Oct. 29, 1929. N. C. DURAND 1,733,951

CONTROL MEANS FOR PHONOGRAPHS

Filed June 22, 1925 2 Sheets-Sheet 1

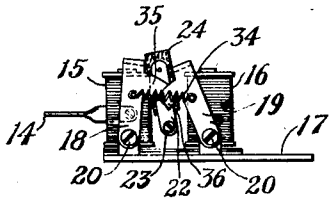

Fig. 3

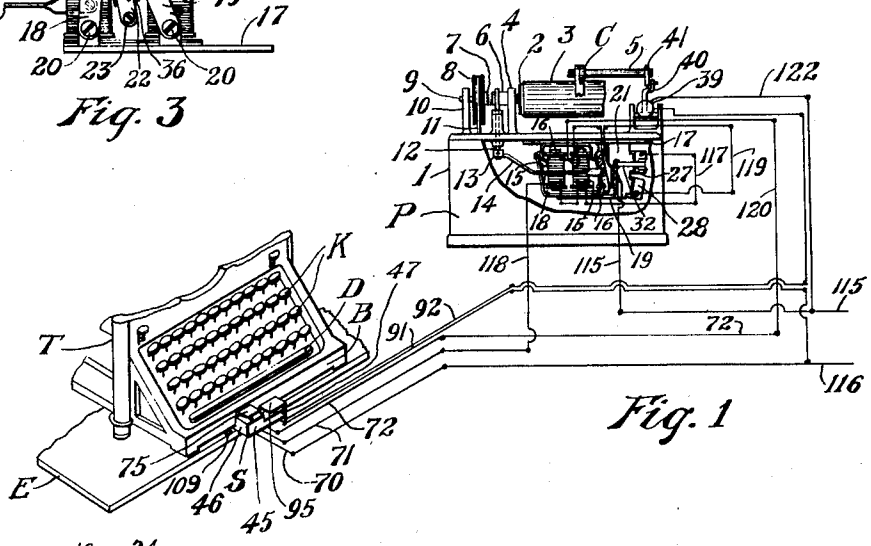

Fig. 1

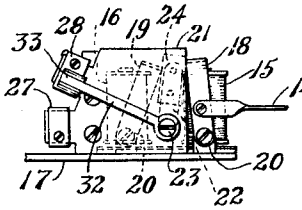

Fig. 4

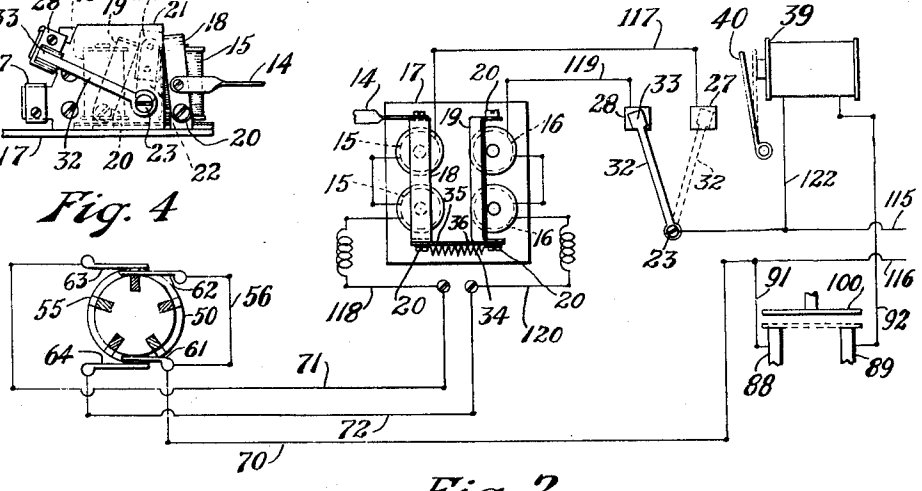

Fig. 2

INVENTOR
Nelson C. Durand
BY Henry Lanahan
ATTORNEY

Oct. 29, 1929. N. C. DURAND 1,733,951

CONTROL MEANS FOR PHONOGRAPHS

Filed June 22, 1925 2 Sheets-Sheet 2

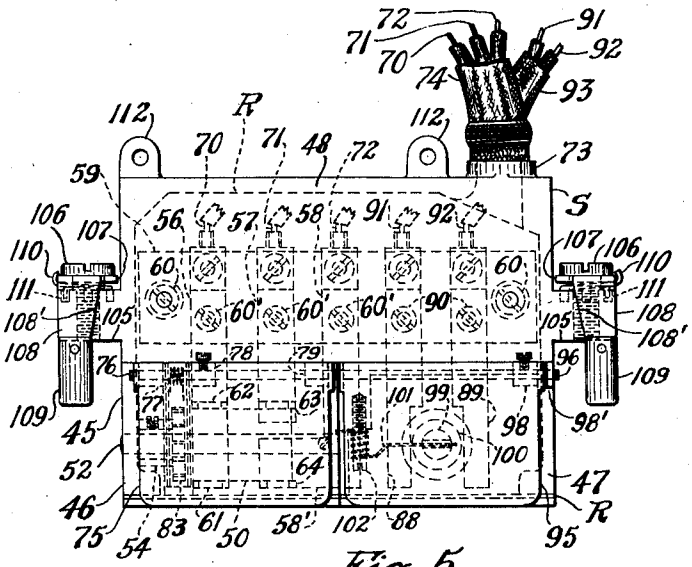

Fig. 5

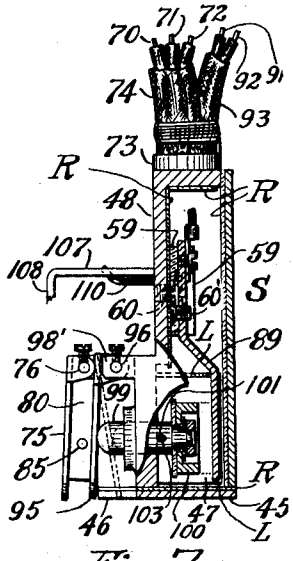

Fig. 7

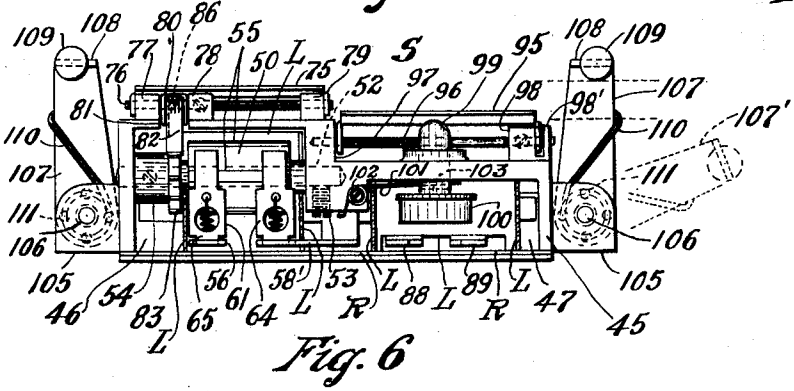

Fig. 6

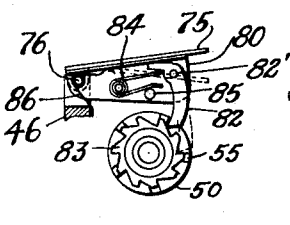

Fig. 8

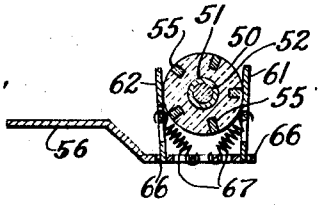

Fig. 9

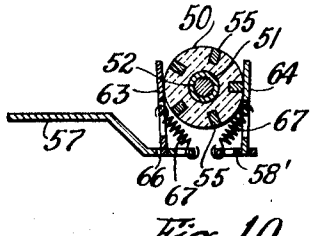

Fig. 10

INVENTOR
Nelson C. Durand
BY Harry Lanahan
ATTORNEY

Patented Oct. 29, 1929 1,733,951

UNITED STATES PATENT OFFICE

NELSON C. DURAND, OF NEWARK, NEW JERSEY, ASSIGNOR TO THOMAS A. EDISON, INCORPORATED, OF WEST ORANGE, NEW JERSEY, A CORPORATION OF NEW JERSEY

CONTROL MEANS FOR PHONOGRAPHS

Application filed June 22, 1925. Serial No. 38,613.

My invention relates to control means for phonographs and more particularly to an improved construction and arrangement wherein means connected to a phonograph of the business or commercial type for controlling a certain operation or certain operations thereof, is combined or associated in a novel manner with a typewriter designed to be used in transcribing matter reproduced by such phonograph.

In transcribing matter recorded on a phonograph cylinder or tablet it is customary for the operator of the typewriter to start the mandrel or record tablet support of the phonograph, with the reproducing mechanism of the latter in operative position, to listen to as much of the reproduction as she can conveniently carry in her mind, and to then stop the mandrel or support and transcribe on the typewriter the matter she has just listened to. These operations are repeated over and over and necessitate frequent starting and stopping of the mandrel or record tablet support of the phonograph. Occasionally, the operator of the typewriter desires to have the last few words of the reproduction of the section of the record just listened to repeated, and this necessitates the stepping back of the reproducing mechanism of the phonograph a slight distance towards the beginning of the record, or what is known as the backspacing of the reproducing mechanism, so that such words will be again reproduced. The start and stop and backspacing operations just described are at present controlled in various ways, all of which are open to certain objections as will be hereinafter set forth.

It is usual to control the start and stop operations of a transcribing phonograph either pneumatically by means comprising a pedal or foot-operated device disposed on the floor beneath the typewriter, or electrically by means including a switch disposed near the typewriter adjacent one end thereof, generally adjacent the left-hand end thereof. Many transcribers object to the pneumatic control means described because the feet are not left free, the pedal or foot-operated device is likely to be moved out of proper position on the floor and also must be repositioned each time the transcriber changes her position, and it is necessary to maintain a fatiguing pressure upon the pedal or foot-operated device throughout each period of rotation of the mandrel. The electrical control means with the switch disposed adjacent one end of the typewriter is also open to improvement, for some transcribers employing the touch system find the manipulation of this switch somewhat distracting owing to the fact that it necessitates the removal of the hand from proper position over the keys of the typewriter.

The backspacing operation referred to is usually effected either mechanically or electrically. Where this operation is effected mechanically it is customary to employ means comprising a manually operable key or lever mounted directly on the phonograph. As the phonograph is necessarily some distance from the typewriter, it is obvious that the actuation of the manually operable key or lever is very distracting to an operator, especially to one employing the touch system. Where the backspacing operation is electrically-controlled, a switch is provided adjacent one end of the typewriter, generally adjacent the right-hand end thereof, which must be actuated by the operator when it is desired to back-space. The manipulation of this switch located as described, is found distracting by some touch operators for the reason indicated above in connection with the switch of the electrical control start and stop means.

The principal object of my invention is to provide an improved arrangement for controlling either the start and stop operations or the backspacing operations of a transcribing phonograph, or both the start and stop and backspacing operations, which will not be open to the objections above noted and which preferably comprises a device adapted to be readily actuated by a very light touch or pressure of the thumb or hand of the transcriber without necessitating the removal of the fingers from their proper touch-operating positions relative to the keys of the typewriter.

Another object of my invention is to provide in an arrangement of this character an

improved manually operable device for association with typewriters, which is of simple construction, which preferably is so constructed that it may be quickly and readily disposed in proper position relative to a typewriter and removed from such position, and which is adapted to be used with various makes and models of typewriters and can be readily removed from one typewriter and applied to another of a different make or model.

Other objects and features of my invention will be hereinafter more specifically described and claimed.

In order that my invention may be more clearly understood, attention is directed to the drawings accompanying and forming a part of this specification, and in which:

Figure 1 is a somewhat diagrammatic view showing a typewriter, a phonograph and control means for the phonograph associated with the typewriter and connected with the phonograph in accordance with my invention, both the typewriter and phonograph being shown partly broken away;

Fig. 2 is a wiring diagram of the phonograph control means shown in Fig. 1;

Figs. 3 and 4 are enlarged views in elevation of the opposite ends, respectively, of the electro-magnetic device comprising a part of the means, shown in Fig. 1, for controlling the starting and stopping of the phonograph mandrel;

Fig. 5 is an enlarged plan view of the combined start and stop and repeat switch device which is shown in Fig. 1 associated with the front bar of the typewriter;

Fig. 6 is a view in front elevation of the switch device shown in Fig. 5, the front wall of the casing of said device being removed;

Fig. 7 is a view in end elevation, partly in section and partly broken away, of the switch device shown in Fig. 5; and

Figs. 8, 9 and 10 are enlarged detailed views of the start and stop control switch.

Referring to the drawing and especially to Fig. 1, reference character P designates a reproducing phonograph of the business or commercial type, T a typewriter and S a switch device associated with the typewriter in accordance with my invention for controlling a certain operation or certain operations of the phonograph, preferably the starting and stopping of the mandrel thereof and the backspacing of the reproducer carriage.

Reference character 1 represents the cabinet of the phonograph and 2 the mandrel carrying the cylindrical sound record 3 and rotatably mounted in a suitable bearing provided in a support or standard 4 on the cabinet 1. The reproducer carriage or arm C of the phonograph is mounted on a back rod 5 and is movable along the same to produce a relative feeding movement between the carriage and the record on the mandrel 2, this feeding movement being effected in the usual way by means comprising a rotating feeding screw and a cooperating feed nut (not shown). A clutch member 6 is splined on the shaft of the mandrel 2 and is adapted to cooperate with an opposed clutch member 7 fixed to a pulley 8 which is rotatably mounted on a stub shaft 9 aligned with the shaft of the mandrel 2 and fixed in a support or standard 10 on the cabinet 1. A belt 11 passes over the pulley 8 and serves to drive the latter from a suitable motor (not shown) disposed within the cabinet 1. The clutch member 6 is movable into and out of engagement with the clutch member 7 by means of a member 12 which is mounted for pivotal or rocking movement about a vertical axis on the cabinet 1 and the upper end portion of which is provided with the usual rearwardly extending fork or yoke (not shown) the arms of which engage a circumferential groove in the member 6. At its lower end below the top of the cabinet 1 the member 12 is provided with an arm 13 which, referring to Fig. 1, extends rearwardly; and to the rearward end of this arm is pivoted one end of a link 14 having its other end pivotally connected to an armature of the electromagnetic means for controlling the movement of the clutch member 6. This electromagnetic means is preferably of the construction described and claimed in Patent No. 1,380,486, granted June 7, 1921, on an application of S. G. Langley, and comprises two pairs of electro-magnets having coils 15, 15 and 16, 16 secured to a supporting plate 17 which is fastened to the under side of the top of the cabinet 1, and two U-shaped armatures 18 and 19 for the respective pairs of coils which are pivoted at their ends to the plate 17 on axes 20 and extend along the sides of the respective coils and over the free ends thereof. Each of the armatures 18 and 19 is mounted so that the base thereof will move in a direction transversely of the lower or free ends of the respective pair of coils. The link 14 is pivotally connected to one of these armatures and, as shown, to the armature 18 At one side of the coils and armatures is a vertical plate 21 secured to the supporting plate 17 and formed of insulating material. A vertically disposed arm 22 mounted independently of and interposed between the U-shaped armatures 18 and 19 so as to be actuated thereby, is pivoted at its upper end to the plate 21 on an axis parallel with the axes 20, said arm being provided with a pivot pin 23 extending through the plate 21 to the opposite side thereof. The arm 22 is provided with suitable shock and noise absorbing material 24, preferably felt, against which the armatures strike when actuated. The plate 21 is provided at one edge with spaced lugs to which are respectively secured contacts 27 and 28 having contact surfaces arranged in a plane substantially

parallel with the plane of the plate 21. A movable switch contact arm 32 is secured at one end to the projecting end portion of the pivot pin 23, the opposite end 33 of this arm being engageable with the spaced contacts 27 and 28 and adapted to slide or brush over the contact surfaces thereof whereby the circuits of the pairs of coils are controlled.

As more fully described in Patent 1,380,486 mentioned above, the clutch member 6 is moved in one direction upon movement of the armature 18 and 19 when one pair of coils is energized and in the opposite direction when the other pair of coils is energized. The movement of these armatures, through the medium of arm 22, also automatically controls the switch contact arm 32 to open the circuit through one set of coils and to place the circuit of the other set of coils in condition to be closed upon each actuation of the start and stop control switch comprising a part of the switch device S, which will be hereinafter more fully described. At one end the armatures 18 and 19 are connected by a coiled spring 34 which is arranged to be tensioned by the movement of either armature to attracted position. This spring cooperates with inwardly extending members 35 and 36 provided upon the armatures and which engage each other and are adapted to prevent the actuation of one armature under the tension of spring 34 until the other armature reaches attracted position. Each of the members 35 and 36 has, referring to Fig. 3, a curved upper edge concentric with the pivot of its armature and adapted to be engaged by a curved end of the member of the other armature. It will be apparent that when one armature is moved to attracted position its said concentric edge supports and holds the other armature and releases it only when such movement is completed, the members then engaging in the reverse order so that when the other armature is attracted the first armature is supported and held until completion of the movement of the latter armature.

The backspacing of the reproducer carriage C may be effected in various ways but is preferably effected by rocking the back rod 5 by means of a construction similar to that disclosed in Patent 1,275,257, granted Aug. 13, 1918, on an application of N. H. Holland, comprising the pivoted armature 40 of an electro-magnet 39 and an arm 41 secured to the back rod 5 and having a pin and slot connection with the armature 40 so as to effect rocking movement of said back rod when said armature is attracted upon energizing of the magnet. The circuit of the electro-magnet 39 is controlled by another switch comprising a part of the switch device S associated with the typewriter T.

The switch device S comprises a hollow casing 45 rectangular in shape and having two front sections 46 and 47, preferably of different height, and a rear section 48 of reduced height, less than either of the sections 46 and 47, which is adapted to take beneath the under-cut portion of the front bar B of the typewriter T so that the switch device may be secured in proper position adjacent said front bar B and intermediate the ends thereof in a manner to be hereinafter described.

The start and stop switch which is preferably of the commutator type and has most of its parts disposed within the higher front section 46 of the casing 45, is the subject matter of my application, Serial No. 395,535, entitled Switch devices, and filed September 27, 1929 as a division of the present application. This start and stop switch comprises a commutator cylinder or drum 50 formed of suitable non-conductive material, secured to a sleeve 51 which is rotatably mounted on a horizontal rod 52 supported in the opposite end walls of the section 46 and held in fixed position by a set screw 53. A spacing sleeve 54 is secured to the sleeve 52 by a set screw, and secured to one end of this sleeve is a ratchet comprising a part of the means for actuating the drum 50. Embedded in the body of the drum 50 and flush with the surface of the drum are a plurality of bars or strips 55 of conductive material, said bars extending longitudinally of the drum and parallel to the axis thereof and being equi-spaced circumferentially of the drum. While the drum may be provided with any number of these equi-spaced conducting bars 55, I have shown the same as provided with five such bars. Reference characters 56, 57 and 58 represent stationary contact arms disposed within the casing of the switch device and extending at right angles to the axis of the commutator drum 50. The forward end portions of these contact arms are disposed within the front section 46 of the casing 45 adjacent the bottom thereof and beneath the commutator drum, such arms being bent so that the rear portions thereof will be adjacent the top wall of the rear section 48 of the casing. A member 59 formed of insulating material and extending lengthwise of the rear casing section 48 is secured against the under side of the top of said rear section by screws 60, and the contact arms 56, 57 and 58 are fixed in spaced relation to said member 59 by screws 60′. Two contacts 61 and 62 are mounted on the contact arm 56 in spaced relation so as to engage the commutator drum 50 adjacent the left-hand end thereof at diametrically opposed points; and similar contact arms 63 and 64 are respectively mounted on the forward end portion of the contact arm 57 and a lateral extension 58′ of the contact arm 58 to likewise engage the commutator drum 50 at diametrically opposed points adjacent the right-hand end of the drum. Each of the contacts 61, 62, 63 and 64 is in

the form of a flat, substantially rectangular member formed of suitable conductive material such as copper and has a reduced lower end portion 65 loosely disposed within an opening 66 provided therefor in the contact arm on which it is mounted, whereby the contact is adapted for pivotal movement about its lower reduced end toward and from the commutator drum; and each of said contacts is yieldingly and firmly held in wiping engagement with the commutator drum 50 by means of a tension spring 67 having its ends respectively connected to the contact and the respective contact arm. Conductors 70, 71 and 72 are respectively suitably secured to the rear ends of the contact arms 56, 57 and 58 and extend from the casing 45 through a suitable outlet 73 provided in the rear side thereof, said conductors being disposed exteriorly of the casing within a cable 74. The commutator drum 50 is adapted to be turned about its axis by a pawl and ratchet mechanism the operation of which is controlled by a large flat vane or flap 75 pivotally mounted adjacent its rear edge on a horizontal rod 76 supported in spaced rectangular lugs 77, 78 and 79 extending upwardly from the top of the front section 46 of casing 45 adjacent the rear edge of said section. The rod 76 is secured in fixed position by a set screw and the vane or flap 75 is mounted on said rod by means of downwardly extending lugs formed at the ends of the vane and through which the rod 76 extends, the lugs on the vane 75 coacting with the lugs 77 and 79 to prevent substantial movement of the vane longitudinally of the rod 76. Also pivotally mounted on the rod 76 between the lugs 77 and 78 and lying beneath the vane 75 is a member 80 which has the shape of an inverted U in transverse cross-section and which is movable about its pivot towards and away from the axis of the commutator drum 50 through an opening 81 provided in the top wall of the front section 46. A pawl 82 is pivotally mounted on the member 80 adjacent the forward end thereof by means of a pin 82′ so as to be in cooperative relation with the ratchet 83 secured to the inner end of the sleeve 54 which is fixed to the sleeve 51 of the commutator drum 50. The ends of a coiled spring 84 which is mounted on the member 80, respectively coact with the upper end of the pawl 82 and with a pin 85 carried by the member 80 so that said spring yieldingly holds the lower end of said pawl 82 in coacting relation with the teeth of the ratchet 83. A coiled spring 86 disposed on the rod 76 and coacting at its ends with the member 80 and the top of the casing section 46, tends to maintain said member 80 and thereby the flap or vane 75 in their uppermost or raised positions, as shown in Fig. 8; the upward movement of the vane 75 and the member 80 under the influence of said spring 86 being limited by engagement of the rear edge of the vane with the top surfaces of the lugs 77, 78 and 79 rearwardly of the pivot rod 76. The ratchet 83 is preferably provided with twice as many teeth as there are conductor bars 55 on the commutator drum 50, the arrangement being such that each time the vane or flap 75 is depressed, the pawl 82 will advance the ratchet 83 the distance of one tooth and thereby move the commutator drum 50 about its axis a distance equal to half the distance between two adjacent conductors 55. The arrangement of the commutator drum 50 and the wiping contacts 61, 62, 63 and 64 coacting therewith is such that each time the commutator drum is moved one step by means of the pawl and ratchet mechanism, either the front pair of contacts 61 and 64 will be in engagement with one of the conductor bars 55 and the rear pair of contacts 62 and 63 will engage a surface portion of the drum between two adjacent conductors or, vice versa, the rear contacts 62 and 63 will be in engagement with one of the conductors 55 and the front pair of contacts 61 and 64 will be in engagement with a surface portion of the drum intermediate two adjacent conductors 55. The pin 85 is secured to the member 80 in such a position that when the vane or flap 75 is depressed to the dotted-line position shown in Fig. 8, said pin will engage between two adjacent teeth of the ratchet 83 and act to limit the forward movement of said ratchet and thereby the commutator drum 50 to a distance corresponding to the distance between two adjacent teeth of the ratchet no matter how quickly the vane or flap 75 is depressed.

The backspacing switch, most of the parts of which are disposed within the front casing section 47, comprises two spaced contact arms 88 and 89 extending transversely of the casing and preferably substantially parallel to the contact arms 56, 57 and 58 of the start and stop switch. The forward end portions of the contact arms 88 and 89 are disposed within the front casing section 47 adjacent the bottom thereof, and said arms are bent so that the rear end portions thereof will be adjacent the top of the rear casing section 48. The contact arms 88 and 89 are secured adjacent their rear ends to the insulating member 59 by screws 90. Two conductors 91 and 92 are respectively suitably secured to the rear ends of said contact arms and extend outwardly from the casing of the switch device through the outlet 73, said conductors being disposed exteriorly of the casing 45, within a cable 93. A pivoted vane or flap 95, similar to the vane 75, is arranged to coact with plunger means to control the opening and closing of the backspacing switch. The vane 95 is pivotally mounted adjacent its rear edge on a rod 96 which is supported at its ends in the shouldered portion 97 of the casing 45 formed between the

sections 46 and 47, and a rectangular lug 98 extending upwardly from the top of the section 47, said rod being secured in fixed position by a set screw. The vane 95 is pivotally mounted on said rod 96 by means of downwardly extending lugs formed at the ends of said vane and through which the rod 96 extends, said lugs coacting with the shouldered portion 97 of the casing 45 and an extension 98′ of the lug 98 to prevent movement of the vane 95 longitudinally of the rod. A plunger 99 extends through an opening in the top of the casing section 47, the upper end of this plunger preferably being rounded and engaging the under side of the vane 95 while the lower end of said plunger has a contact 100, preferably in the form of a cylinder of copper or other conductive material, mounted thereon. The said cylindrical contact 100 is preferably freely rotatable on the lower end of the plunger 99 and is suitably insulated therefrom. The plunger 99 and contact 100, and thereby the vane 95, are biased to their uppermost circuit-opening positions, as shown in the Figures 6 and 7, by means of a coiled spring 101 mounted on a screw 102 and having one end coacting with the casing and the other end thereof extending through an opening 103 in the plunger 99. Upward movement of the vane 95 and thereby of the plunger 99 and contact 100, is limited by engagement of the rear edge of the vane 95 with the upper flat surface of the lug 98 rearwardly of the rod 96.

To guard against short-circuiting of the start and stop and backspacing switches, and especially against the short-circuiting of one of these switches in case any part of the other switch disposed within the casing 45 becomes loose or is broken, the inner sides of the bottom, front and rear walls of casing 45 and of the top wall of casing section 48 are lined with suitable insulation R and partitions L of insulating material are disposed within the front casing sections 46 and 47 so as to separate moving parts of each switch from conductive parts of the casing and of the other switch.

The reduced rear section 48 of the casing 45 of the switch device S is provided at its ends with outstanding lugs 105, and pivotally mounted on said lugs as by means of screws 106 are two arms 107 having forwardly extending right-angular end portions 108. Each of the portions 108 of the arms 107 has an inclined edge 108′ and each of said portions has secured thereto at its forward free end a cylindrical handle 109. Strong coiled springs 110 mounted on the screws 106 between the heads of the latter and the lugs 105 constantly tend to hold the arms 107 in a vertical position against the ends of the casing 45, as shown in Fig. 6, one end portion of each of the springs 110 bearing against and embracing the outer edge portion of the respective arm 107 and the other end portion thereof being deflected laterally and engaged with one of a circular series of spaced recesses 111 formed in the respective lug 105. The inner lateral deflected end portion of each of the springs 110 may be engaged with any one of the respective series of recesses 111 to thereby adjust the effective tension of the spring as desired.

As hereinbefore indicated, the switch device S is associated with the typewriter T substantially in the position shown in Fig. 1, that is, in a position adjacent the front bar B of the typewriter intermediate the ends thereof, and preferably substantially midway between the ends thereof, with the reduced casing section 48 disposed and held between said front bar and the desk or other support E for the typewriter and with the actuating vanes or flaps 75 and 95 of the start and stop and backspacing switches adjacent said front bar. The switch device S may be readily so located by pressing each of the arms 107 downwardly about its pivot against the action of spring 110 to a position corresponding to the dotted-line position 107′ in Fig. 6, moving the switch device to a position on the support E in which the rear casing section 48 and the angular end portions 108 of the arms 107 are beneath the front bar B and then releasing said arms. The springs 110 then act to hold the inclined edges 108′ of the angular end portions of the arms 107 firmly against the under side of the front bar B of the typewriter and the casing 45 firmly against the support E. The switch device will thus be frictionally held in proper position with respect to the typewriter, and it is apparent that the same may be readily disposed in and removed from such position. The casing sections 46 and 47 are preferably of such height that the actuating flaps or vanes 75 and 95 will, when the device S is disposed in the position described, be positioned adjacent the top of the front bar B so as to enable the same to be readily actuable by the thumbs, wrists or heels of the hands of the transcriber or operator of the typewriter T while maintaining the fingers in proper position over the keys K of the typewriter, and this without interfering with the proper operation of the usual spacing bar D. The start and stop switch is operated much more frequently than the backspacing switch and the front section 46 of the casing of the switch device is therefore considerably higher than the front section 47 so that the vane 75 will be disposed at a higher and somewhat more convenient level than the vane 95 The disposition of these vanes at different heights not only enables the operator to more readily differentiate between them but renders less likely the accidental actuation of either vane upon the actuation of the other. Where the switch device S comprises both a start and stop and a backspac-

ing switch with two pivoted actuating vanes or flaps, as shown, it is intended that the vane 75 for controlling the start and stop switch be actuated by the thumb, wrist or heel of the left hand of the operator and that the vane 95 of the backspacing switch be operated by the thumb, wrist or heel of the right hand, while the fingers of both hands are maintained in proper touch-operating position over the keys K. The construction is preferably such that a very light pressure quickly applied and removed, similar to but preferably somewhat less than the pressure or touch used in actuating the keys of the typewriter, will suffice to fully depress either of the switch actuating vanes 75 and 95.

While the switch device S may be associated with nearly every make of typewriter in the manner above described when the typewriter is supported on a table or desk in the usual way, it is sometimes necessary because of the peculiar construction of certain makes of typewriters, or because the typewriter is mounted on a special form of support, either to affix the switch device to the desk or other support for the typewriter or to clamp the device to the frame of the typewriter. The casing 45 is accordingly provided with two apertured lugs 112 to enable the switch device to be screwed or bolted to the desk or other support for the typewriter. Where it is necessary to clamp the switch device to the frame of a typewriter, any suitable form of clamping means may be employed.

Reference characters 115 and 116 represent the conductors of a line leading from a suitable source of current supply (not shown) for furnishing current to the start and stop actuating means and switch and also to the backspacing actuating means and switch. The line conductor 115 is directly connected to the switch contact arm 32 which coacts with the spaced stationary contacts 27 and 28 of the start and stop actuating means. The contact 27 is connected by a conductor 117 to the coils 15, 15 of one pair of magnets of the start and stop actuating means and said coils are connected by a conductor 118 and through a suitable resistance to the conductor 71 which leads from the contact arm 63 of the start and stop switch. The other contact 28 with which the arm 32 coacts is connected by a conductor 119 to the coils 16, 16 of the other pair of electro-magnets of the start and stop actuating means and said coils are connected by a conductor 120 and through a suitable resistance to the conductor 72 which leads from the contact 64 of the start and stop switch. Line conductor 116 is directly connected to the conductor 70 which leads from the contacts 61 and 62 of the start and stop switch.

The line conductor 115 is also connected by a conductor 122 to one end of the coil of the electro-magnet 39 of the backspacing actuating means, the other end of this coil being directly connected to the conductor 92 which leads from the contact 89 of the backspacing switch; while the line conductor 116 is directly connected with the conductor 91 which leads from the other contact 88 of the backspacing switch.

The operation of the arrangement above described is as follows: whenever the operator desires to actuate either the start and stop switch to effect the starting or stopping of the mandrel of the phonograph P, or the backspacing switch to backspace the reproducer carriage C of the phonograph so that the section of the record 3 last reproduced will be repeated, she merely applies a light pressure to the proper vane 75 or 95 and quickly removes such pressure, the construction and arrangement, as explained above, being such as to enable the operator to thus actuate the proper vane or flap with the thumb, wrist or heel of one hand or the other without removing her fingers from proper touch-operating position over the keys of the typewriter. It will be apparent that the actuating of the start and stop and backspacing switches in this manner does not distract the operator's attention, does not interfere with the proper operation of the typewriter and is not fatiguing. Upon each actuation of the vane 75 of the start and stop switch the commutator drum 50 is moved about its axis by the pawl and ratchet mechanism 82 and 83 a distance equal to half the distance between two of the adjacent conductor strips 55 thereof, the arrangement being such that upon one such actuation of the vane the drum is moved to a position in which one of the conducting strips 55 engages the front pair of contacts 61 and 64 and a non-conductive surface portion of the drum engages the back pair of contacts 62 and 63 and upon the next actuation of the vane the drum is moved to a position in which one of the conductive strips 55 engages the rear pair of contacts 62 and 63 and a non-conductive surface portion of the drum engages the front pair of contacts 61 and 64.

As shown in Fig. 1, the clutch member 6 is disengaged from the clutch member 7 and accordingly the mandrel 2 and record 3 are at rest. In this position of the clutch member 6 the armature 19 will be in its attracted position with the base thereof directly opposite the lower ends of the coils 16, 16, the armature 18 will be in its unattracted position to the right of the position shown in Fig. 2, the pivoted contact arm 32 will be in engagement with the stationary contact 27 in a position corresponding to the dotted-line position thereof in Fig. 2, the front pair of contacts 61 and 64 of the start and stop switch will be in engagement with one of the conducting strips 55 of the commutator drum 50, and the back pair of contacts 62 and 63 will be in engagement with a non-conductive

portion of the surface of said drum. To now throw the clutch member 6 into engagement with the member 7 and start the mandrel 2 and record 3, it is merely necessary to actuate the vane 75. Upon such actuation of this vane the drum 50 will be turned to a position in which one of its conductive strips 55 engages the back pair of contacts 62 and 63 and a non-conductive surface portion thereof engages the front pair of contacts 61 and 64, as shown in Fig. 2. The movement of the drum 50 to this position effects the closing of the circuit of the coils 15, 15 of the start and stop actuating means through the following path: from the line conductor 115, through the contact arm 32, contact 27, conductor 117, coils 15, 15 and conductors 118 and 71 to the contact 63 of the start and stop switch, then through the conductive strip 55 of the commutator drum engaging the contact 63, contact 62, contact arm 56 and conductor 70, to the other line conductor 116. The coils 15, 15 now being energized attract armature 18 and move the same from the position shown in Fig. 1 to that shown in Fig. 2, and such movement of this armature through the medium of members 14, 13 and 12, moves clutch member 6 into engagement with clutch member 7 and thereby effects the starting of the mandrel 2 and record 3. Just as it completes its movement to attracted position armature 18 through the medium of spring 34, moves armature 19 from its attracted position to the position shown in Fig. 2, the latter armature by means of arm 22 and pivot pin 23 thereupon moving the contact arm 32 from engagement with contact 27 into engagement with contact 28 thus breaking the circuit of coils 15, 15 and placing said arm 32 in such position that the circuit of coils 16, 16 is adapted to be closed upon a subsequent actuation of the vane 75. Upon such subsequent actuation of said vane 75, the commutator drum 50 is moved to a position in which one of its conductive strips 55 engages the front contacts 61 and 64 and a non-conductive surface portion thereof engages the rear contacts 62 and 63, whereupon the circuit of coils 16, 16 will be closed over the following path: from line conductor 115 through contact arm 32, contact 28, conductor 119, coils 16, 16, and conductors 120 and 72, to the contact 64 of the start and stop switch, then through the conductive strip 55 of the commutator drum engaging the contact 64, contact 61 and conductor 70 to the line conductor 116. The coils 16, 16 now being energized, the armature 19 is moved to attracted position, that is, from the position shown in Fig. 2 to a position corresponding to that shown in Fig. 1. Just as it completes its movement to attracted position, armature 19, through the medium of spring 34, moves armature 18 from its attracted position to the position shown in Fig. 1, the latter armature by means of members 14, 13 and 12 thereupon disengaging the clutch member 6 to effect the stopping of the mandrel 2 and record 3. The armature 18 in such movement thereof from attracted position and through the medium of arm 22 and pivot pin 23, also moves contact arm 32 from engagement with contact 28 into engagement with contact 27, thus opening the circuit of coils 16, 16 and placing said arm 32 in such position that the circuit of coils 15, 15 is adapted to be closed, as described above, upon the next actuation of the vane 75.

When it is desired to backspace the reproducer carriage C of the phonograph, the operator merely applies a light pressure of small duration to the vane or flap 95 of the backspacing switch. Such actuation of the vane 95 depresses plunger 99 against the action of spring 101 and brings the contact 100 into engagement with the contacts 88 and 89 so as to close the circuit of the coil of the electro-magnet 39 over the following path: from the line conductor 115, through conductor 122, the coil of magnet 39 and conductor 92, to the contact 89 of the backspacing switch, then through the contacts 100 and 88 and conductor 91 to the other line conductor 116. The coil of the electro-magnet 39 now being energized the armature 40 is moved to attracted position, indicated in dotted lines in Fig. 2, and by reason of its connection with the arm 41, thereupon rocks the back rod 5 and effects the backspacing of the carriage C as described in the Holland Patent No. 1,275,257, referred to above. Upon removal of pressure from vane 95, spring 101 returns plunger 99, contact 100 and vane 95 to their raised position and effects the opening of the circuit of the electro-magnet 39, whereupon the armature 40 moves to a position corresponding to the full-line position thereof shown in Fig. 2.

While I have illustrated my invention by showing and describing a preferred embodiment thereof, it is to be understood that such embodiment is subject to many changes and modifications without departure from the spirit of the invention and the scope of the appended claims.

Having now described my invention, what I claim as new and desire to protect by Letters Patent, is as follows:

1. The combination with a typewriter, of means for controlling an operation of a phonograph designed to be used in conjunction with the typewriter, said means comprising a device having means coacting directly with a part of the typewriter and holding said device in such a position with respect to the typewriter as to render such device operable by the hand of the operator while maintaining the type-operating fingers of said hand, including the little finger thereof, in proper touch-operating position over the keys of the typewriter, substantially as described.

2. The combination with a typewriter, of electrical means for controlling an operation of a phonograph designed to be used in conjunction with the typewriter, said means comprising a switch device having means coacting directly with a part of the typewriter and holding the said device in such a position with respect to the typewriter as to render such device operable by the hand of the operator while maintaining the type-operating fingers of said hand, including the little finger thereof, in proper touch-operating position over the keys of the typewriter, substantially as described.

3. The combination with a typewriter, of means for controlling an operation of a phonograph designed to be used in conjunction with the typewriter, said means comprising a manually operable device having means coacting directly with the front member of the typewriter and holding the said device in such a position adjacent and intermediate the ends of said front member as to render such device operable by the hand of the operator while maintaining the fingers of said hand, including the little finger thereof, in proper touch-operating position over the keys of the typewriter, substantially as described.

4. The combination with a typewriter, of a device comprising separate means for respectively controlling different operations of a phonograph designed to be used in conjunction with the typewriter, said device having means coacting directly with a part of the typewriter and holding the said device in such a position with respect to the typewriter as to render said separate means respectively operable by the hands of the operator while maintaining the type-operating fingers of said hands, including the little fingers thereof, in proper touch-operating position over the keys of the typewriter, substantially as described.

5. The combination with a typewriter, of a device comprising manually operable members for respectively controlling different operations of a phonograph designed to be used in conjunction with the typewriter, said members being adjacent to each other, but at different levels, and said device having means coacting directly with a part of the typewriter and holding the said device in such a position with respect to the typewriter as to render said members respectively operable by the hands of the operator while maintaining the fingers of said hands, including the little fingers thereof, in proper touch-operating position over the keys of the typewriter, substantially as described.

6. The combination with a typewriter, of a device comprising separate electrical means for respectively controlling different operations of a phonograph designed to be used in conjunction with the typewriter, said electrical means having manually operable members, and said device having means coacting directly with a part of the typewriter and holding said device in such a position with respect to the typewriter that said manually operable members are located adjacent the front member of the typewriter and intermediate the ends thereof in a position rendering the same respectively operable by the hands of the operator while maintaining the type-operating fingers of said hands, including the little fingers thereof, in proper touch-operating position over the keys of the typewriter, substantially as described.

7. The combination with a typewriter, a device for controlling an operation of a phonograph designed to be used in conjunction with the typewriter, said device having means coacting directly with the front bar of member of the typewriter and firmly holding the said device in such a position with respect to the typewriter as to render the device operable by the hand of the operator while maintaining the type-operating fingers of said hand, including the little finger thereof, in proper touch-operating position over the keys of the typewriter, said holding means being yieldably mounted on said device so as to permit the latter to be readily removed from and applied to the typewriter, substantially as described.

8. A device of the character described comprising a casing containing a control device and provided with means whereby said control device may be actuated from without said casing, said casing being provided with a portion adapted to take beneath the usual front bar of a typewriter and also having spaced members movably mounted thereon and spring biased to upright positions, said members being movable from their upright positions whereby they are adapted to be disposed beneath said front bar, and coact directly therewith to hold the said device in such a position with respect to said front bar as to render such device operable by the hand while maintaining the fingers of said hand in proper touch-operating position over the keys of the typewriter, substantially as described.

This specification signed this 19th day of June, 1925.

NELSON C. DURAND.