(No Model.) 3 Sheets—Sheet 1.

W. J. PERKINS.

TYPE WRITING MACHINE.

No. 594,706. Patented Nov. 30, 1897.

Fig. 1.

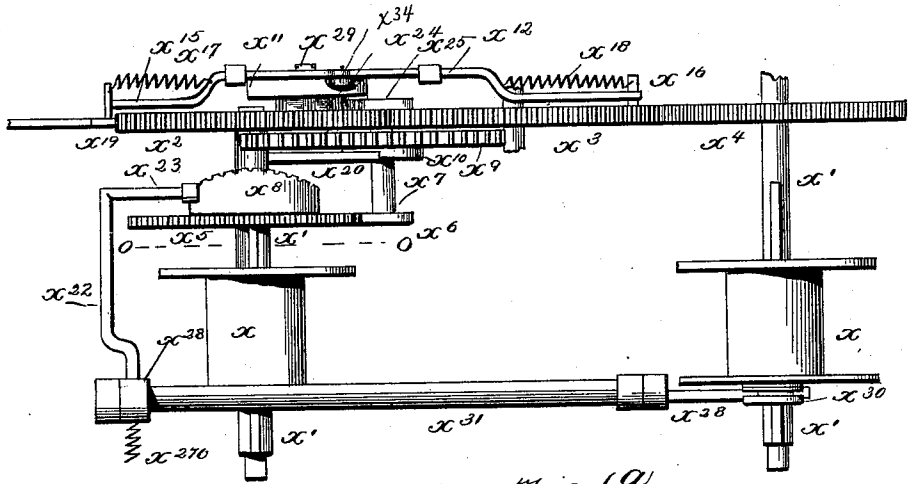


Fig. 1a

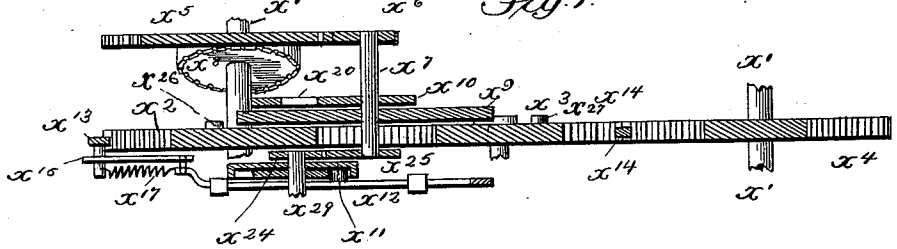
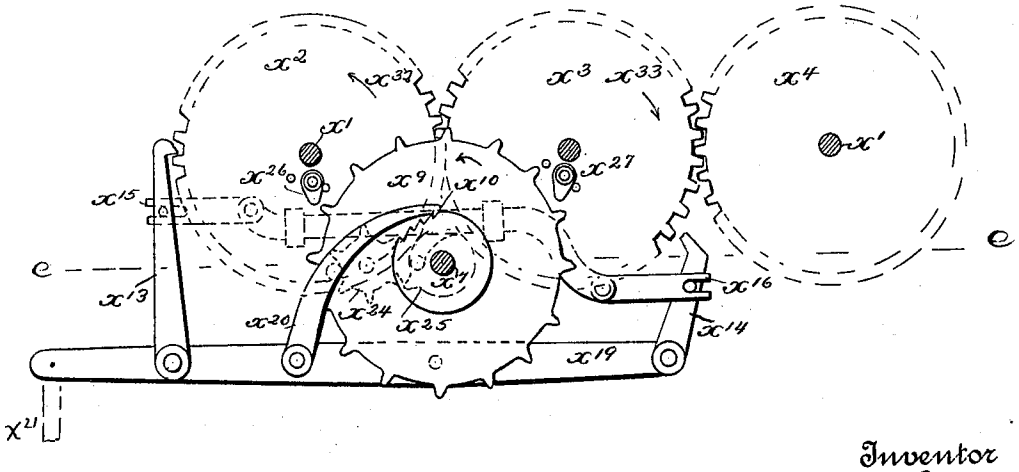


Fig. 2.



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Fig. 3

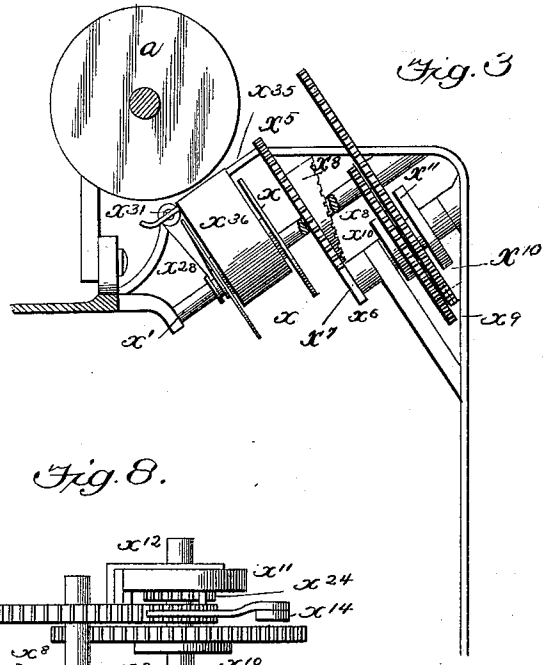


Fig. 8.

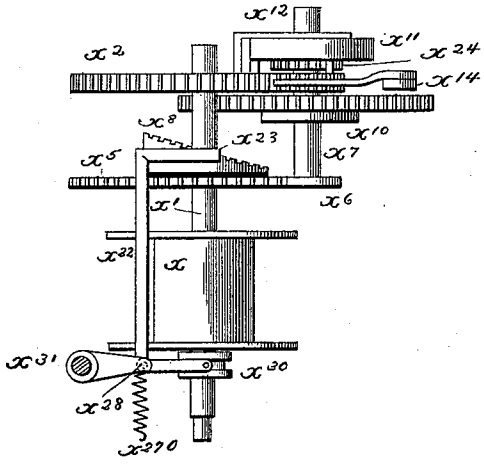


Fig. 4.

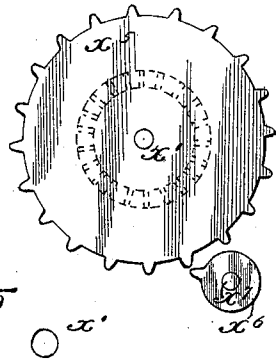
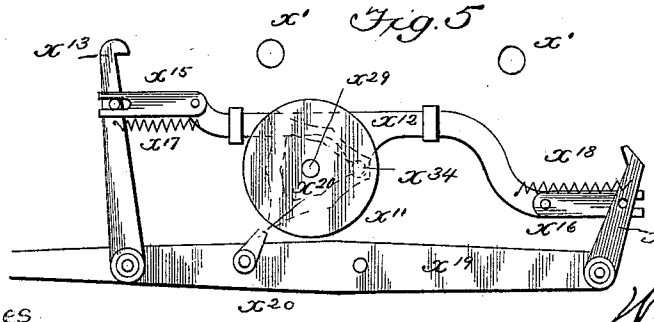


Fig. 5



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TYPE WRITING MACHINE.

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Fig. 9.

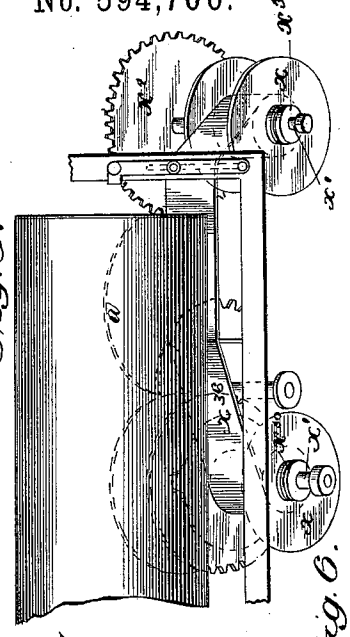


Fig. 7

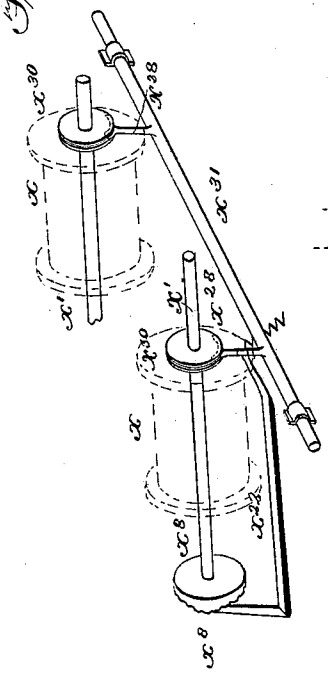
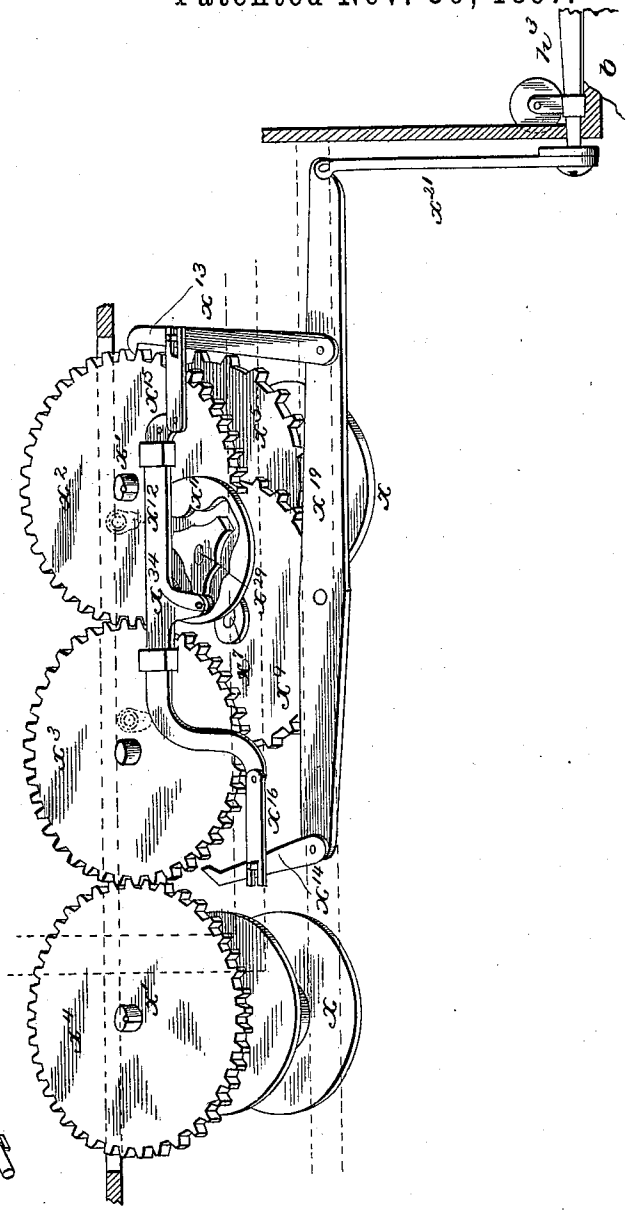


Fig. 6.



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UNITED STATES PATENT OFFICE.

WILLIS J. PERKINS, OF GRAND RAPIDS, MICHIGAN, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE SMITH PREMIER TYPEWRITER COMPANY, OF SYRACUSE, NEW YORK.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 594,706, dated November 30, 1897.

Original application filed July 24, 1886, Serial No. 208,966. Divided and this application filed July 28, 1892. Serial No. 441,530. (No model.)

To all whom it may concern:

Be it known that I, WILLIS J. PERKINS, residing at Grand Rapids, in the county of Kent and State of Michigan, have invented certain new and useful Improvements in Type-Writers, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to type-writing machines, and especially to the ribbon mechanism thereof.

The object of the invention is to shift the inking-ribbon automatically and uniformly; also to improve the construction and combination of parts relating to the ink-ribbon mechanism.

This application is a division of original application, Serial No. 208,966, filed July 24, 1886, and the other division of which was patented April 23, 1895, No. 537,993. In the original application it was stated that parts were omitted in many of the figures and parts were shown broken, and in some instances only the position of a part was indicated. The same is true of this division of said application. It should be understood that I expect to avail myself of usual and known constructions in this and analogous arts and of the expert skill of mechanics in the carrying out of my invention according to the general principles thereof.

Figure 1 is an edge plan of the ribbon-reels and driving and shifting mechanism. Fig. 1ª is a partial section of the same. Fig. 2 is an elevation of the ink-ribbon-shifting mechanism; Fig. 3, a partial end elevation of a portion of the ink-ribbon-shifting apparatus, part of the frame and paper-roll being shown in section; Fig. 4, a detail of ink-ribbon-shifting apparatus on line *o o*, Fig. 1; Fig. 5, an elevation of mechanism for shifting pawls of inking-ribbon. Fig. 6 is a plan of the ribbon-shifting mechanism. Fig. 7 is a diagrammatic perspective illustrating the general arrangement of the ribbon-reels with reference to their supporting-axles; Fig. 8, a partial elevation of portion of ribbon-shifting apparatus; Fig. 9, a partial detail showing ribbon and supports and paper-roll in perspective.

The mechanism for automatically and continuously shifting the type-inking ribbon, so that the wear on the same and the "color" furnished to the paper may be uniform, is as follows:

The inking-ribbon is made to unwind itself from one drum or spool and wind upon another, and reverse this movement automatically as soon as it shall have completed its travel. It is also shifted laterally across the plane of impression of the type on the paper. (See Figs. 3, 7, and 8.)

Two spools or reels $x\,x$ are made of a width to receive an inking-ribbon of usual character. These reels are splined to shafts x' x', suitably supported in the frame of the machine, so as to rotate with the shafts, but are free to slide longitudinally thereon. x^2 and x^4 are gears on these shafts, having an intermediate x^3. This train of gears causes the shafts and reels to rotate in unison. Gears x^2 and x^3 have pawls x^{13} and x^{14} engaging therewith, so that when the pawls are suitably actuated the gears may be turned. The pawls x^{13} and x^{14} are pivoted to a lever x^{19} at equal distances from the pivoted center of said lever. The lever x^{19} is attached to the spacing-lever h^3 by a pitman connection x^{21}. Thus when the spacing-lever moves, the pawl-actuating lever x^{19} is also turned slightly about its pivot, and one of the pawls x^{13} and x^{14} is raised, while the other is depressed. (See Figs. 2, 5, and 6.) Thus whichever pawl is in engagement with the wheels x^2 and x^3 serves to actuate the train of gears and unwind the ink-ribbon a little distance from one reel x onto the other. On the side of the gear x^2 is a pivoted pawl or fly x^{26}, and on the side of gear x^3 there is a pivotal pawl x^{27}, a pin at each side of each pawl or fly limiting its movement in either direction.

When the wheel x^2 is rotated in the direction of arrow x^{32}, Fig. 2, the pawl or fly x^{26} will not engage the teeth on spaced gear-wheel x^9 by reason of the location of the pawl x^{26} and its pins with the relation to the teeth of said wheel, which is mounted on the shaft x^7, as shown. The pawl x^{27}, however, moving in the direction of arrow x^{33}, Fig. 2, engages one tooth on the spaced gear-wheel x^9 and rotates said wheel one space.

The spaced gear-wheel x^9 has sixteen teeth, as shown. The gears x^2 and x^3 (and the ribbon-reels) will thus make sixteen revolutions to one revolution of the spaced gear x^9.

The shaft x^7, to which the spaced gear x^9 is keyed, bears also the single-toothed gear x^{25}, which single-tooth wheel x^{25} engages a six-tooth gear x^{24}, which is fastened to shaft x^{29}, which bears the six-sided race-cam x^{11}. As the sides or operating-faces of the cam agree with the number of cogs on gear x^{24} it is apparent that when the wheel x^{24} is shifted one space one of the cam-faces on cam x^{11} makes a complete stroke or impulse. This cam-plate x^{11} has a pin or roller x^{34} moving in its race-way, which pin or roller is connected to a slide-bar x^{12}.

The bar x^{12} slides in bearings and is connected to pawl x^{14} at one end by a pitman-rod x^{16}. This pitman has a slot in the end in which a pin on pawl x^{14} rests. The pawl is held toward the pitman by spring x^{18}. A similar connection of pawl x^{13} to the other end of the slide-rod x^{12} is made by means of slotted pitman x^{15} and spring x^{17}. The shifting of the slide-bar x^{12} by means of the race-cam x^{11} thus shifts the pawls x^{13} and x^{14}, one being thrown out of gear with its pinion whenever the other is thrown in.

To prevent the possibility of pawls x^{13} and x^{14} becoming locked on a dead-center, so that neither one shall engage its gear-wheel, there is a ratchet-wheel x^{10} on shaft x^7 and a pawl x^{20} on lever x^{19} engaging said ratchet-wheel x^{10}. The ratchet-wheel x^{10} has teeth only on a part of its surface, the remainder of its periphery being smooth. The teeth on the ratchet-wheel correspond with the point of engagement of the single-tooth gear x^{25} with the six-tooth gear x^{24}, this being the shifting-point of the slide-bar x^{12}. Should the race-cam therefore fail to make a complete shift of the slide-bar and its pawls, this positive ratchet engagement will complete the movement—that is, the lever x^{19} being positively driven will positively move pawl x^{20}. When pawl x^{20} is in engagement with the toothed portion of wheel x^{10}, it will rotate such wheel and with it the shaft x^7 and of course the train connected with such shaft, thereby insuring the movement of the race-cam and connections, but when the pawl x^{20} engages the smooth face of the wheel x^{10} it has a mere lost motion and no propulsive effect.

By the mechanism made in the proportions described each movement of the lever h^3, which is connected to the key mechanism, causes a movement of the ribbon-reels. Sixteen revolutions of one of the gears x^2 or x^3 causes one revolution of the wheel x^9, and this shifts the race-cam one space through the mechanism described, thus throwing the opposite pawl (of the two pawls x^{13} and x^{14}) into engagement and reversing the movement of the ribbon. Of course other convenient proportions of the mechanism may be adopted. Thus the traveling of the ribbon back and forth from one reel to the other under the impulse of the key mechanism is quite automatic.

The transverse shifting of the ribbon is effected by means of a face-cam x^8, which is loose on shaft x', the face-cam being attached to gear x^5, which is actuated by the one-tooth gear x^6 on shaft x^7. The cam-face of cam x^8 is divided by a series of radial notches. The rod x^{22}, which is drawn endwise by a spring x^{270}, has a bent arm x^{23}, which extends partly across the face of face-cam x^8, so as to lie in one of the grooves when the cam is at rest. The rod x^{22} has a pin bearing against the forked rocker-arm x^{28}, the rocker-arm being connected to rock-shaft x^{31} and its fork engaging a groove in the periphery of the hub x^{30} of reel x. The rock-shaft x^{31}, Fig. 1, is connected to rocker-arm x^{28}, and the other end of said bar is connected to a similar arm engaging a groove in the hub of the other reel x, so that the two reels are shifted simultaneously. When the spaced gear x^9 has made one revolution, the gear x^6 engages gear x^5 and turns it as far as the distance between the grooves in its face. This shifts the bar x^{22} lengthwise and so slides the reels x x lengthwise on their shafts x' x' by the mechanism heretofore explained.

It will be noticed that the pawl x^{13} works on the downstroke, while pawl x^{14} works on the upstroke, but on the opposite side of the pivot of lever x^{19}. Thus whichever pawl is in operative connection gives its impulse to the ribbon after the printing has been done.

The inking-ribbon x^{36} is supported on a plate x^{35}, (see Fig. 3,) which plate x^{35} has a slot in it, permitting the type to strike through the slot toward the paper-roll a.

It will be understood that many of the figures of the illustration are diagrammatic, the machine-frame and supports being intentionally omitted for convenience of illustration.

It is evident that slight changes may be made from the form shown and described without departing from the spirit of the invention; also, that the substitution of an equivalent, as a weight for a spring or one form of gear or lever for another, is within the scope of the invention.

No broad claim is made herein to an automatic shifter operating to shift the ribbon laterally during the travel of the carriage, but the combinations of mechanisms hereinafter claimed are believed to be new, and the mechanical structures involved are also intended to cover equivalents.

I claim—

1. In a type-writing machine, the ribbon-spools and supports therefor, means for moving the ribbon longitudinally from one spool to the other, a rotating cam and connections therefrom to the ribbon-spools by which said spools are moved to carry the ribbon laterally, and a spring acting on said spools against the force of the cam.

2. The combination, in a type-writing machine, of ribbon-supports and means for wind-

ing the ribbon thereon, an inclined bearing-surface and connections from an operative part of the machine to move said surface and thereby shift the ribbon sidewise, and a spring operating against the force of said inclined surface to press the ribbon in opposite direction.

3. In a type-writing machine, the ribbon, two spools on which the ribbon is supported, means for rotating these spools to traverse the ribbon longitudinally and means for automatically traversing the spools independently of their supports to move the ribbon laterally in a plane parallel with the face of the type when in printing position.

4. In a type-writing machine, the combination of the inking-ribbon and its supporting-spools, means for winding the ribbon longitudinally on said spools and for automatically reversing the movement thereof, and mechanism for automatically shifting the ribbon laterally and reversing such lateral movement, all substantially as described.

5. In a type-writing machine, the inking-ribbon and its supports and means for moving the ribbon in the direction of its length and for reversing this movement automatically, and means for traversing the ribbon in the direction of its width, and for reversing this movement automatically, all combined substantially as described.

6. In a type-writing machine, the inking-ribbon and its supports, means for feeding the ribbon longitudinally with a series of impulses, means for automatically moving the ribbon sidewise for a determined distance, and means for reversing the lengthwise movement, substantially as described.

7. In a type-writing machine, the inking-ribbon and supports, and a train of driving-gears automatically operated from a moving part of the machine, said train comprising within itself a reversing mechanism for traversing the ribbon lengthwise a determinable distance and then automatically reversing this lengthwise movement, substantially as described.

8. In a type-writing machine, the ribbon-spools and their supports and a positively-driven train of mechanism comprising within itself a motor part which at a determinable interval reverses the rotary movement of said spools, in combination substantially as described.

9. In a type-writing machine, the ribbon-supporting reels, a rock-shaft having arms connected to both reels, and means for rocking said shaft automatically to automatically shift said reels in the direction of their length, substantially as described.

10. In a type-writing machine, the reel-supporting shafts and means for positively driving both shafts simultaneously, reels supported on said shafts and a train of mechanism by which both reel-shafts are positively driven, all combined.

11. In a type-writing machine, the combination of the reel-supporting shafts both driven positively, the reels movable on said shafts, and means for automatically shifting the reels simultaneously and lengthwise of said shafts.

12. In a type-writing machine, the ribbon-supporting reels, and a train of mechanism connecting said reels, and positively driving both simultaneously and means for automatically reversing the rotation of both said reels, substantially as described.

13. In a type-writing machine, the ribbon-supporting reels, driving gear and ratchet-and-pawl connections by which both reels may be rotated, and a lever connected to the driving-ratchets of both reels, whereby both may be driven and the movement of both positively reversed simultaneously, substantially as described.

14. In a type-writing machine, the ribbon-winding reels both positively rotated simultaneously, a train of lever mechanism, and pawls operated by the lever mechanism to positively reverse the rotation of the winding-reels, all combined substantially as described.

15. In a type-writing machine the ribbon-reels ratchet-wheels connected to said reels, a lever having pawls operatively engaging said ratchet-wheels and variable driving mechanism operating on said pawls to shift them simultaneously and thereby reverse the rotary movement of the reels, all combined substantially as described.

16. In a type-writing machine, the ribbon-spools and their supports, a rock-shaft and means for oscillating the same automatically, and arms from the rock-shaft connecting to the ribbon-spools to shift them in the direction of their length, and simultaneously, substantially as described.

17. In a type-writing machine, the ribbon-spools, the ratchet-wheels connected thereto and the pawls engaging said wheels, the lever by which said pawls are operated, and the intermittingly-rotating shifter forming part of the driving-train and connected to the pawls, whereby they are alternately engaged and disengaged and by which the direction of movement of the reels is controlled, all combined substantially as described.

18. In a type-writing machine, the ribbon-spools and driving-gear for rotating the same positively, a mutilated gear-wheel engaging said driving-gear to rotate the spools intermittingly, and means connected to the operative parts of the machine for rotating said mutilated gear, all combined substantially as described.

19. The combination in a type-writing machine, of an inking-ribbon, longitudinally-winding mechanism therefor, means for automatically reversing the longitudinal movement, and an automatic lateral-shifting mechanism for the ribbon, substantially as described.

20. The combination in a type-writing ma-

chine, of an inking-ribbon and ribbon-supports and longitudinal-feed mechanism, automatic reversing mechanism, and a mechanism for automatically shifting the ribbon sidewise, substantially as described.

21. In a type-writing machine, a ribbon, ribbon-supports, and variable automatic means for moving the ribbon lengthwise from one support to the other, combined with mechanism for automatically shifting the ribbon laterally, so as to use the ribbon in parallel longitudinal lines.

22. Means for moving the ribbon lengthwise and for reversing said movement, and means for shifting the ribbon sidewise, operatively connected to the train of mechanism for moving the ribbon lengthwise, whereby the lengthwise travel of the ribbon may be reversed, and the ribbon also moved sidewise, to present parallel lines of working surface.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIS J. PERKINS.

Witnesses:
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S. BRASHEARS.