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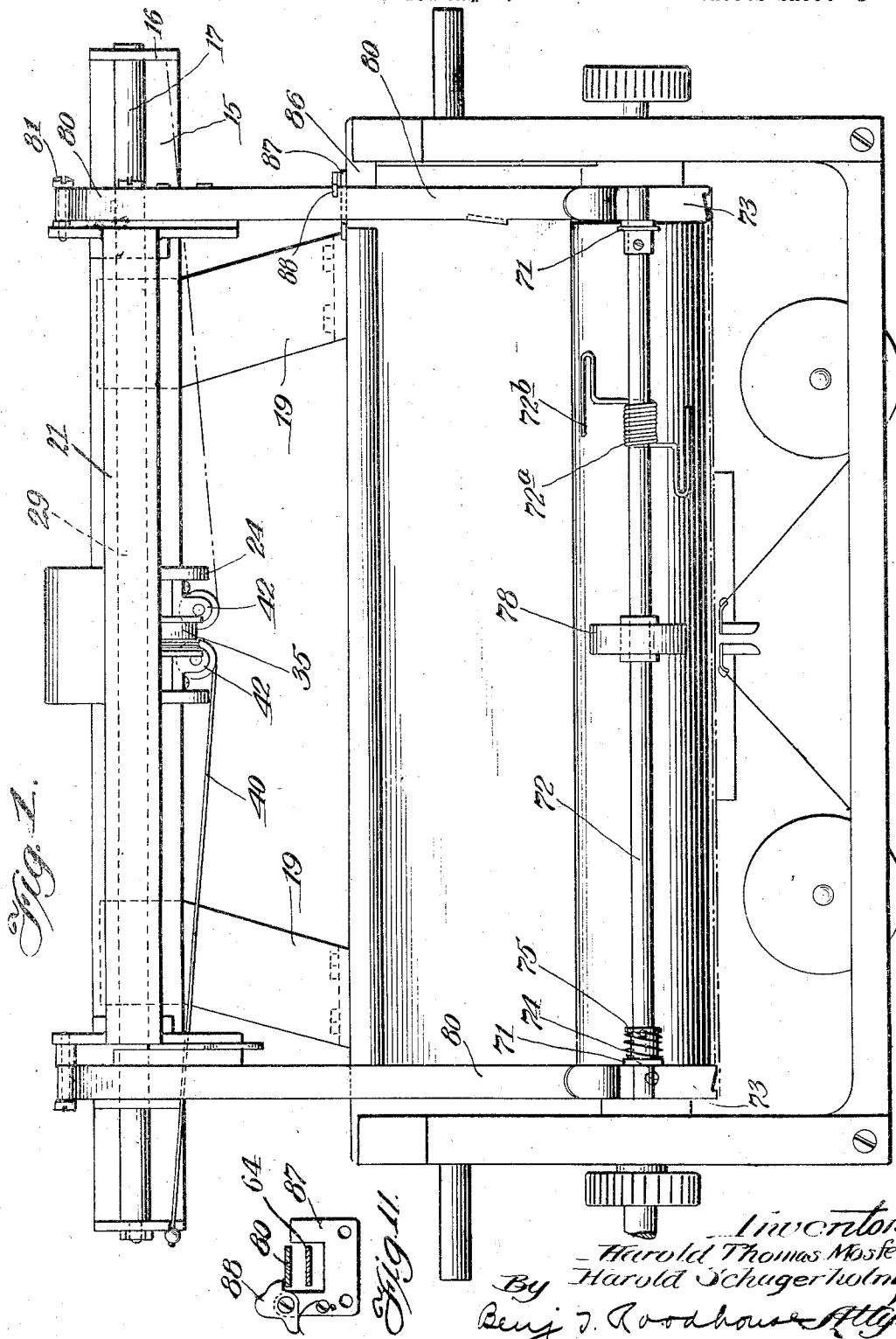
H. T. MOSFELT ET AL.

1,961,906

MANIFOLDING ATTACHMENT FOR TYPEWRITERS

Filed May 5, 1932

4 Sheets-Sheet 1



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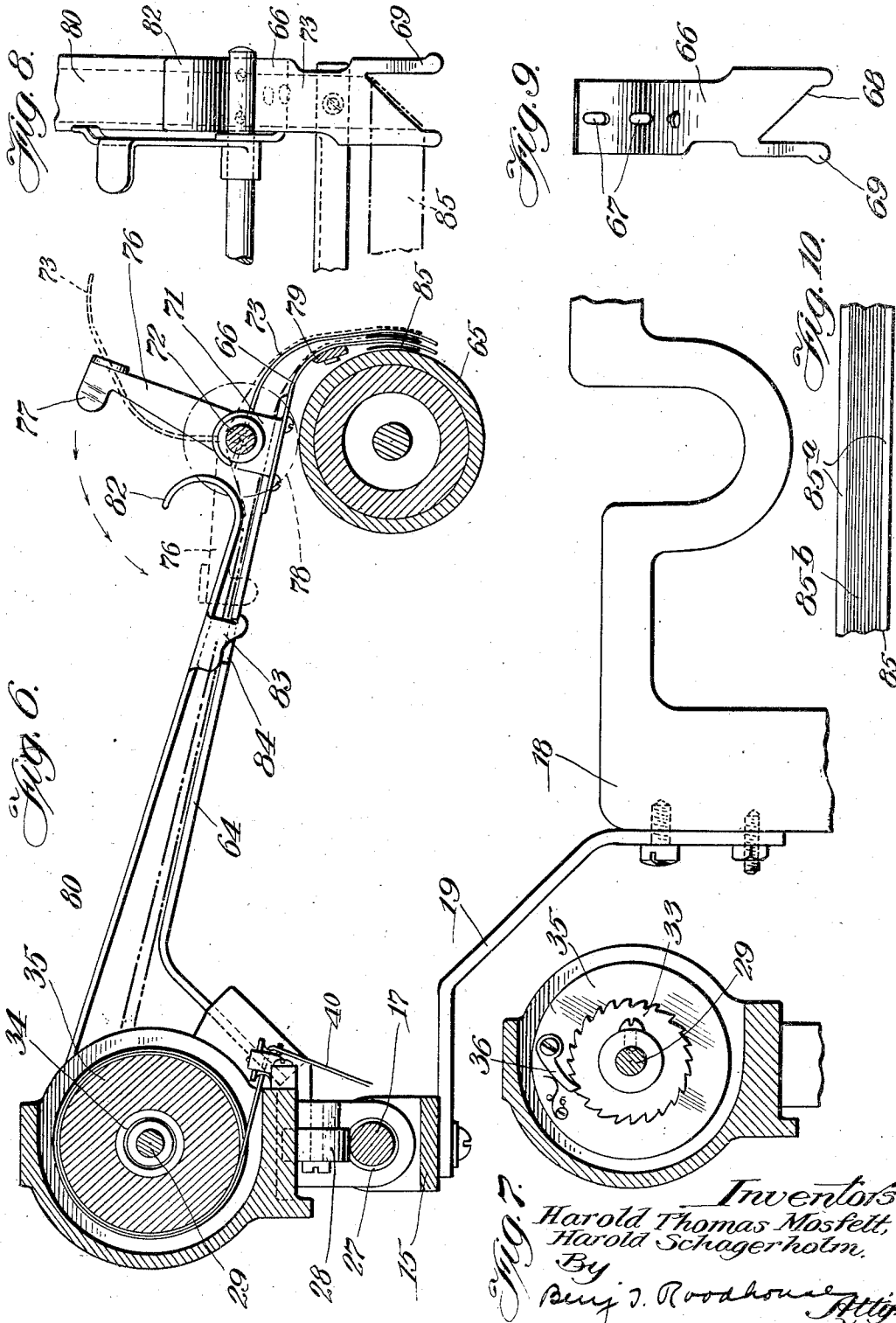
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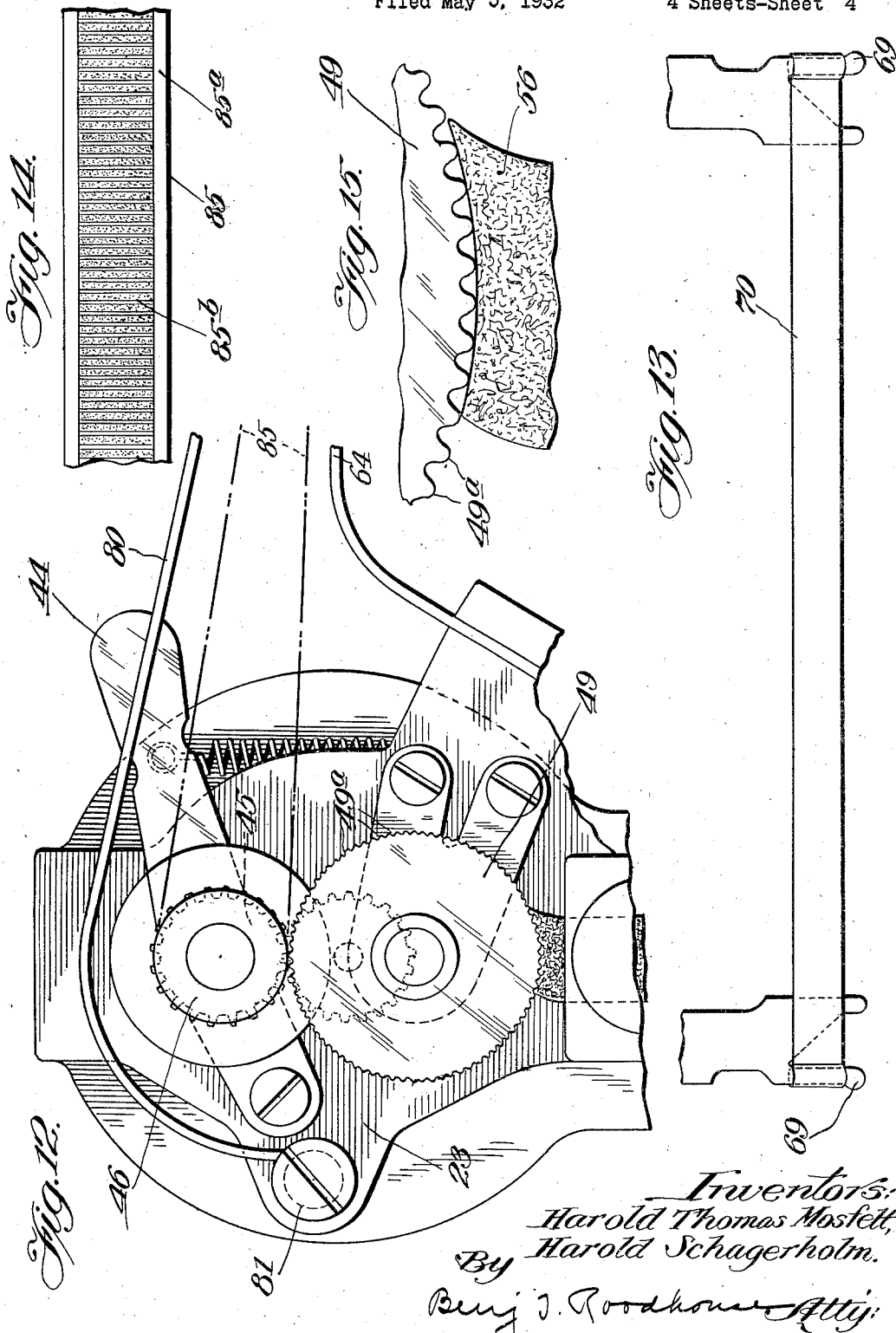
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UNITED STATES PATENT OFFICE

1,961,906

MANIFOLDING ATTACHMENT FOR
TYPEWRITERS

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5 Claims. (Cl. 197—153)

Our present invention has relation to the provision of a manifolding attachment for typewriters which will permit and secure the production of a plurality of copies of the transcribed matter without the necessity of employing manifolding paper. Our objects in the production of the present apparatus were the simplifying of the structure and particularly the simplifying and improvement of the feed of the inked or printing ribbon.

We have also greatly improved the ribbon for such an apparatus in that we have coated the edges of our ribbon with an ink-repelling substance which prevents the fraying of the edges of the ribbon and greatly diminishes the tendency of the ribbon to smut or discolor the paper between which it is fed, and we have also embodied in our mechanism means for supplying to the ribbon the requisite amounts of ink and properly distributing the ink supplied so that an uneven distribution of ink will be avoided and the mechanism will be capable of much longer operation as the type of the typewriter do not come in contact with the manifolding ribbon, and the contact of the type with the ribbon is the chief cause of ribbon wear and destruction.

We have also assembled our manifolding attachment with the typewriter in such a manner as to reduce relative movement between the attachment and the platen carriage of the typewriter, and to permit the use of the typewriter with the attachment in connection with a folding typewriter desk without disaster.

We have attained the foregoing objects, together with other refinements of construction and modes of operation which will hereafter be apparent, by means of the structure illustrated in the accompanying drawings, in which—

Fig. 1 is a fragmental plan of a typewriting machine without manifolding attachment associated therewith.

Fig. 2 is a front elevation, partially in section, of our manifolding attachment.

Fig. 3 is a vertical section, looking in the direction of the arrows, on line 3—3 of Fig. 2.

Fig. 4 is a fragmental detail of the ribbon feeding gear train on the left end of the attachment.

Fig. 5 is an end elevation of the right end of the manifolding attachment.

Fig. 6 is a central vertical section on line 6—6 of Fig. 2 showing the ribbon separating means in separated position in dotted lines.

Fig. 7 is a fragmental vertical section showing the end of the cable drum with the pawl

carried thereby and the ratchet co-operating with the pawl and the shaft to which the ratchet is secured.

Fig. 8 is a fragmental front elevation of the ribbon guide fingers. 60

Fig. 9 is a rear elevation of a ribbon guide finger plate.

Fig. 10 is a fragmental plan of a piece of inked ribbon.

Fig. 11 is a fragmental detail of the releasable latch for holding the manifolding attachment in operative relation with the platen carriage of the typewriter. 65

Fig. 12 is a fragmental end elevation similar to Fig. 3 to an enlarged scale illustrating particularly the ink feed. 70

Fig. 13 is a fragmental schematic illustration of the ribbon shield.

Fig. 14 is a plan of a portion of the ribbon illustrating the deposition of ink from a single application by the knurled edge of the ink roller 49; and 75

Fig. 15 is a fragmental schematic illustration of the co-action between the inking wick and inking roller. 80

Similar reference characters refer to similar parts throughout the respective views.

Our manifolding attachment comprises a carriage adapted to move parallel to and concurrently with the platen carriage of a typewriter and to support such a carriage we provide a flat bar 15, the ends whereof are turned up, as at 16. Suitably secured in and extending between the turned up ends 16 of the bar 15 is a round bar or track 17. The flat bar 15 is secured to the rear upper portion of the main frame of a typewriter 18 by means of straps 19, as most clearly shown in Figs. 1 and 6. 85

The frame of the carriage of the manifolding attachment may be economically cast from light metal in an integral piece, and, as clearly shown in Fig. 2, comprises the lower and upper longitudinal rails 20 and 21, connected at their ends by the webs 22 and 23 and in the center by the spaced webs 24 and 25. Depending from the bottom longitudinal rail 20 are the brackets 26, the lower ends of which are bored, as at 27, to permit the passage of the rail 17, and the upper portions of which are split to receive the anti-friction bearings of the wheels 28 which ride upon the rail 17. The transverse frame webs, 22 to 25 inclusive, are bored to permit the passage of the shaft 29, the bores in the webs 22 and 23 being sufficiently large to accommodate anti-friction bearings 30 for the shaft 29 while 110

the bores in the webs 24 and 25 are sufficiently larger than the shaft 29 to permit its rotation therein without contact. Fixed by set screws, or in any other suitable manner, to the shaft 29, between the webs 24 and 25, are collars 31 and 32. One end of the collar 32 is somewhat reduced to receive the ratchet wheel 33 which is pressed on the reduced end of the collar or fixedly secured thereto in any other suitable way.

Mounted upon the shaft 29 between the collars 31 and 32 upon anti-friction bearings 34 is a drum 35, upon the face of which adjacent the ratchet wheel 33 is a spring pressed pawl 36. Surrounding the shaft 29 between the web 24 and collar 31 is a coiled spring 37, one end whereof is attached to the web 24, at 38, and the other end whereof is attached to the drum 35, at 39. The tension of the spring 37 is such as to tend to rotate the shaft 29 in the direction permitted by the action of the pawl 36 so that when the shaft is rotated by the pawl the spring is wound up.

One end of a cable 40 is secured to the drum 35 by knotting the same and running it through a slot in a side flange of the drum, as indicated at 41 in Fig. 2. A length of the cable is then wound around the drum and passed over a sheave 42, pivoted beneath and to one side of the drum upon the lower frame member 20. From thence the cable is carried to a securing slot in either of the turned up ends 16 of the flat bar 15. In Fig. 2 we have shown the cable extending to the left end of the bar 15. With such an arrangement the spring 37 winds the cable 40 upon the drum 35 as the carriage moves to the left in the normal use of the typewriter and when the frame is returned to the right to begin a fresh line the drag of the cable rotates the drum and through the pawl 36 and ratchet 33 rotates the shaft 29 to feed the ribbon by mechanism yet to be described.

As will be seen by reference to Fig. 2 we have placed an additional sheave 42 to the right of the drum so that the cable 40 may be secured to the right instead of the left end of the flat bar 15. When the cable is so secured to the right end of the bar 15 the cable is pulled from the drum and the shaft 29 rotated during the normal progress of the carriage to the left when typing is occurring, and the spring winds the cable upon the drum when the carriage is returned to the left to start a fresh line. The later mode of arrangement puts a slightly greater load upon the mechanism of the typewriter for feeding the platen carriage, but for certain varieties of work and with certain operators is preferred. As will be clearly seen, either arrangement is possible without complication of the structure or its functions and without additional expense.

On the left hand end of the shaft 29, beyond its journal in the transverse web 23, is provided a gear 43, shown in Figs. 2, 3 and 4. Pivoted to the outer face of the transverse web 23 adjacent the top and to one side of the gear 43 is a lever arm 44, intermediate the ends of which is journaled a gear 45 and ribbon pulley 46, which are fixedly secured together. The gear 45 is broader than the gear 43, and journaled in a bracket 47, secured to the transverse plate 23, is a third gear 48 to which is likewise fixedly secured a roller, this time an inking roller, 49.

The positioning of the gear 48 is such as to bring its topmost portion in horizontal alignment with the topmost portion of the gear 43 so that when the lever 44 is moved to bring the gear 45

into co-action with the gear 43, it will also be brought into co-action with the gear 48. A spring 50 is provided between a pin 51, extending from the lever arm 44, and a point of attachment or screw 52 upon the plate 23 which normally maintains the gears 43, 45 and 48 in engagement. The ribbon pulley 46 and inking roller 49 are so proportioned as to be held in yielding contact by the spring 50 when the gears 43, 45 and 48 are meshing.

The left end of the horizontal frame member 20 is enlarged and bored to provide an ink reservoir 53 and the frame member 20 is further transversely bored and provided with a screw plug closure 54 so that by removing the closure the reservoir may be readily filled. The left hand end of the reservoir is also closed by a screw plug closure 55 and a slot is provided in the lateral wall of the reservoir directly beneath the lowermost portion of the inking roller 49 for the passage of a wick 56 from the reservoir to the roller 49. The wall of the reservoir opposite to that through which the wick extends is bored and provided with a screw plug closure 57 which permits of the insertion and arrangement of a spring 58 for pressing the wick yieldingly against the inking roller 49.

It will be noted that the feeding of the ribbon takes place when the carriage is moving in but one direction, which renders both the feeding and the inking intermittent. We have found that the use of an inking roller 49 with a plane or smooth inking surface permits the ink fed to it through or by the wick 56 to accumulate on the roller during the intervals when the inking roller is not rotating and such an accumulation of ink upon parts of the surface of the inking roller produces an unequal distribution of the ink upon the ribbon and likewise an unequal and ununiform impression from the type through the ribbon.

In order to secure an equal distribution of ink by the inking roller 49 to the roller we knurl or cut its surface to provide transverse ribs or corrugations 49a, the tops of which only touch the wick 56 and therefore provide much less surface for an accumulation of ink thereon. The ridges 49a also act in another and equally important manner in that it is practically impossible to synchronize the feed of the ribbon with the rotation of the inking roller so that the tops of the ridges contact each successive time with the same area of the ribbon, which results in the disposition of small quantities of ink on changing spaced areas of the ribbon and in a more uniform and less blotch-producing distribution of the ink to the ribbon.

Secured to the opposite or right hand end of the shaft 29, as most clearly shown in Fig. 5, is a ribbon pulley 59. The pulley 59 is on the outside of the transverse plate 22, and also pivoted to the outer face of the plate 22 at the intersection of its head and staff is a T-shaped lever arm 60. To the ends of the head of the T are secured headed pins 61 and to the staff of the T is secured a spring 62, the other end whereof is secured to the plate 22. By feeding a bight of the ribbon over one of the pins 61 and under the other, a very compact ribbon take-up is secured which has considerable capacity and occupies very little room.

Secured to lateral developments 63, from the respective end webs 22 and 23, are the lower ribbon guides 64, which project forwardly and downwardly, as most clearly shown in Fig. 6, to bring their forward ends closed adjacent to and parallel

with the line where the typewriter keys co-operate with the platen 65 of the typewriter.

While the lower ribbon guide 64 may be extended integrally as above described, we prefer to terminate the metal of the guide 64 above the platen and to provide the requisite extension in a separate piece 66 conveniently designated as a ribbon finger or hand. This ribbon finger or hand is preferably made, as shown in Figs. 8 and 9, with elongated slots 67 by means of which the finger may be adjustably related to the part 64 of the ribbon guide. A recess with an angular bottom 68 is made in the end of the ribbon finger for receiving the ribbon and directing it across the platen. The metal of the finger upon the edge of the slot opposite to the direction of the ribbon is provided with a ball-like development 69 for retaining a detachable ribbon shield 70 to be placed in position in front of the manifold folding ribbon when it is desired only to use the back instead of both surfaces of the manifold folding ribbon for producing copies. Such a shield may be formed by suitably impregnating with non-absorptive material a ribbon of fabric with looped ends to go over the portion 69, as shown in Fig. 13.

Upstanding lateral projections 71 are provided upon the inside forward ends of the ribbon guides 64 and extending between the projections 71, and through perforations or journaled therein, is a shaft 72. To the ends of the shaft 72 are secured ribbon fingers or hands 73 substantially the same as the ribbon fingers or hands 66. A spring 74 and collar 75 are provided to yieldingly maintain the ribbon fingers or hands 73 adjacent the ribbon fingers or hands 66 and to separate these pairs of ribbon fingers or hands we provide the arm 76 fixed to the shaft 72 and with the latch tang 77 for latching with the ribbon guide 64 for maintaining the pairs of ribbon fingers or hands in separated position when they may be desired.

The upstanding projections 71 are slotted through from their central perforations to their edges, as at 71a, so that by rotating the shaft 72 to the proper position the fingers or hands 73 may be drawn through the slot 71a, thereby permitting the removal of the shaft 72 with the parts associated therewith from its bearings without disassembling the ribbon fingers or hands and the paper holding attachments therefrom.

A paper guide roller 78 may be advantageously associated with the shaft 72 and located in the center thereof. Also a tearing bar 79, as clearly shown in Fig. 6, may be advantageously associated with the ribbon fingers or hands 66 for separating the manifolded copies without removing the roll of paper from the machine.

We have also shown in connection with the shaft 72 an extremely simple and effective paper holding device consisting of a piece of spring wire 72a wound about the shaft 72 with its ends extended to provide paper holding arms 72b. Each arm may be adjusted in desired paper holding position about the shaft 72 by pressing it in a direction opposite to the convolution of the wire about the shaft 72. Any force applied to the arms in an opposite direction is ineffective to move them as such force causes the coiled wire to bind upon the shaft.

The upper ribbon guide members, or ribbon guide covers 80 are pivoted to the outer faces of the end webs 22 and 23, at 81, as most clearly shown in Figs. 3 and 5, and extend forwardly with turned-up finger grasping ends 82, as most

clearly shown in Fig. 6. Lateral tangs extend downwardly from the inner edges of the covers 80, as at 83, and slots 84 co-operating with the tangs 83 are provided in the lower ribbon guide members 64. The cover pieces 80 are of light flexible metal and through flexing them, by manipulation of the turned-up ends 82, the latch formed by the tangs 83 and the slots 84 may be readily engaged and disengaged.

The ribbon which we prefer to employ with our present apparatus is of the endless type, or with the ends thereof secured together, as mentioned in the application for patent filed by us on the 28th day of December, 1931, Serial No. 533,472. The path of the ribbon may be seen from a consideration of Figs. 1, 3, 5, 6 and 8. The ribbon 85 next to the platen proceeds from the lower edge of the pulley 59 on the right hand end of the apparatus forwardly through the guide member 64 to the guide hand or finger 66 located at the forward end thereof. The ribbon then changes its direction at right angles, as shown in Fig. 8, and passes in front of the platen, as shown in Fig. 6. The ribbon then is turned at right angles and proceeds backwardly through the guide member 64 on the left hand of the machine between the inking roller 49 and the ribbon pulley 46 and around the pulley 46 and thence backwardly retracing its path except this time it passes over the shaft 72 and through the guide hands 73 instead of 66. The upper strand of the ribbon passes over the upper tensioning pin 61 and under the lower tensioning pin 61 and around the ribbon pulley 59 to its place of beginning.

The special ribbon which we have designed for use with this machine is shown in Fig. 10. The margins 85a thereof we impregnate with a solution of a colloided material, such as nitrate or acetate of cellulose, which solution contains an ingredient having a waxy or unctuous characteristic which will be repellent to ink supplied through the roller 49 to the central path 85b of the ribbon. Such a ribbon has its margins protected from abrasion and we have found that it is possible to feed such a ribbon between the layers of paper used upon the machine without causing the transference of ink from the ribbon to the paper except at the places where the type strike.

The apparatus, as heretofore described, will cooperate very nicely with a typewriter under normal conditions. It will, however, be seen that the point of interaction between the typewriter and the manifolding attachment is at the front end of the ribbon guides between the ribbon guides and the platen. When the apparatus is associated with mechanical writing machinery the work is continuous and at high speed, and considerable vibration between the manifolding attachment and the typewriter is liable to occur. To reduce this as far as possible we secure to the rear longitudinal platen carriage rail 86 the latch, most clearly shown in Fig. 10, comprising a recessed plate 87 adjacent one edge of the recess in which is secured a spring pressed latch 88, which detachably secures the ribbon guide members 64 and 80 which enter the slot in the plate 87 when the manifolding attachment is in operative relation with the typewriter. By providing the above described latch mechanism the point of juncture between the manifolding attachment and platen carriage is moved considerably nearer to the point of support of the manifolding attachment which very materially reduces any

relative movement between the platen carriage and the manifolding attachment.

It will be noted that the recess in the plate 87 is quite as effective in reducing relative movement between the manifolding attachment and platen carriage while the typewriter is being operated without the latch member 88 and the special reason for the spring pressed latch 88 is to permit the use of a typewriter and manifolding attachment with the variety of typewriter desk which drops the typewriter backwardly in shut-up or closed position. The spring pressed latch 88 holds the manifolding attachment to the platen carriage when the typewriter is so shifted.

Having described our invention what we claim as new and desire to secure by Letters Patent is:

1. A manifolding attachment for typewriters comprising a rail, a carriage supported by and movable upon said rail, a shaft rotatably mounted in said carriage, a drum rotatably mounted on said shaft, a ratchet fixedly mounted on said shaft, a pawl carried by said drum coacting with said ratchet, a spring co-operating between said carriage and said drum to rotate said drum in the direction permitted by said pawl, a cable co-operating with said drum and carriage for rotating said drum in the opposite direction, ribbon holding and guiding means mounted upon said carriage and means actuated by said shaft for feeding said ribbon.

2. In a manifolding attachment for a typewriter a reciprocable carriage, a shaft rotatably mounted therein, a ribbon pulley mounted on one end of said shaft, a gear mounted upon the other end of said shaft, a gear and ribbon pulley fixedly related with respect to each other and mounted upon said carriage so as to be capable of movement into and out of co-action with said first mentioned gear, a third gear and inking roller fixedly related with respect to each other and mounted upon said carriage so as to be thrown

into and out of co-action with the movable ribbon pulley and gear upon the movement thereof.

3. In combination with a typewriter having a movable platen carriage, a manifolding device comprising a carriage mounted to move concurrently with the platen carriage of said typewriter, ribbon holding and guiding mechanism mounted upon the carriage of said manifolding device and mechanism including a pair of opposed rollers, a train of gears for driving said rollers in opposite directions and means for moving said rollers into and out of co-operation and said gears into and out of train for feeding a ribbon through the holding and guiding means of said attachment.

4. In combination with a typewriter having a movable platen carriage, a manifolding attachment consisting of a carriage mounted to move concurrently with the platen carriage of said typewriter, ribbon holding and guiding means mounted upon said last mentioned carriage, and ribbon feeding and inking means co-acting with said holding and guiding means comprising a pair of rollers driven in opposite directions and means for throwing said rollers into and out of conjoint co-operation with said ribbon, and means for actuating said feeding and inking means operated by the reciprocation of said carriage.

5. In combination with a typewriter having a movable platen carriage, a manifolding attachment comprising a carriage mounted to move concurrently with said platen carriage, ribbon guiding and feeding mechanism associated with the carriage of said attachment, an ink reservoir associated with the carriage of said attachment and means comprising a pair of rollers driven in opposite directions, and means for throwing said rollers into and out of conjoint co-operation with said ribbon for the distribution of ink from said reservoir to the ribbon of said attachment.

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