June 19, 1945. I. G. H. VON KRAEMER 2,378,520

DRIVING MECHANISM FOR RETURNING THE ROLLER OF TYPEWRITERS

Filed Aug. 31, 1943 2 Sheets-Sheet 1

Fig. 1.

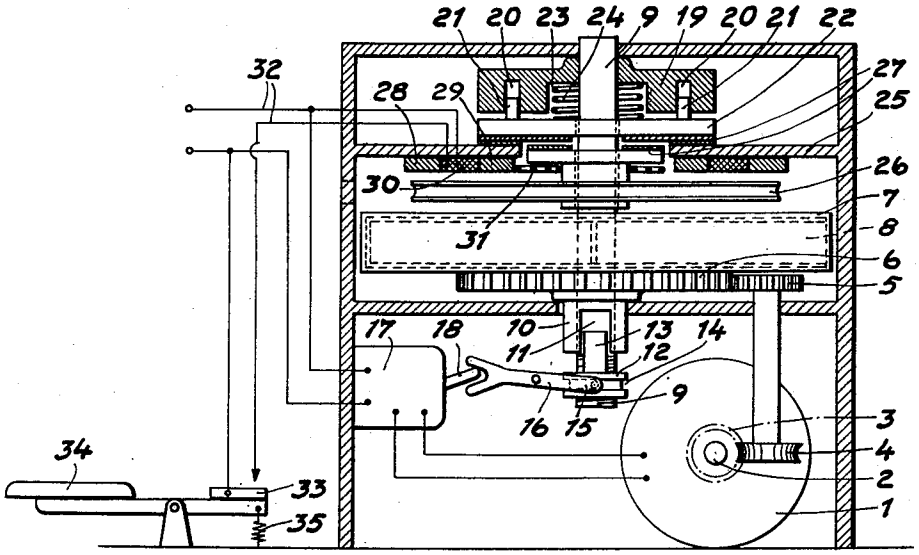
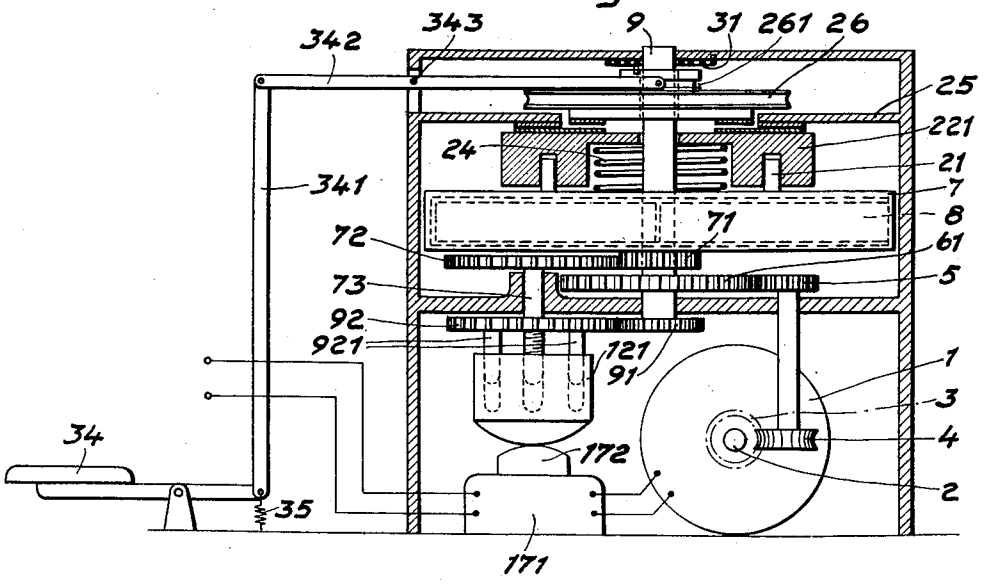



Fig. 2.




Ivan Gustaf Henry von Kraemer
INVENTOR
By Otto Munk
his ATT'Y.

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Fig. 3.

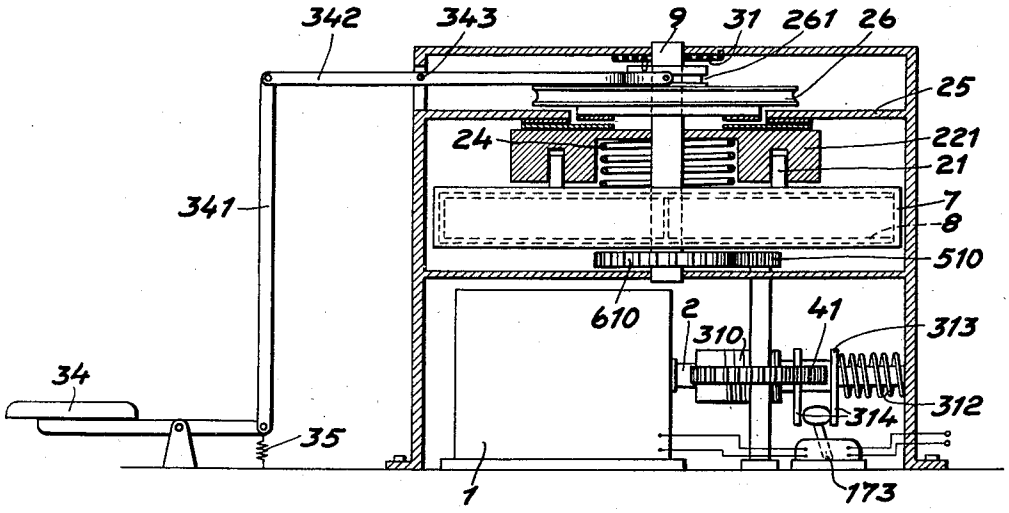



Fig. 5.

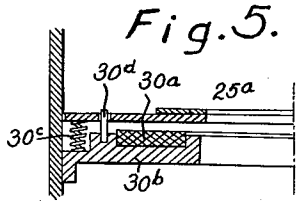
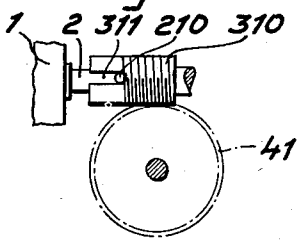



Fig. 4.




Ivan Gustaf Henry von Kraemer
INVENTOR
By Otto Schmidt
his ATT'Y.

Patented June 19, 1945 2,378,520

# UNITED STATES PATENT OFFICE

2,378,520

## DRIVING MECHANISM FOR RETURNING THE ROLLER OF TYPEWRITERS

Ivan Gustaf Henry von Kraemer, Stockholm, Sweden

Application August 31, 1943, Serial No. 500,612
In Sweden March 3, 1942

4 Claims. (Cl. 197—66)

When a person is engaged in type-writing he has to produce not only the intellectual performance of the writing itself but also to exert a physical work in the incessant moving back of the carriage for every line written. This is quite an unnecessary work which is eliminated by the present invention.

The present invention relates to a driving mechanism for returning the carriage of type-writers at the end of the written line.

According to the invention an electric motor is provided for winding up a spring which by means of a key is adapted to be connected to the carriage when the latter is to be returned. Moreover, there is a device for automatically connecting the motor to a source of current when the spring has performed a certain work.

In the accompanying drawings,

Figures 1, 2 and 3 are constructional forms of the invention,

Figure 4 is a detail, seen from the top in Figure 3, and

Figure 5 illustrates a modification of Fig. 1.

According to Figure 1 a worm 3 is fixed to the shaft 2 of a motor 1, which worm through a worm wheel 4 and a toothed wheel 5 drives a toothed wheel 6, which is fixed to a casing 7 for a spiral spring 8 whose outer end is fixed to the casing 7 and whose inner end is fixed to the shaft 9, on which the casing 7 is freely mounted. To the wheel 6 there is fixed a sleeve 10 surrounding the shaft 9 and provided with two slots 11, which by way of example may extend over about 90° of the periphery. On the lower threaded part of the shaft there is mounted a nut 12 provided with projections 13 entering into the said slots 11. Around the periphery of the nut there is a circular slot 14 engaged by a fork 15 which is fixed to a two-armed lever 16, whose other end has the shape of a fork adapted to actuate the handle 18 of a switch 17.

At the upper part of the shaft 9 there is fixed a round disc 19 with axially directed bores 20 engaged by pins 21 fixed in a disc 22 which is loosely mounted on the shaft 9. In a central bore 23 in the disc 19 there is provided a helical spring 24 which is normally pressing the disc 22 against a fixed partition 25 provided with a central opening, into which the upper part of a driving disc 26 enters. The partition 25 and the driving disc 26 consist of magnetisable material, such as iron. The lower surface of the disc 22 and the upper surface of the partition 25 as well as the upper surface of the driving disc 26 are provided with coatings 27 of some suitable material with great friction coefficient. At the lower surface of the partition 25 there are fixed two iron rings 28, 29, coaxial with the shaft 9. In the annular space between the rings there is provided an electrical winding 30. The driving disc 26 is connected to the partition 25 by means of a relatively weak spiral spring 31.

The winding 30 may be connected to a distribution system through conductors 32 and a switch 33 which may be closed by means of a key 34 against the action of a spring 35. The switch 17 is connected to the distribution system through conductors 36.

The operation of the device is as follows:

When a line has been written on the type-writer, whether in full or only partly, and the carriage is to be returned, the key 34 is pressed down against the force of the spring 35, whereby current is supplied to the winding 30 which then produces a magnetic field, whose lines of force are closed through the driving disc 26 so that the said disc 26 is attracted and with its upper surface comes into contact with the disc 22. The magnetic device is so dimensioned that the attraction will be sufficient to overcome the force of the spring 24, so that the disc 22 is pressed upward and gets out of contact with the partition 25 and is stopped, by the disc 19 without the driving disc 26 coming into contact with the magnetic device 28, 29.

The space bar usually provided in type-writers is according to the present invention preferably divided into two parts, one of which, e. g., the left one, may constitute the returning key 34 and the other part serve as space bar so that these two keys are operated by the left and the right hand thumb respectively.

At the described movement of the discs 22 and 26 the friction has been transferred successively from the partition 25 to the driving disc 26.

If now the spring 8 has been sufficiently wound up, it will, through the intermediary of the shaft 9, the disc 19, the pins 21 and the disc 22, rotate the driving disc 26 which then, by means of a cable (or steel band), attached to the disc returns the carriage and actuates some suitable line shifting device, not shown. When the pressure on the key 34 ceases, the driving disc 26 falls down and thus comes out of contact with the disc 22, which by means of the spring 24 is now pressed against the partition 25 and thereby stopped. A braking device of some kind may be provided so as to lessen the speed of the carriage when it comes near its right end position. Also, the conductor 32 may pass over a contact controlled by the carriage and so arranged that the circuit is broken

when the carriage comes near to its right end position.

When the current to the winding 30 has been switched off by releasing the key 34 and the driving disc 26 consequently has been disconnected in the manner described above, writing may take place. During the writing the cable will cause the driving disc to turn a small angle at each step of the carriage. The spiral spring 31 serves to keep the cable tight and to turn the driving disc back if the carriage is returned by hand.

At the above described rotation of the shaft 9 this shaft will screw the nut 12 down, whereby the nut 12 actuates the switch 17 through the lever 16. When a number of lines have been written so that the nut has come down to a certain point, the switch 17—which preferably is a quick-closing and quick-breaking one—is closed and the motor starts and drives through the worm gear 3, 4 and the gear 5, 6, the spring casing 7 so that the spring is wound up. At the same time the sleeve 10, which is fixed to the toothed wheel 6, will turn the nut 12, so that it is screwed up on the shaft 9 until it has been moved so much as to open the switch by means of the lever 16 whereby the motor stops. It is also possible, as shown in Fig. 5, to make the partition axially displaceable instead of the driving disc. The winding 30*a* may, for this purpose, be arranged on a circular iron ring 30*b* secured to the casing, the left part of this ring being shown in section in Fig. 5. The partition 25*a* is axially movable and is acted upon by the winding 30*a* against the action of springs 30*c* distributed along the periphery of ring 30*b*, one of said springs being shown in Fig. 5. The winding 30*a* is energized in the same manner as described with respect to Fig. 1. The partition 25*a* is secured against rotation by means of one or more pins 30*d* fixed in the ring 30*b* and passing through suitable holes provided in the partition 25*a*.

The device according to Figure 2 differs from the device according to Figure 1 fundamentally thereby that the electric control of the driving disc has been replaced by manual control and that the nut, which actuates the switch, is driven through gears so that its displacement for each line is less than that according to Figure 1.

When the carriage is to be returned, the key 34 is pressed down against the action of the spring 35 and thereby actuates the link 341 and the lever 342, which is mounted at 343 and by means of a fork with pins engages a circular slot 261 in the driving disc 26, which is thereby pressed against the disc 221 and will press the same down against the action of the spring 24 so that the disc 221 loses its contact with the partition 25. The outer end of the spring 8 will then turn the spring casing 7 and thereby, through the pins 21, also turn the disc 221 and, through the friction engagement, the driving disc 26, thereby returning the roller. At the same time the gear 71 fixed to the spring casing 7 will turn the gear 72 and thereby the screw 73 so that the nut 121 threaded thereon is screwed down and actuates the push button 172 of the switch 171. When a number of lines have been written, so that the push button 172 has been displaced a certain distance, the switch is closed. Thereby the motor 1 is started and rotates the shaft 9 through the worm gear 3, 4, the gear 5 and the gear 61 which is fixed on the shaft 9, at which the inner end of the spring 8 is fixed, so that the spring 8 is wound up. At the same time the shaft drives the gear 92 through the gear 91 fixed on the shaft 9 so that the pins 921 fixed in the gear 92 and engaging bores in the nut 121 will rotate the said nut 121, thereby screwing it up on the screw 73, until the spring-actuated push button 172 has risen so much that the circuit is opened and the motor is stopped.

The device according to Figures 3 and 4 differs from the device according to Figure 2 only concerning the actuating of the switch. On the shaft 2 of the motor 1 there is slidably mounted a worm 310 provided with a slot 311. A pin 210 fixed in the shaft 2 is displaceable in the slot 311 and serves to cause the worm to rotate with the shaft. A spring 312 presses a slide 313 against the worm, the said slide being prevented from rotating by means of a stop or guide not shown. The slide 313 is provided with two projections 314 serving to operate a switch 173, as will be described below. The worm 310 drives a worm gear 41, which by means of a gear 510, 610 drives the shaft 9, to which the spring 8 is fixed. For the rest the device is identical with the device according to Figure 2.

As is easily understood, the force exerted by the worm gear 41 on the worm 310 in the axial direction of the latter is proportional to the force of the spring 8. Consequently, when a number of lines have been written so that the spring 8 has become sufficiently slack, the spring 312 has successively expanded and has displaced the slide 313 to the left so that the right projection 314 closes the switch 173. The motor is now started and is loading the spring 8 through the gears 310, 41 and 510, 610, thereby increasing the torque of the spring 8 and thus compressing the spring 312. When the spring 8 has been wholly wound up, the left projection 314 will open the switch 173 whereby the motor is stopped.

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

1. Driving mechanism for returning the carriage of typewriters, comprising the combination of a driving spiral spring for returning the carriage, means for winding said spring connected to one end of said spring, a member connected to the other end of the spring and normally in engagement with a non-rotatable part, a freely mounted driving disc adapted to be connected to the carriage, and manually operable means to bring the driving disc into engagement with the said member and to bring this member out of engagement with the non-rotatable part, to allow said driving spring to drive said driving disc.

2. Driving mechanism according to claim 1, including a shaft to which said other end of the driving spring is connected a disc fixed on said shaft, a second disc mounted on said shaft for rotation with and axially displaceable relative to said first disc, said second disc being resiliently urged against a non-rotatable plate, an electromagnet provided on this plate, a key controlled switch for connecting said electromagnet to a current source, said driving disc consisting of magnetisable material and being freely mounted on the shaft, the said electromagnet, when magnetised, serving to bring the driving disc into engagement with the said second disc and to bring said second disc out of engagement with the non-rotatable plate to allow said driving spring to drive said driving disc.

3. Driving mechanism according to claim 1, including a casing for said driving spring, said other end of said driving spring being fixed to said casing, a disc rotatable with and axially dis-

placeable relative to said casing, said disc being resiliently urged against a non-rotatable plate, and a key adapted, when pressed down, to press the driving disc against the said displaceable disc and thereby to bring the latter out of contact with the non-rotatable plate to allow said driving spring to drive said driving disc.

4. Driving mechanism according to claim 1, including a key adapted to displace the non-rotatable part in order to disengage it from the member connected to the driving spring and thereby to bring the said member into engagement with the driving disc.

IVAN GUSTAF HENRY von KRAEMER.