

Feb. 13, 1945.

W. T. SAGNER
TYPEWRITING MACHINE

2,369,315

Filed June 4, 1942

2 Sheets-Sheet 1

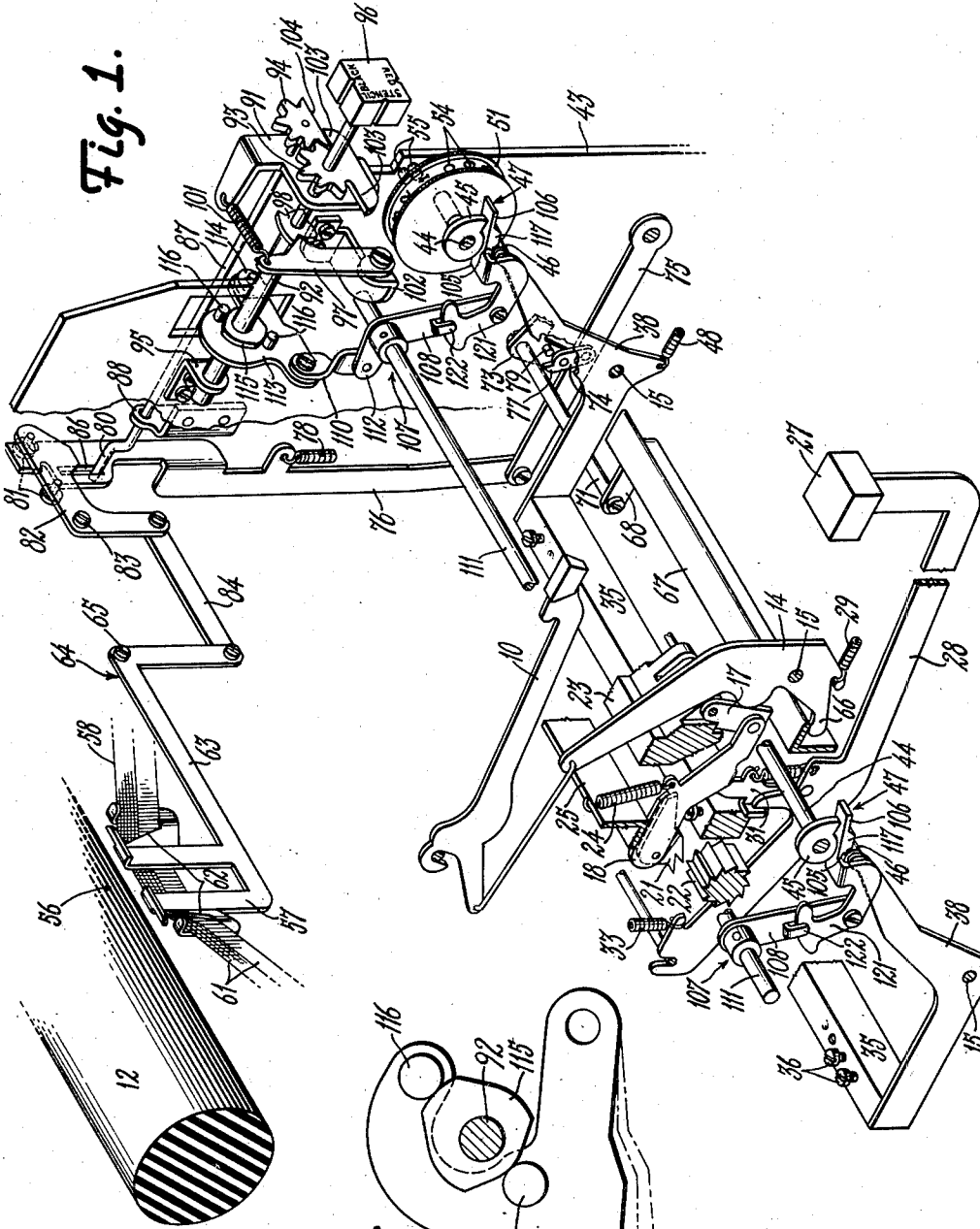


Fig. 1.

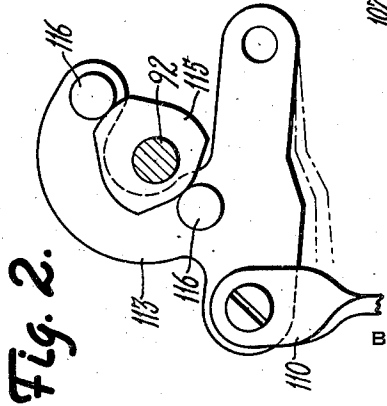


Fig. 2.

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2 Sheets-Sheet 2

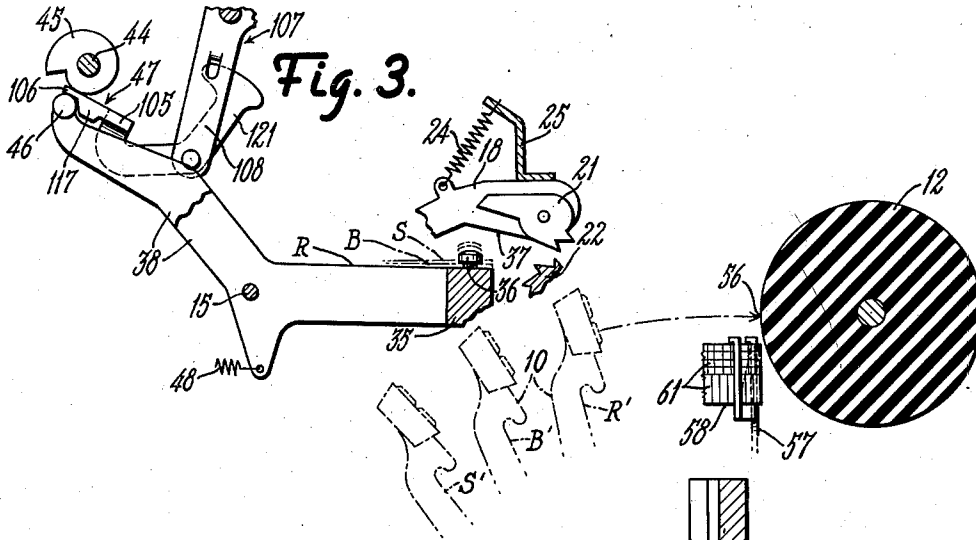


Fig. 4.

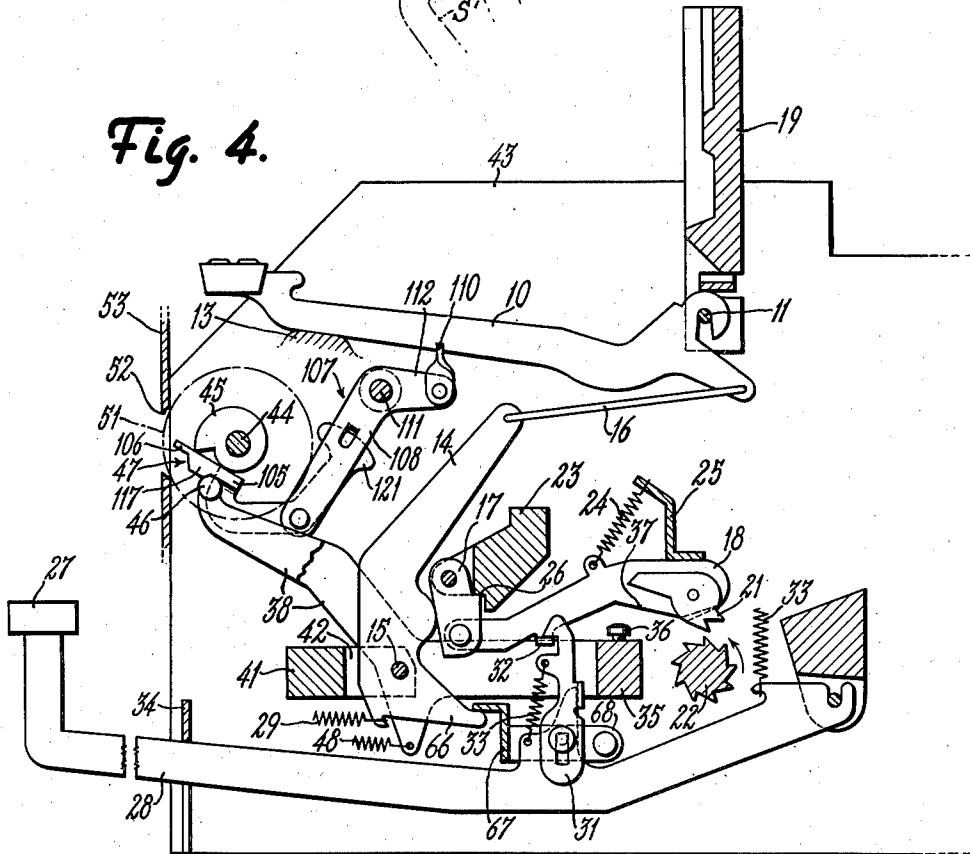
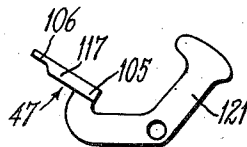


Fig. 5.



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2,369,315

TYPEWRITING MACHINE

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Application June 4, 1942, Serial No. 445,732

8 Claims. (Cl. 197—17)

This invention relates to typewriting machines embodying power-operated typing means and, with regard to certain more specific features thereof, to means in such machines whereby the operating force imparted to the typing means is controllable.

In the conventional typewriting machines, printing is effected through the medium of an inking ribbon which is vibrated to the typing point through a ribbon-vibrating mechanism, incidental to each typing operation. So that different portions or fields of the ribbon may be selectively presented at the printing point, the ribbon-vibrating mechanism is settable for operations or vibrations of different extents by a setting mechanism therefor. When a ribbon with different color-fields is used, this setting mechanism serves to select the desired color-field for typing and, for this reason, is usually known as the ribbon bichrome-setting mechanism.

The operation of the ribbon-vibrating mechanism to different extents imposes different loads on the typing mechanism, and it has been found that such differences in the loads have a material effect on the typing force in power-operated machines wherein the typing mechanism is dissociated from the power-operating mechanism appreciably before an operated type strikes. More specifically, with equal operating impulses given to the typing mechanism, the typing impressions will be appreciably lighter if the ribbon is vibrated a greater distance. It is, therefore, paramount that for uniformity in typing, the typing mechanism receive differently powered impulses for different extent vibrations of the ribbon-vibrating mechanism.

To this end, it is an object of the invention to provide for efficient and reliable printing force regulation under control of said ribbon-vibrating-setting mechanism in a manner that the typing mechanism prints with substantially uniform strength regardless of the extent of vibration to which the ribbon-vibrating mechanism is set.

A further object is to provide for uniform print under control of said ribbon-vibration-setting mechanism by efficient means without resorting to any change in the operating speed of the motor, whereby motor-operated mechanism, other than the typing mechanism, remain unaffected and always operate at equal speed.

Another object of the invention is to provide for reliably operative imprint regulating by efficient mechanical means, partly by regulation of said ribbon-vibrating mechanism and partly by regulation of a main imprint control, the imprint

regulations effected by the two different sources altering with respect to each other.

In association with the last-mentioned object, it is a further object to provide reliably effective means which provide that in each regulated position of the said main imprint control the imprint will be caused to be substantially the same regardless of the varying extent to which the ribbon may be caused to vibrate under control of the vibration-determining-setting mechanism.

For stencil cutting, it is required that the ribbon remain removed from the printing point, and the ribbon-vibrating mechanism of the invention, for this purpose, is settable for non-operation under control of the ribbon-vibrating-setting mechanism. Many commercially available stencils have cardboard portions which usually constitute a frame whereupon certain desirable information may be legibly typed through the medium of the typewriter ribbon. In the course of typing such a stencil, it is thus required to set the ribbon-vibrating or positioning mechanism so that typing will be effected with, or independently of, the ribbon. The force required for typing upon the said stencil frame is considerably more than the force which is desired to impress or cut the stencil-sheet proper, it being well-known that, for neat and efficient reproducing effect, the stencil must be cut with just the proper typing force.

With the above in view, it is a further object of the invention to provide simple and reliably effective means whereby the typing force is adjustable under the control of a mechanism by means of which typing may be caused to occur either through, or independently of, the typewriter ribbon.

Still another object of the invention is to provide for efficient regulation of the typing force under the control of the ribbon-vibration-setting mechanism in a manner so that the typing force is properly varied for stencil writing in accordance with whether or not, or to what extent, the ribbon is vibrated.

Furthermore, an object of the invention is to provide for typing force vibrations under the combined control of a main imprint controlling mechanism and a ribbon-vibration regulating mechanism of the character pointed out in the last-mentioned object, the two mechanisms being individually settable and the printing-force adjustments obtainable by each altering with respect to each other.

With these and other objects in view, the invention includes certain novel features of construc-

tion and combination of elements which are set forth in the appended claims and a preferred form or embodiment of which is hereinafter described with reference to the drawings which accompany and form part of this specification.

In the accompanying drawings:

Figure 1 is a front perspective illustrating certain portions of a power typing mechanism and devices for regulating the imprint obtainable by such typing mechanism;

Figure 2 is a large front elevation of a camming mechanism shown in Figure 1;

Figure 3 is a right-hand fractional side elevation of the imprint-regulating mechanism as it is conditioned when the ribbon-vibrating mechanism is set for maximum vibration;

Figure 4 shows the power typing mechanism of Figure 1 in sectional side elevation, there being also shown certain of the parts of the imprint-regulating devices;

Figure 5 illustrates an alternate form of an interponent member comprising part of the imprint-regulating devices.

The typing mechanism shown in the drawings corresponds to the one of the patent to Yaeger No. 2,254,764, dated September 2, 1941, and it will suffice to describe it only briefly. Type bars 10, pivoted in an arcuate array upon a pivot wire 11 in a segment 19, are movable against a platen 12 from a type rest 13 upon which they are normally nested. A series of upstanding levers 14 pivoted on a rod 15 are individually connected at their upper ends with the type bars 10 by draw links 16. Behind each lever 14, for operating it in rolling engagement therewith, is a pendent arm 17 which has articulated thereto, in a rearwardly extending relation, an actuator 18, each actuator having a snatch pawl 21 suitable for engagement with a common drive member 22 which is rotated at constant speed by an electric motor, not shown, in the direction indicated by an arrow in Figure 4. A cross bar 23 is provided with vertical slots wherein the said arms 17 are guided. The drive member 22 is in the form of a toothed snatch roll, and the actuators 18, together with the snatch pawls 21, are normally held clear of the snatch roll by springs 24 which pull the actuators upwardly and rearwardly against a transverse angle bar 25, the rearward limit being defined by the pendent arm 17 engaging the bar 23 at 26, see Figure 4. The said actuators 18 are selectively associable with said snatch roll 22 for operation thereby under control of type keys 27, each of which key is provided upon a key lever 28, and each of which key lever has a hook-ended draw link 31 normally overlying a lug 32 on one of the actuators. Springs 33 restore the key levers 28 to their normal positions in which their front ends abut against the upper ends of slots provided in a comb plate 34. The type bars are biased to return to their normal positions by springs 29 attached to the levers 14 below their pivot rod 15. When, in response to a key depression, the snatch pawl 21 has been brought into engagement with the snatch roll 22, the latter will first turn the snatch pawl limitedly on the actuator and will then impart a typing impulse to the latter and, consequently, the said pendent arm 17, the result being that the type bar is given an impetus toward the platen. The duration of engagement of the snatch pawl with the snatch roll and, consequently, the effective strength of the operating impulse imparted to the typing mechanism by the actuator is determined by the position of an abutment bar 35 which has ad-

justable abutment screws 36, with which cam edges 37 of the actuators engage. Upon engagement of any of the said cam portions with the abutment screws, the rear end of the associated actuator is cammed upwardly so that the snatch pawl 21 clears the snatch roll 22. This occurs some time before the type strikes against the platen. However, the lever 14, the link 16, and the type bar 10 continue to move by momentum; while, on the other hand, the rolling contact between the lever 14 and the arms 17 allows the return of the actuator 18 under the power of its return spring 24. For obtaining a very light imprint, the abutment bar 35 is adjusted so that the snatch pawl 21 becomes disengaged after only a small part-actuation of the type bar 10; whereas, for obtaining a heavy imprint, the abutment bar 35 is adjusted so that the snatch pawl becomes disengaged when the type bar has nearly reached the platen.

Referring now, more particularly, to Figure 1, it will be seen that the abutment bar 35 is supported on two widely spaced bell cranks 38, both of which are pivoted for movement in a vertical plane on the same rod 15 on which the type-action levers 14 are pivoted. A cross member 41, wherein the pivot rod 15 is imbedded, has guide slots 42 for the type-action levers 14, as well as for the bell crank levers 38. It will be seen that the abutment bar 35 forms with the bell cranks 38 a single bail structure and that this structure is pivotally swingable on the rod 15. The cross member 41, as also the cross bar 23, comprises part of a general machine frame which also includes two opposite side walls 43. Pivoted in these side walls and extending intermediate thereof, directly behind the keyboard, is a rotatable shaft 44 whereon there are fixed two widely spaced spiral-shaped cams 45. Each of the bell cranks 38 has a pin 46 which extends laterally underneath one of the cams 45, there being a vertically freely swingable interponent finger 47 between each cam and pin. The purpose of these fingers will be set forth later. Under the urge of springs 48 attached to the bell cranks 38, the abutment 35 always occupies a position in which the bell crank pins 46 press the interponent fingers upwardly against said cams 45. A dial wheel 51, constituting a main imprint control, is fixedly carried by the right end of the cam shaft 44 and, when turned, results in an upward or downward adjustment of the abutment bar 35. The dial wheel 51 protrudes through a rectangular opening 52 provided in a front panel 53 of the machine and bears indicia 54 which is indicative of the adjustment effected to the abutment bar. When the high portions of the cams 45 are opposite the pins 46, the impressions will be the weakest, and when the low portions of the cams are opposite the pins, the impressions will be the strongest. Stop pins 55, oppositely on the right side wall of the frame and the dial wheel, restrict the turning of the cam shaft 44 between the strongest and weakest imprint position.

The printing point, against which the type bars 10 strike, is indicated in Figures 1 and 4 by the reference numeral 56. Normally posed below this printing point, slightly below the front of the platen, is a ribbon vibrator or holder 57 holding a typewriter ribbon 58 removed from the printing point. The ribbon 58, which, as shown in Figures 1 and 4, may have a plurality of color-fields 61, is guided through openings 62 in the vibrator and extends oppositely to spaced

ribbon spools in front of the platen, not shown. The vibrator 57 may be integral with a horizontally disposed arm 63 forming part of a bell crank 64 pivoted at 65 to the framework of the machine. Concomitant with each operation of one of the type-action levers 14, the bell crank 64 is operated in a manner presently to be described. Overlying short rearward arms 66 of the levers 14 is a universal bar 67 common to all the type actions. This universal bar has at each end rigid therewith a rearwardly extending arm 68 about the rear ends of which the universal bar pivots, the right arm having a shaft 71 fulcrumed and extending through the side wall 43. To the outer end of the shaft 71 is fixed a bell crank 73 having a link connection 74 with an arm 75 pivoted to the outer side of the right side wall 43 of the machine. The link 74 and the arm of the bell crank 73 connected thereto constitute a toggle which normally is in a partly folded condition. Incidental to each operation of the universal bar 67, the toggle becomes straightened and, in doing so, swings the arm 75 downwardly so that the latter imparts a downward movement of a definite extent to a pitman 76 which is articulated to its rear end. To prevent overthrow of the universal bar, the link 74 may have a tongue 77 capable of engagement with a pin 79 on the bell crank 73. Restoration of the universal bar is effected by a spring 78 connected to the pitman 76, see Figure 1. At the upper end, depending on the position of a crank 80, the pitman 76 may be in coupled engagement with either one of two pins 81 on a horizontally disposed arm of a bell crank lever 82, or the pitman may be entirely clear of these pins. As may be noted from Figure 1, the pins 81 are differently spaced from a pivot 83 of the bell crank 82, and the pitman, therefore, is capable of imparting different angular movement to the bell crank 82, depending on to which of the pins 81 the pitman is coupled. A link 84 connects the bell crank 82 operatively with the bell crank 64, and when the pitman 76 is coupled with the particular pin 81 which is further from the pivot 83, the actuation of the universal bar causes an operation of said vibrator or holder 57 to an extent presenting the upper ribbon field 61, which may be black to the printing point 56. Conversely, when the pitman 76 is coupled to the pin 81 which is nearer to the pivot 83, the throw given to the vibrator 57 will be such that the lower ribbon field 61, which may be red, will be presented at the printing point. The said crank 80 extends into a vertical guide slot 86 provided in the upper end of the pitman 76 and is settable to the right or left to couple the pitman selectively to the pins 81. In a central or stencil position of the crank, the pitman clears both the pins 81, and, consequently, operation thereof will not cause vibration of the ribbon. The crank 80 comprises part of a crank shaft 87 which extends fore and aft in the machine and which, at opposite ends, near the crank 80, and at the front, respectively is turnable in brackets 88 and 91, both projecting laterally from the adjacent side wall 43. Parallel to the crank shaft 87, at the inner side of the adjacent side wall 43, is another shaft 92 carrying fixedly near its front end a gear 93 which is in mesh with another gear 94, the latter gear being secured upon the front end of the crank shaft 87. The bracket 91 provides also a front pivotal support for the shaft 92, the rear end of the latter being pivoted in an ear 95 reaching inwardly from the

adjacent side wall 43. Forwardly of the gear 93, the shaft 92 protrudes through a hole in the front panel 53 and is equipped with a control or setting knob 96. A pawl 97, cooperating with a notched disc 98 on the shaft 92 detents the latter in three different positions which correspond to the aforementioned three different positions of the crank 80, the pawl 97 being pivoted on a bracket 102 projecting inwardly from the adjacent side wall 43 and being under constant tension of a spring 101 to enter the notches of the disc 98. So that the rotation of the shaft 92, and, therefore, also the shaft 87, may be positively limited, the gear 93 has two stop teeth 103 which are adapted for engagement with a flat face 104 on the other gear 94. From the foregoing, it will be seen that turning of the knob 96 to the proper position predetermines whether or not, and to what extent, the ribbon shall be vibrated during typing.

It has previously been stated that the ribbon-vibrating mechanism imposes a heavier load on the typing mechanism when the extent of ribbon vibration is greater, the consequence being an imprint-weakening influence on the typing mechanism. According to the invention, the power impulse receivable by the typing mechanism is predeterminable under the control of said ribbon-vibration-setting mechanism and in a manner so that the types will print with uniform force regardless of the extent to which the ribbon may be vibrated. In the embodiment of the invention shown, this is accomplished through said aforementioned interponent fingers 47, both of which, for this purpose, are shiftable fore and aft, each to present either one of two finger portions 105 and 106 actively between the pins 46 and the impression-regulating cams 45. When the knob 96 is set for presentation of the upper ribbon-field 61 to the printing point, the finger portions 105 are between the cam 45 and the pins 46, see Figure 1. On the other hand, if the knob 96 is set for vibration of the ribbon for use of the lower field, the thinnest portion 106 of the finger 47 is interposed, see Figure 3.

The mechanism for shifting the fingers comprises a bail generally designated by the numeral 107 and extending transversely of the machine, the bail comprising widely spaced arms 108 whereon the said fingers 47 are pivoted for vertical swinging movement in substantially the same arc as the underlying pins 46. The bail 107 comprises also a shaft 111 extending intermediate and pivoted in the opposite side walls 43 of the machine, the arms 108 being fixed thereto. The arm 108 at the right-hand side of the machine is part of a bell crank which also includes a rearwardly extending arm 112, the latter of which has a vertical link connection 110 with a member 113 vertically rockably supported on an ear 114 bent outwardly from the adjacent wall 43. For operating the rockable member 113, the shaft 92 has a cam 115 which, on opposite sides, is engaged by pins 116 carried on the member. The cam 115 gives the member 113 a different position in each of the three detented positions to which the control 96 may be set, and, consequently, the fingers 47 will occupy correspondingly different positions. When in their intermediate positions, each finger has a portion 117 interposed between its associated cam 45 and pin 46, and, according to the form of the invention illustrated in Figures 1, 3, and 4, these finger-portions 117 are thicker than the aforementioned portions 105 and 106.

From the above, it is evident that with the impression control cams 45 positioned as indicated in Figure 3, and with the intermediate cam portions 117 in contact with the pins 46, the abutment bar 35 will be in the dot-and-dash position "S" being indicative of the setting of the ribbon-vibration-setting mechanism for stencil typing. The abutment bar assumes the slightly lower position designated by the letter B, when the vibration-controlling mechanism is set for vibrating the upper, or black, ribbon-field to the printing point, whereas the lowest position R is obtained when the vibration-controlling mechanism is set for typing through the lower, or red, ribbon field, i. e., when the finger is positioned as shown in Figure 3. The position of the bar, as hereinbefore stated, determines the extent of power operation of the typing mechanism; and with the cam 45 set as at Figure 3, the power operation of the type bar 10 may be to any one of the designated positions S', B', or R', see Figure 3, depending on respectively corresponding settings of the knob 96. The interponent fingers 47 are beveled intermediate the said portions 105, 106, 117, so that they are easily slidable to their different positions over the pins 46. The differences in the thicknesses of the finger portions are, of course, such that the desired power impulse will be imparted to the typing mechanism in each set position of the knob 96. Also to be noted is that the interponent fingers are capable of effecting a change in the position of the abutment bar in any angular position of the cam shaft 44, that is, in any position of the main imprint control or dial wheel 51; and, conversely, the dial wheel 51 is operative to effect a change in the position of the abutment bar regardless of the positions of the interponent fingers 47. The adjustments of the abutment bar 35 effected by the dial wheel 51 and the knob 96 might be regarded as additive or supplemental in nature. For better guidance, the fingers 47 have upward extensions 121 swingably confined between the arms 108 and lips 122 offset therefrom.

The fingers 47 are pivotally secured to the arms 108 by screws; and if the work requires, other fingers with relatively differently proportioned thickness portions 105, 106, and 117 may be substituted. Such a substitution may be required or desirable in view of the differing characteristics of stencils that are commercially available, or it may be desirable due to other conditions, such as the desire for a lesser or harder impressed stencil. For writing some stencils, see Figure 5, the portions 117 of the fingers may be identical in thickness with the portions 105, while for other work the portions 105 and 106 may be relatively different. In other words, the fingers may be shaped in accordance with the particular requirements of different work.

What is claimed is:

1. In a typewriting machine having power means, type actions normally disassociated from said power means, means to associate said type actions selectively with said power means in a manner to cause the selected type action to receive an operating impulse from the power means, and means whereby to vary the operating impulse receivable by said typing means, comprising, a pivotally adjustable member, manually settable cam means, means rendering said member pivotally adjustable by said cam means, including

interponent means, varying in thickness and slidable across said cam means, to give thereby a supplementary adjustment to said member, thereby to alter the said operating impulse, and means to slide said interponent means across said cam means to different positions.

2. In a typewriting machine having power means, type actions normally disassociated from said power means, means to associate said type actions selectively with said power means in a manner to cause a desired type action to receive an operating impulse from the power means, and means whereby to vary the operating impulse receivable by said typing means, comprising, an elongate member adjustable transversely of its length, adjustably settable means extending substantially parallelly to said elongate member, expansible and contractible means connecting said elongate member at widely spaced points with said settable means for adjustment thereby independently of adjusting said settable means, and means to expand or contract said connecting means.

3. The combination with typing means and power means to operate said typing means; of means for normally holding a typewriter ribbon removed from a printing point, adapted to be operated to different extents by said typing means, to present thereby different portions of the ribbon to the printing point, and means differently settable to predetermine whether or not, and to what extent, said ribbon-holding means is operable by said typing means, and additionally to predetermine the typing force that is impartable to said typing means in each different setting of said settable means.

4. In a typewriting machine having constant-speed power-drive means, typing means normally disassociated from said power-drive means, means to associate said typing means operatively with said power-drive means, in a manner to cause the latter to impart an operating impulse to said typing means, adjustable means whereby to vary said operating impulse, ribbon-vibrator means, normally holding a typewriter ribbon removed from a printing point, means adapted to operate said vibrator means incidental to each operation of said typing means, and means differently settable to predetermine whether or not said operating means shall operate said vibrator means, and, additionally, to adjust said adjustable means in a manner so that the operating impulse impartable to said typing means is different when said settable means is set for non-operation of said vibrator means than when it is set for operation thereof.

5. In a typewriting machine having power-drive means, typing means operable to effect imprints at a printing point, normally disassociated from said typing means, means to associate said typing means operatively with said power means, in a manner to cause the latter to impart an operating impulse to said typing means, adjustable means whereby to vary the operating impulse, means normally holding a typewriter ribbon removed from said printing point, means adapted to operate said vibrator means incidental to each operation of said typing means, means differently settable to predetermine whether or not, and to what extent, said operating means shall operate said vibrating means, a settable imprint control, and means so operatively associating said imprint control, said settable means, and said adjustable means that the latter is adjust-

able aggregatively by said imprint control and said settable means, and in such a manner that in every setting of said imprint control the operating impulse impartable to the typing means will be of minimum strength when said setting means is set for nonoperation of said vibrating means.

6. In a power-driven typewriting machine, the combination with a series of type actions operable to effect imprints at a printing point; of a power-drive member, an actuator associated with each type action and engageable with said power-drive member for operation of its associated type action, means to selectively engage said actuators with said drive member, adjustable means in the path of said actuators engageable to effect their disengagement after partial operation of each type-action, each operated type action completing its operation by momentum, means adapted to vibrate a typewriter ribbon to said printing point whenever an actuator is actuated, means yieldingly settable to different positions to vary the magnitude of said vibration to present different portions of the ribbon to the printing point, an imprint regulating control, means associating said control and said settable means with each other and the adjustable means in a manner so that the latter is adjustable by either said control or said settable means and so that the adjustment of the adjustable means effected by either alters that effected by the other, said associating means being so constructed that the force of the actuators engaging the adjustable means will not disturb the position of said settable means.

7. In a power-driven typewriting machine, the combination with a series of type actions operable to effect imprints at a printing point; of a power-drive member, an actuator associated with each type action and engageable with said power-drive member for operation of its associated type action, means to selectively engage said actuators with said drive member, adjustable means in the path of said actuators engageable to effect their disengagement after partial operation of each type action, each operated type action completing

its operation by momentum, means adapted to vibrate a typewriter ribbon to said printing point whenever an actuator is actuated, means yieldingly settable to different positions to vary the magnitude of said vibration to present different portions of the ribbon to the printing point, a yieldingly adjustable imprint regulating control, means associating said control and said settable means with each other and the adjustable means in a manner so that the latter is adjustable by either said control or said settable means and so that the adjustment of the adjustable means effected by either alters that effected by the other, said associating means being so constructed that the force of the actuators engaging the adjustable means will have no disturbing effect on the position of said settable means and said control.

8. In a power-driven typewriting machine, the combination with a series of type actions operable to effect imprints at a printing point; of a power-drive member, an actuator associated with each type action and engageable with said power-drive member for operation of its associated type action, means to selectively engage said actuators with said drive member, adjustable means in the path of said actuators engageable to effect their disengagement after partial operation of each type action, each operated type action completing its operation by momentum, means adapted to vibrate a typewriter ribbon to said printing point whenever an actuator is operated, means yieldingly settable to effectively or ineffectively condition said vibrating means, an imprint regulating control, means associating said control and said settable means with each other and said adjustable means in a manner so that the latter is adjustable by either said control or said settable means and so that the adjustment of the adjustable means effected by either alters that effected by the other, said associating means being so constructed that the force of the actuators engaging the adjustable means will not disturb the setting of said settable means.

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