57 will first engage the corresponding bar 42, to operate the selector roller, as described, and immediately afterwards the stud 88 will engage one of the six bars 71 and depress the same to its lowermost position. The bar thus engaged will be the one which is associated, through the ring 60 and the other elements described, with the planetary member that carries the type marked on the key which is depressed, or the corresponding capital letter, already put in phase.

The depression of the bar 71 will displace member 70 downwardly, and this latter will act on the wedge-shaped lower portion of the member 65, to swing the same away from the extension 62a, whereupon the bracket 62 and the ring 60 will be released and will also be moved downwardly. The position thus assumed by the various parts is illustrated in dotted lines in Fig. 6.

Concurrently, the rod 82 will become free to move in a downward direction, and the centrifugal force applied to the planetary member will straighten the toggle formed by the arms 84, 85 and swing the planetary member outwardly, about its joint 24, and into contact with the paper carried by the platen, thereby effecting the printing of the desired character. As mentioned above, diametrically opposed rods 82 cooperate with a single ring 60, so that two diametrically opposed type wheels having identical types will concurrently move to the operative position, and two impressions of the same type are produced on the paper, a second platen 11a being, of course arranged parallel to the platen 11 for this purpose, as illustrated in Fig. 9.

Upon release of the key 58 and return of the key arm 59 to normal position under the influence of suitable spring means (not shown), the springs 77 will cause the bar 71 and the member 70 to return to their initial position, whereby member 65 will be released and will swing back to normal position passing over the depressed extension 62a. This, however, does not effect the return of the bracket 62 and associated elements, and the following means are provided for this purpose.

A gear 90 is mounted on the continuously rotating shaft 19 and meshes with a gear 91 fastened to a suitably supported shaft 92, which carries a further gear 93 meshing with a gear 94 secured to a shaft 95. This latter is mounted in supports 96, 97 and carries six cams 98, each vertically alined with one of the brackets 62. Said cams are angularly staggered by amounts proportional to the angular intervals between the planetary members, and their shaft 95 is suitably geared to insure that each cam will be in such a position as to permit full downward displacement of the associated bracket 62, and consequent full outward displacement of the corresponding type where, at the moment in which the type wheel, if fully swung outwardly, would come in contact with the paper.

In its continued rotation, the cam then engages and lifts the bracket 62 returning the same to its initial position, the inclined surface of the extension 62d engaging, in its upward movement, the inclined surface of the upper end of member 65 and causing this latter to swing to the right, thereby allowing passage of the extension. The member 65 then immediately returns to its normal position in engagement with the lower face of the extension 62a, thereby locking the bracket against further downward movement until the bar 71 is again depressed.

Conventional line feeding and letter feeding devices, the latter operated by the ends of the arms 59 upon depression of the keys, may be employed. Likewise, suitable inking means will be provided, as, for instance, an inking pad arranged in such a position that the type in phase on the planetary member which is moved to the operative position will roll on the inking pad prior to coming into contact with the paper.

The construction of the typewriter lends itself readily to the provision of means for simultaneously effecting the direct printing of the same matter on four sheets of paper, without any substantial alteration in the structure of the various elements described. This may be accomplished by arranging two pairs of platens at opposite sides of the machine and providing planetary members each having two series of identical types.

As illustrated in Fig. 3, the platens may be of equal diameter, as shown at 102, 103; or, their diameter may be different as in the case of platens 104, 105. These latter, it will be observed, are in contact with one another and turn in opposite directions, so that the characters will be printed on opposite faces of the sheets. Likewise, the type wheels carried by the planetary members may assume various shapes, opportunely designed in relation to the arrangement of the pairs of platens, to permit rolling contact of the types with the paper. Possible forms of planetary members are illustrated, by way of example, at 106, 107, this latter member being substantially formed of a pair of cones joined at their apices. Suitable connections will, of course, be provided for insuring simultaneous line and letter feeding of the pairs of platens.

It is obvious that suitable means may be provided for permitting only partial use of a plurality of platens, should it not be desired to print all the possible sheets. It is equally apparent that the machine can be provided with a single platen if the printing of only one sheet at a time is required, and, likewise, the duplicate set of planetary members may be eliminated.

While I have described my invention substantially with reference to a preferred embodiment thereof, it is to be understood that many changes and modifications may be made in the structure illustrated in the drawings without departing from the spirit of the invention or exceeding the scope of the claims.

I claim:

1. In a typewriting machine comprising a disc rotating continuously in one direction and a plurality of pinions rotatably mounted on said disc and driven with a continuous planetary movement, a pair of paper-carrying platens arranged at opposite side of said disc, a number of type wheels each associated with one of said pinions for planetary movement therewith and having a plurality of types, said type wheels being arranged to form a pair of sets the opposed members whereof are provided with identical types and are movable between an inoperative position and a writing position wherein they come into contact with said platens, a mechanism for selectively moving any one of the pairs of opposed type wheels to the writing position, a mechanism for selectively determining which one of the types on each type wheel of the pair that is moved to the writing position will leave its impression on the paper, and a set of keys for controlling both said aforementioned mechanisms.

2. In a typewriting machine comprising a disc rotating continuously in one direction and a number of pinions rotatably mounted at the periphery of said disc and driven with a continuous planetary movement, a pair of paper-carrying platens aranged at opposite sides of said disc, a number of type wheels each associated with one of said pinions for planetary movement therewith and having a plurality of types, said type wheels being arranged to form a pair of sets the opposed members whereof are provided with identical types and are simultaneously movable from an inoper-

ative position to a writing position wherein they come in contact with said platens, key-controlled means for selectively moving any one of the pairs of opposed type wheels to the writing position, and key-controlled means for selectively causing any one of the types on each type wheel of the pair that is moved to the writing position to leave its impression on the paper.

3. In a typewriting machine comprising a disc rotating continuously in one direction and a number of pinions rotatably mounted at the periphery of said disc and driven with a continuous planetary movement, a plurality of paper-carrying platens arranged at opposite sides of said disc, a number of type wheels each associated with one of said pinions for planetary movement therewith and having a number of series of types equal to the number of platens at each of said opposite sides of the disc, said type wheels being arranged to form a pair of sets the opposed members whereof are provided with identical series of types and are simultaneously movable from an inoperative position to a writing position wherein they come simultaneously in contact with said platens at the opposite sides of the disc, key-controlled means for selectively moving any one of the pairs of opposed type wheels to the writing position, and key-controlled means for selectively causing any one of the types of the series provided on each type wheel of the pair that is moved to the writing position to leave its impression on the paper.

4. In a typewriting machine comprising a disc rotating continuously in one direction and a number of pinions rotatably mounted at the periphery of said disc and driven with a continuous planetary movement, a pair of spaced parallel paper-carrying platens arranged at opposite sides of said disc, a number of type wheels each associated with one of said pinions for planetary movement therewith and having a plurality of types, said type wheels being arranged to form a pair of sets the diametrically opposed members whereof are provided with identical types and are simultaneously movable between an inoperative position and a writing position wherein they come in contact with the paper carried by said parallel platens, means for normally maintaining all the type wheels in the inoperative position, a mechanism for selectively moving any one of the pairs of diametrically opposed type wheels to the writing position, a mechanism for selectively causing any one of the types on each type wheel of the pair that is moved to the writing position to leave its impression on the paper, and a set of keys for jointly controlling both said aforementioned mechanisms.

5. In a typewriting machine comprising a disc rotating continuously in one direction and a number of pinions rotatably mounted on said disc and driven with a continuous planetary movement, in combination, a paper-carrying platen, a number of type wheels each associated with one of said pinions for planetary movement therewith and being movable between an inoperative position and a writing position, each of said type wheels carrying a plurality of types, a mechanism for selectively moving any one of the type wheels to the writing position, a mechanism for selecting any one of the types carried by the type wheel that is moved to the writing position to determine which one of the types will leave its impression on the paper, said mechanism comprising a selector roller through the rotation whereof the selection of the types is effected and which is displaceable, in a translatory movement, to different possible positions, the rotation of the selector roller resulting in the selection of different types in said different possible position thereof, means for selectively moving the selector roller to any one of said different possible positions thereof, and a set of keys operatively connected to both said aforementioned mechanisms for controlling the operation of the same.

6. In a typewriting machine comprising a disc rotating continuously in one direction and a number of pinions rotatably mounted at the periphery of said disc and driven with a continuous planetary movement, a paper-carrying platen, a number of type-wheels each associated with one of said pinions for planetary movement therewith, each of said type wheels carrying a plurality of types and being swingable outwardly under the action of the centrifugal force in the rotation of said disc, a plurality of devices rotating with said disc and effective to normally hold the type wheels in an inner inoperative position, means for selectively releasing any one of the type wheels to permit the same to swing outwardly into a writing position, means for selecting any one of the types carried by the type wheel that is swung outwardly to determine which one of the types will leave its impression on the paper, and a set of keys for jointly controlling the operation of both said aforementioned means.

7. In a typewriting machine comprising a disc rotating continuously in one direction and a number of pinions rotatably mounted at the periphery of said disc and driven with a continuous planetary movement, a paper-carrying platen, a number of type wheels each associated with one of said pinions for planetary movement therewith, each of said type wheels carrying a plurality of types and being swingable outwardly under the action of the centrifgual force in the rotation of said disc, a plurality of devices rotating with the disc each connected to one of the type wheels, said devices being normally held in a position wherein they maintain the respective type wheels away from the platen in an inner inoperative position, means for selectively releasing any one of said devices to permit the type wheel connected therewith to swing outwardly into a writing position, means for selecting any one of the types on the type wheel that is swung into the writing position to determine which one of the types will leave its impression on the paper, and a set of keys for controlling the operation of both the aforementioned means.

8. In a typewriting machine comprising a disc rotating continuously in one direction and a number of pinions rotatably mounted at the periphery of said disc and driven with a continuous planetary movement, a paper-carrying platen, a number of type wheels each associated with one of said pinions for planetary movement therewith, each of said type wheels carrying a plurality of types and being swingable outwardly under the action of the centrifugal force in the rotation of said disc, a plurality of devices rotating with the disc each connected to one of the type wheels, said devices being normally held in a position wherein they maintain the respective type wheels away from the platen in an inner inoperative position, means for selectively releasing any one of said devices to permit the type wheel connected therewith to swing outwardly into a writing position, means for se-

lecting any one of the types on the type wheel that is swung outwardly to determine which one of the types will leave its impression on the paper, a set of keys for controlling the operation of both the aforementioned means, and cam-actuated means for automatically returning the device that has been released to its normal position as soon as a type has been printed on the paper.

9. In a typewriting machine comprising a disc rotating continuously in one direction and a number of pinions mounted at the periphery of said disc and driven with a continuous planetary movement, a paper-carrying platen, a number of type wheels each associated with one of said pinions for planetary movement therewith, each of said type wheels having a plurality of types and being swingable outwardly under the action of the centrifugal force in the rotation of the disc, a plurality of toggles rotating with the disc, each of said toggles being connected to one of the type wheels and normally holding the respective type wheel in an inner inoperative position, means for selectively causing any one of said toggles to straighten thereby permitting the respective type wheel to swing outwardly into a writing position, means for selecting any one of the types carried by the type wheel that is moved into the writing position to determine which one of the types will leave its impression on the paper, and a set of keys for controlling the operation of both the aforementioned means.

10. In a typewriting machine comprising a disc rotating continuously in one direction and a number of pinions rotatably mounted at the periphery of said disc and driven with a continuous planetary movement, a paper-carrying platen, a number of type wheels each associated with one of said pinions for planetary movement therewith, each of said type wheels having a plurality of types and being swingable outwardly under the action of the centrifugal force in the rotation of said disc, a plurality of toggles rotating with said disc, each of said toggles being connected to one of the type wheels and normally holding the respective type wheel in an inner inoperative position, means for selectively causing any one of said toggles to straighten thereby permitting the respective type wheel to swing outwardly into a writing position, means for selecting any one of the types on the type wheel that is swung into the writing position to determine which one of the types will leave its impression on the paper, a set of keys for controlling the operation of both said aforementioned means, and means for automatically returning the type wheel that has been swung outwardly to its initial inoperative position as soon as a type has been printed on the paper.

11. In a typewriting machine comprising a disc rotating continuously in one direction and a number of pinions rotatably mounted at the periphery of said disc and driven with a continuous planetary movement, a paper-carrying platen, a number of type wheels each associated with one of said pinions for planetary movement therewith, each of said type wheels having a plurality of types and being swingable outwardly under the action of the centrifugal force in the rotation of said disc, a plurality of stationary rings, a plurality of toggles rotating with the disc each connected to one of the type wheels, a plurality of rigid members each connected to one of the toggles and riding on one of said stationary rings, said rigid members normally locking the toggles in a position in which they maintain the respective type wheels inoperative, means for selectively displacing any one of the rings to allow of such a displacement of the rigid member riding thereon whereby the respective toggle is permitted to straighten and the type wheel connected thereto is swung outwardly into a writing position, means for selectively causing any one of the types on the type wheel that is swung outwardly to leave its impression on the paper, and a set of keys for controlling the operation of both the aforementioned means.

12. In a typewriting machine comprising a disc rotating continuously in one direction and a number of pinions rotatably mounted at the periphery of said disc and driven with a continuous planetary movement, a paper-carrying platen, a number of type wheels each associated with one of said pinions for planetary movement therewith, each of said type wheels having a plurality of types and being swingable outwardly under the action of the centrifugal force in the rotation of the disc, a plurality of stationary rings, a plurality of toggles rotating with the disc each connected to one of the type wheels, a plurality of rigid members each connected to one of toggles and riding on one of said stationary rings, said rigid members normally locking the toggles in a position in which they maintain the respective type wheels inoperative, means for selectively displacing any one of the rings downwardly to permit downward movement of the rigid member riding thereon, whereby the respective toggle is allowed to straighten and the type wheel connected thereto is swung outwardly into a writing position, means for selectively causing any one of the types on the type wheel that is swung outwardly to leave its impression on the paper, a set of keys for controlling the operation of both the aforementioned means, and cam means continuously rotating in synchronism with the disc for returning the ring that has been displaced downwardly to its initial position as soon as a type has been printed on the paper.

13. In a typewriting machine comprising a disc rotating continuously in one direction and a number if pinions rotatably mounted at the periphery of said disc and driven with a continuous planetary movement, a pair of paper-carrying platens disposed at opposite sides of said disc, a number of type wheels each associated with one of said pinions for planetary movement therewith and having a plurality of types, said type wheels being swingable outwardly under the action of the centrifugal force in the rotation of the disc and being arranged to form a pair of sets the diametrically opposed members whereof are provided with identical types, a plurality of toggles rotating with the disc, each of said toggles being connected to one of the type wheels and normally holding the respective type wheel in an inner inoperative position, means for selectively causing the toggles connected to any one of the pairs of diametrically opposed type wheels to straighten simultaneously thereby permitting the type wheels of such pair to simultaneously swing outwardly into a writing position, means for selectively causing any one of the types carried by the type wheels thus swung outwardly to leave its impression on the paper, and a set of keys for controlling the operation of both the aforementioned means.

14. In a typewriting machine comprising a disc rotating continuously in one direction and a number of pinions rotatably mounted at the periphery

of said disc and driven with a continuous planetary movement, a paper-carrying platen, a number of type wheels each associated with one of said pinions for planetary movement therewith, each of said type wheels carrying a plurality of types and being swingable outwardly under the action of the centrifugal force in the rotation of said disc, a plurality of devices rotating with the disc and each connected to one of the type wheels, said devices being normally held in a position wherein they maintain the respective type wheels away from the platen in an inner inoperative position, a mechanism for selectively releasing any one of said devices to permit the type wheel connected thereto to swing outwardly into a writing position, a mechanism for selecting any one of the types on the type wheel that is swung outwardly to determine which one of the types will leave its impression on the paper, said mechanism comprising a selector roller having two possible longitudinal positions and being effective to select different types in said two different positions of the selector roller, means for moving the selector roller to either one of said possible longitudinal positions thereof, and a set of keys operatively connected to both said aforementioned mechanisms for jointly controlling the operation thereof.

15. A typewriting machine comprising a paper-carrying platen, a disc continuously rotating in one direction, a stationary gear coaxial with said disc, a plurality of planetary pinions rotatably mounted at the periphery of said disc and meshing with said stationary gear, a plurality of type wheels each associated with one of said pinions and driven thereby with a continuous planetary movement, each of said type wheels carrying a plurality of types and being movable between an inoperative position and a writing position, a mechanism for selectively moving any one of said type wheels to the writing position, a number of movable bars equal to half the number of types on any of the type wheels, a selector roller having a number of possible angular positions equal to twice the number of said movable bars and two possible longitudinal positions, means for causing the selector roller to assume either one of said possible longitudinal positions, means for causing the selector roller to assume either one of two predetermined angular positions when one of said bars is actuated depending upon the longitudinal position of the selector roller, whereby said movable bars are effective to actuate the selector roller to all of its possible angular positions, gear means univocally relating said angular positions of the selector roller to as many angular positions of said aforementioned stationary gear, the angular position of said stationary gear determining which one of the types carried by each type wheel will leave its impression on the paper when the type wheel is moved to the writing position, a set of keys, and means controlled by said set of keys for jointly actuating said aforementioned mechanism and said movable bars.

16. A typewriting machine as in claim 15, wherein the mechanism for selectively moving any one of the type wheels to the writing position comprises a plurality of toggles rotating with the disc, each connected to one of the type wheels and normally holding the same in an inner inoperative position, and means controlled by the set of keys for selectively causing any one of said toggles to straighten thereby permitting the respective type wheel to swing outwardly to a writing position under the action of the centrifugal force in the rotation of the disc.

17. In a typewriting machine comprising a disc rotating continuously in one direction and a number of pinions rotatably mounted at the periphery of said disc and driven with a continuous planetary movement, a paper-carrying platen, a number of type wheels each associated with one of said pinions for planetary movement therewith, each of said type wheels carrying a plurality of types and being swingable outwardly under the action of the centrifugal force in the rotation of said disc, a plurality of devices rotating with the disc each connected to one of the type wheels, said devices being normally held in a position wherein they maintain the respective type wheels away from the platen in an inner inoperative position, key-controlled means for selectively releasing any one of said devices to permit the type wheel connected therewith to swing outwardly into a writing position, and key-controlled means for selecting any one of the types on the type wheel that is swung into the writing position to determine which one of the types will leave its impression on the paper.

18. A typewriting machine as in claim 17, wherein the key-controlled means for selecting any one of the types on the type wheel that is swung into the writing position comprise a selector roller having two possible longitudinal positions and are effective to select different types in said two different positions of the selector roller.

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