Nov. 14, 1933. E. F. WATSON 1,934,897

MANIFOLD TYPEWRITING MACHINE

Filed Oct. 3, 1930

FIG. 1

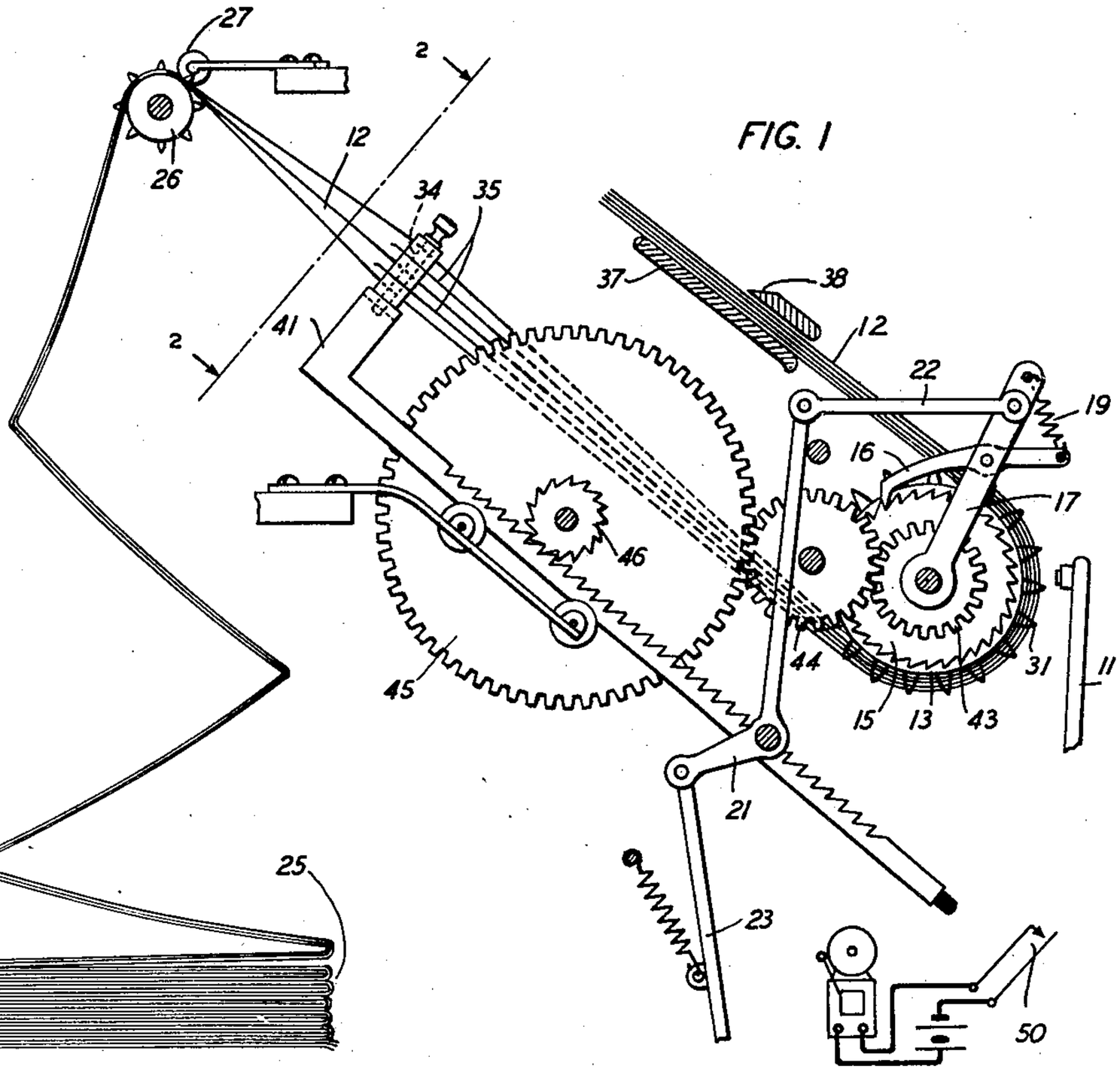
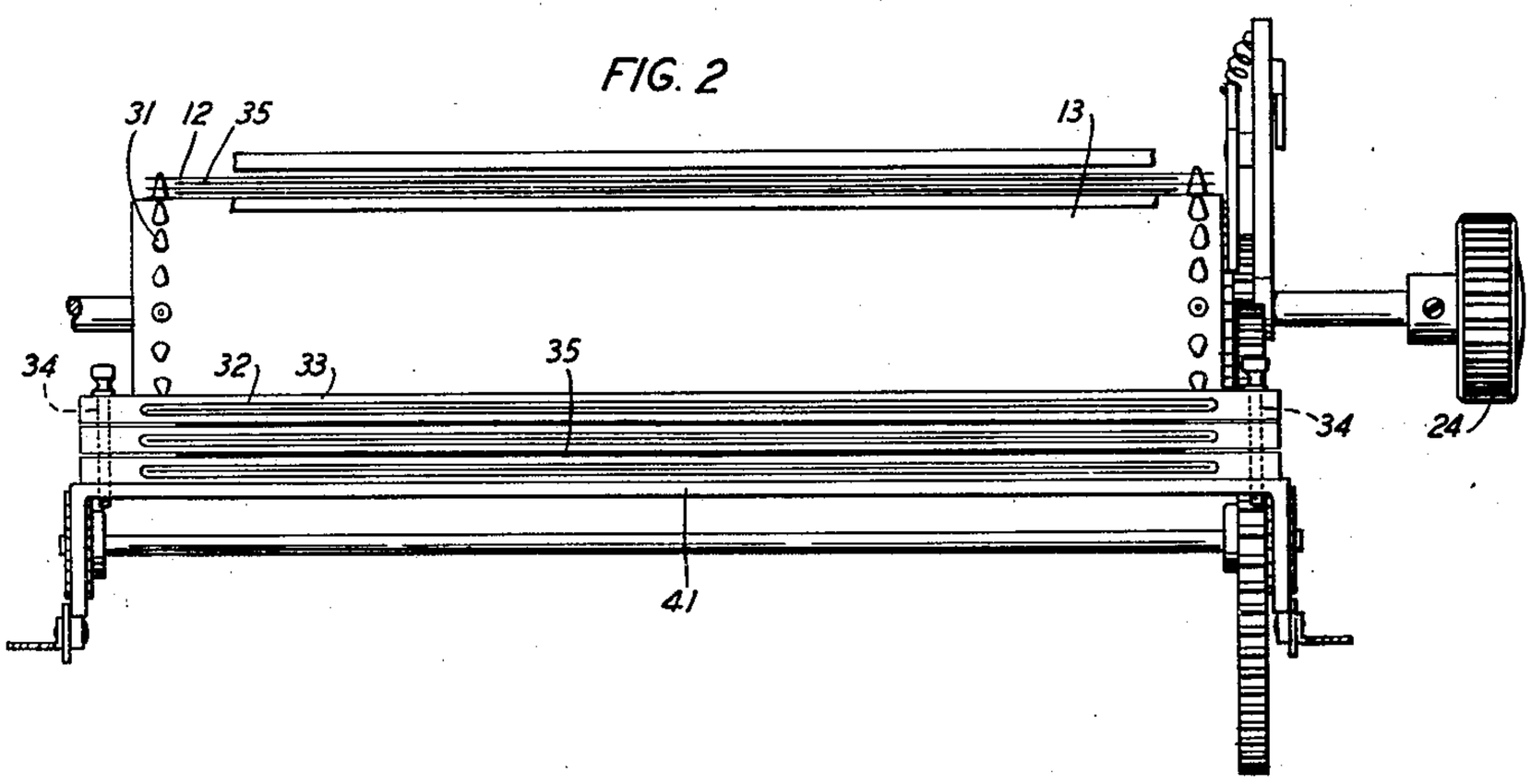


FIG. 2



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MANIFOLD TYPEWRITING MACHINE

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3 Claims. (Cl. 197—126)

This invention relates to typewriting machines and more particularly to typewriters for making multiple copies by means of carbon paper. The invention is applicable both to telegraph printers and to manually operated typewriters.

The general object of this invention is to provide a mechanism for feeding and controlling paper such as printed forms, and carbon sheets interleaved therewith, although the invention is not restricted in any particular character of work sheet or paper.

More specifically, and object of this invention is to provide a slow feed for the carbon sheets so that they may be used with greater economy, that is, so that less length of carbon sheet will be used than of the printed form.

In the printing telegraph machines which have thus far been developed for handling printed forms, it has been common practice to employ paper perforated along its edges so that it can be fed through the machine by the use of sprocket wheels. Multiple copies are usually produced by including with the printed stationery, so-called one-time carbon sheets which are fastened in the folded stationery and fed through the machine with the same. Thus, these carbon sheets are used for a single impression and are then torn off with the printed copy and discarded. Inasmuch as the average carbon sheet may be used repeatedly, the system employed at present results in a waste of carbon paper. This is particularly true when the typing is impressed upon printed forms, in which instance only a small portion of the surface of the carbon paper is utilized.

In accordance with this invention, the carbon sheet is caused to creep with respect to the paper, so that the use of the carbon may be not only repeated but also uniformly distributed throughout the surface of the carbon sheet.

In the suggested arrangement, a carbon holding frame is provided and arranged to clamp one end of the carbon sheet or sheets which feed through the printer along with the printed forms but at a slower rate. To accomplish this, the carbon sheets are pulled along by frictional contact with the printed forms but are restrained from feeding as great a distance by means of gears driven from the platen. A gear ratio is selected to permit feeding of the carbon sheets at the desired rate.

Other objects and features of this invention will appear more clearly from the following description, accompanying drawing and appended claims.

In the accompanying drawing,

Figure 1 is a side view of an apparatus embodying the present invention, and

Fig. 2 is an oblique plan view looking in the direction of the arrows 2—2 in Fig. 1.

The drawing shows a telegraph printer provided with type bars 11 adapted to strike against the paper 12 and a cylindrical platen 13. The platen is advanced step by step for a fraction of a revolution at a time, by means of a line feed mechanism. The line feed mechanism comprises a ratchet 15 attached to the platen, and a pawl 16 for advancing the ratchet. The pawl is mounted upon a pawl arm 17 and is held yieldingly in engagement with the ratchet by a spring 19. The pawl arm 17 is rocked by a bell crank lever 21 connected to the arm 17 by means of a connecting link 22. The bell crank lever is actuated by a pull bar 23, cooperating with a code bar (not shown) which responds to the code impulses received from the telegraph line. The line feed mechanism for the platen 13 is similar to the line feed shown in Fig. 3 of the Pfannenstiehl Patent 1,374,606, issued April 12, 1921. The mechanism for actuating the pull bar 23 will therefore be understood by those skilled in the art without further description. If desired, the platen may be rotated manually by the knob 24.

The paper 12 employed in connection with the printer shown in the drawing is illustrated as being triplicated and each copy is perforated along its edges. The perforated edges cooperate with sprocket wheels whereby the paper may be advanced at an accurate speed selected at the transmitting end of the telegraph line. The fresh paper commences its travel from the stack 25 from where it is pulled into the machine, passing first over a gathering sprocket 26. A spring-pressed roller 27 holds the paper in engagement with this sprocket. Another sprocket 31 is connected rigidly to the platen 13 and serves to advance the three sheets of paper from the stack 25 to the platen 13. Intermediate the gathering sprocket 26 and the feed sprocket 31 the three sheets of paper are separated and each sheet passes freely through a slot 32 in a clamping bar 33. The clamping bars are adjustably secured to each other by two bolts 34. Two sheets of carbon paper 35 are clamped between adjacent clamping bars 32. The carbons are interleaved with the paper from the clamping bars to the free end of the paper which terminates at the guide 37 and cutting knife 38. The carbons are of less width than the paper so that the carbons do not engage the sprocket wheel 31. It will be seen that the paper, being loosely housed within

the clamping bars 33, will not be restrained from motion by the clamping bars but will be advanced at a speed determined by the motion of the sprocket wheel 31. The carbons, on the other hand, are not advanced directly by the sprocket wheel, and are restrained from forward motion by the clamping bars 33.

An arrangement is provided for permitting the clamping bars and consequently the carbons to advance in the direction of the paper but at a considerably reduced rate of speed. The clamping bars are mounted upon frame 41 to which the bolts 34 are secured. A train of reducing gears 43, 44 and 45, respectively, permit the toothed pinion 46 to rotate at a speed determined by but much slower than the speed of the platen 13. The frame 41 is provided with a toother arm held in spring-pressed engagement with the ratchet wheel 46 and is permitted to slide in the direction of the paper at a rate determined by the rotation of the ratchet wheel 46. The carbon and the frame 41 are advanced due to the frictional contact between the carbon and the paper, but the friction is not too great to permit the paper to advance faster than the carbon. When the frame 41 approaches the limit of its motion, the free end of the frame contacts with a switch 50 for closing a circuit which gives an alarm indicating that the carbon needs to be replaced.

To replace the used carbon sheets, the telegraph printer is first disconnected from the line, or the motor stopped, to prevent the printing of any letters while the carbon sheets are being replaced. The bolts 34 are loosened, whereby the rear end of the carbon sheets are released. The front end of the carbons which overlies the guard 37 may be grasped by the hand, and the carbons are pulled forward slightly. The front edges of the new carbons are attached to the rear edges of the old carbons, and the old carbons are then grasped and pulled forwardly until the forward edge of the new carbons is exposed beyond the end of the paper. The old and new carbons are then detached from each other and the rear end of the new carbons is clamped by tightening the bolts 34. The frame 41 is moved upwardly and rearwardly, pulling the new carbons along, and the printer is ready to be started again.

In an alternative method of replacing carbon sheets, the front edge of each carbon sheet is gummed so that it may be moistened and fastened to the rear edge of the partly used sheet when the bolts 34 are loosened. After attaching two carbon sheets in this manner, the frame 41 is pushed to its rearmost position, the carbon sheets sliding between bars 33 so that the front edge of the used carbons stays in its position at tearing edge 38. Then the bolts 34 may be tightened and the machine is again ready for service.

After the printing of a complete form or page, the paper may be torn off by the knife blade 38 and the small amount of used carbon sheet will also be torn off with each set of forms and easily discarded.

This invention is not limited in its application to the embodiment shown in the drawing. While the arrangement is shown as applied to a printer equipped for sprocket feed, it is evident that it will be equally possible to use such an arrangement with a printer equipped for feeding by means of pressure rolls provided the arrangement were such that the pressure rolls made contact with the forms only at their edges so that the carbon sheets which would normally be narrower than the forms would not be clamped in the assembly.

It will be understood furthermore, to those skilled in the art, that the present invention may be applied to typewheel printers as well as to those having typebars.

What is claimed is:

1. In combination, a rotatable platen, a reduction gear system actuated by turning of said platen, a ratchet system operated thereby, said ratchet system comprising a toothed ratchet wheel and a toothed arm held in spring-pressed engagement, so that said toothed arm is released to forward motion at a rate less than the circumferential rate of motion of said platen, and a clamping device, in which are spaced longitudinal, parallel slots, attached to said toothed arm, the alternate slots of said clamping device being subject to closing by the clamping action.

2. In a typewriting machine, a rotatable cylindrical platen, a toothed frame, means responsive to the rotation of said platen tending to advance said frame toward said platen, a ratchet wheel engaging said toothed frame and actuated by a reduction gear train associated with said platen and responsive to rotation thereof, said ratchet wheel limiting the advance of said frame, a clamp member attached to said frame wherein sheets of carbon paper may be clamped, and escapement means associated with said frame permitting its return to a starting position after each full extent of advance.

3. In a manifold copying machine of the stationary carriage type, a cylindrical toothed platen carrying perforated stationery, and carbon paper interleaved with said stationery to permit duplicate copying, said carbon paper being of narrower width than said stationery, and being clamped to a toothed frame in the rear of said platen, the clamping means providing slots for the unimpeded passage of the stationery in proper relation to the carbon paper, said frame being urged towards the platen by frictional contact of the stationery and carbon paper when the stationery is advanced by rotation of said platen and being retarded in its rate of advance by a ratchet wheel engaging said toothed frame, said ratchet wheel being responsive through a reduction gear train to rotation of said platen.

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