

Sept. 14, 1937.

G. M. SACERDOTE

2,092,780

MEANS FOR PREVENTING SMUDGING BY INTERLEAVED PRINTING RIBBONS

Filed Aug. 10, 1934

4 Sheets-Sheet 1

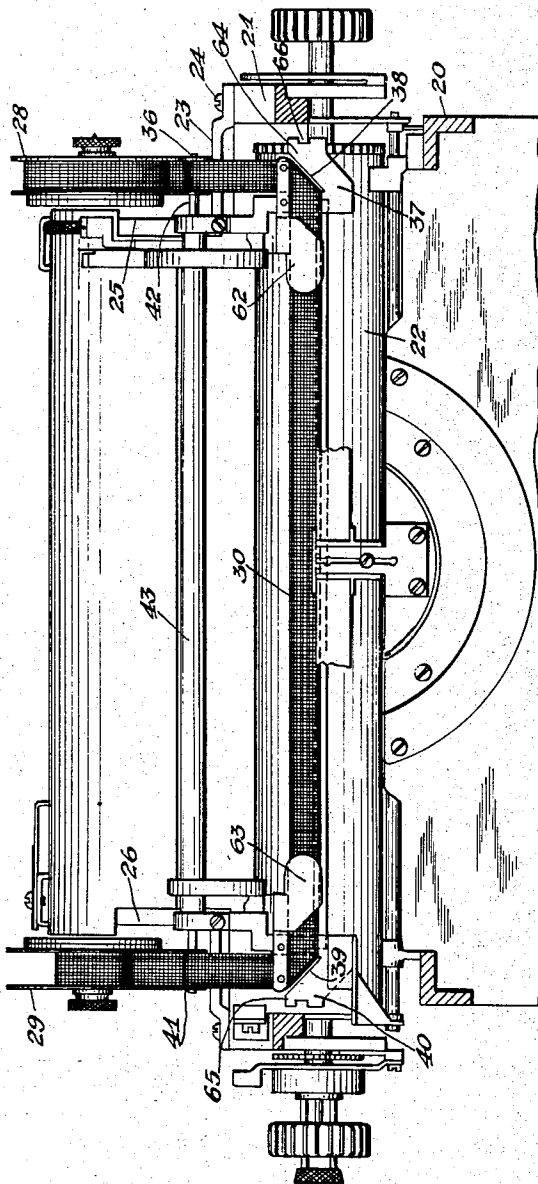


Fig. 1

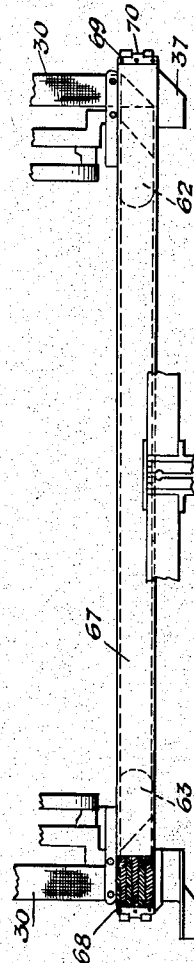


Fig. 14

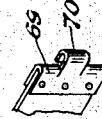


Fig. 15

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4 Sheets-Sheet 2

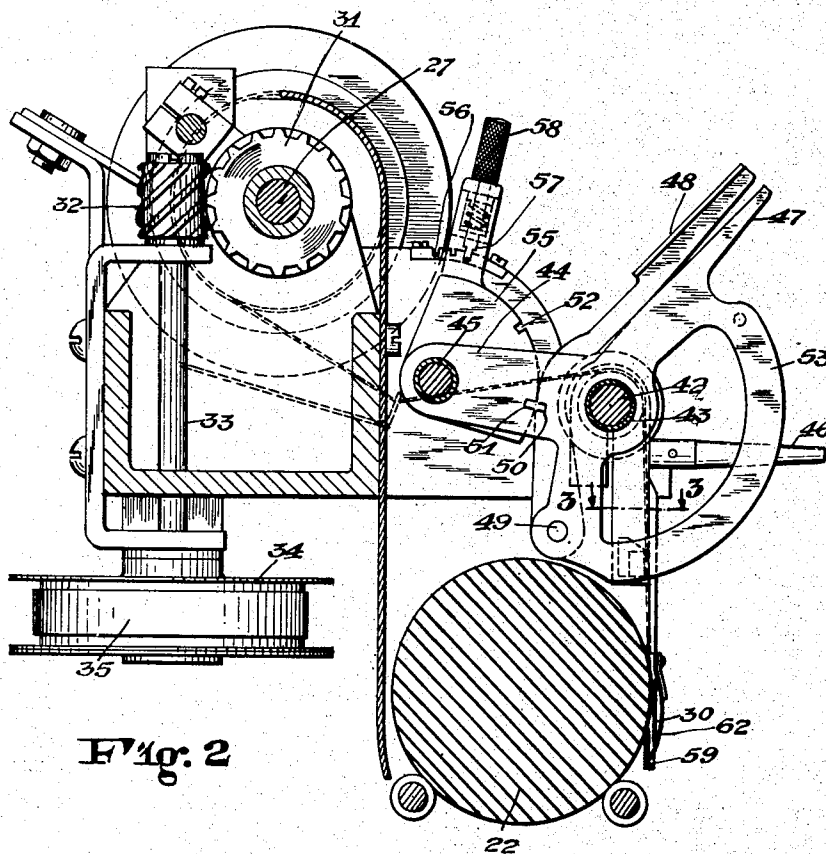


Fig. 2

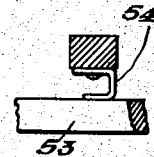


Fig. 3

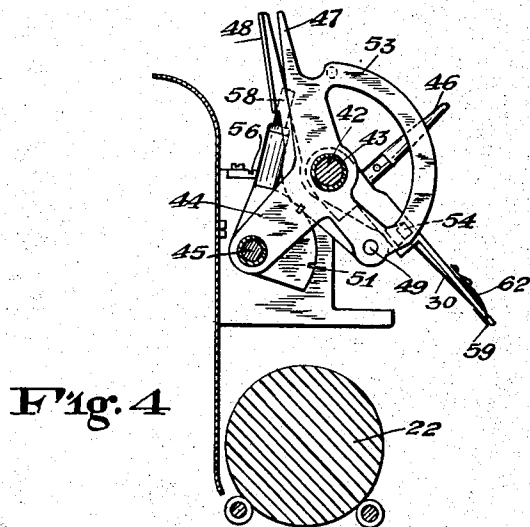


Fig. 4

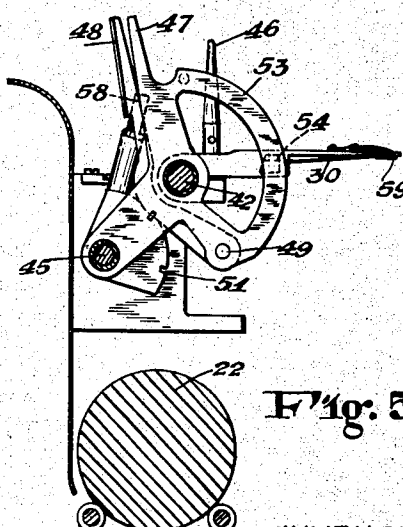


Fig. 5

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4 Sheets-Sheet 3

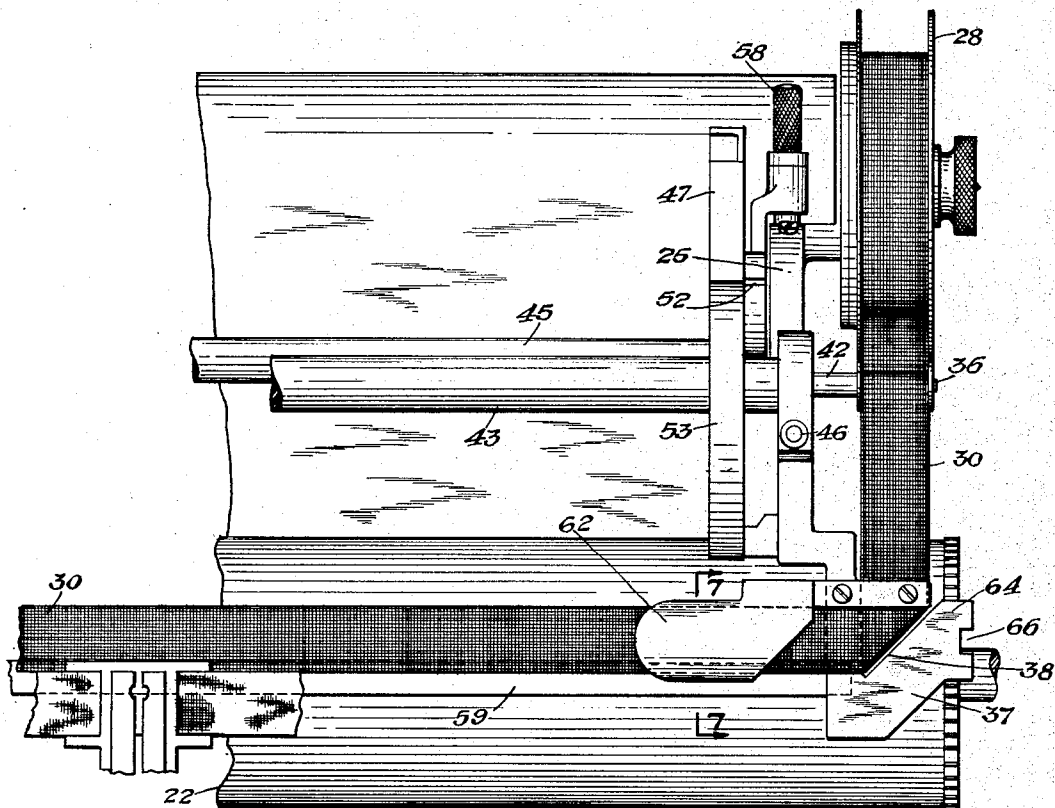


Fig. 6

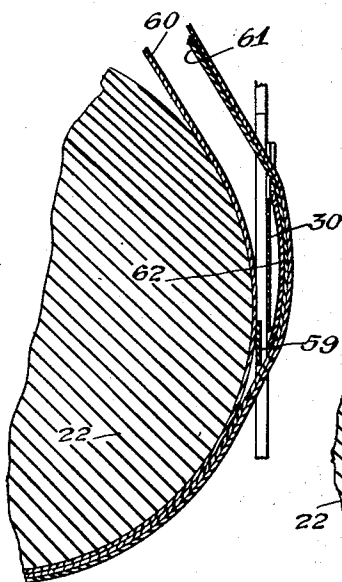


Fig. 7

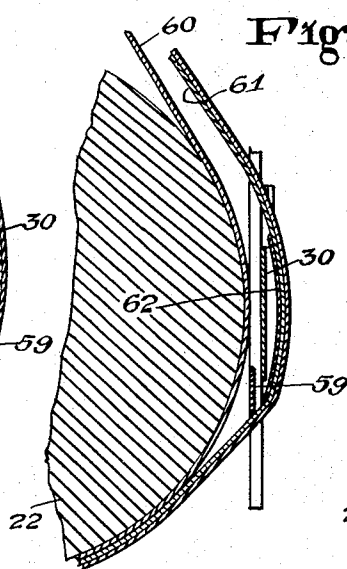


Fig. 8

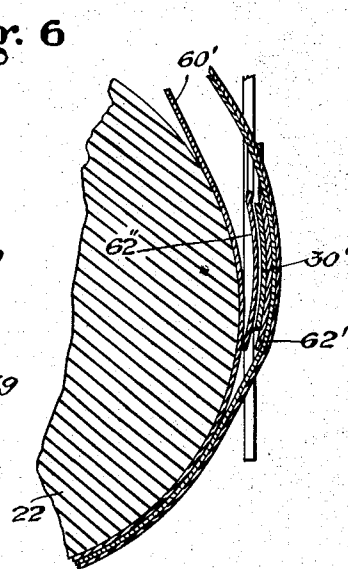


Fig. 9

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4 Sheets-Sheet 4

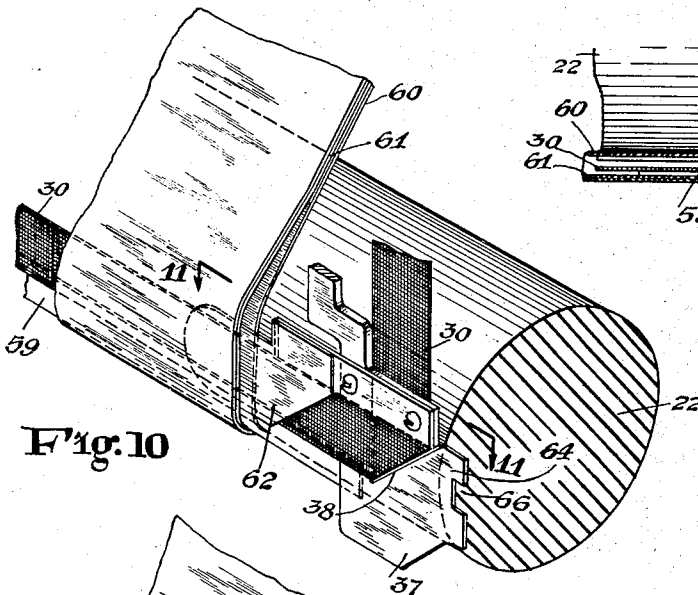


Fig. 10

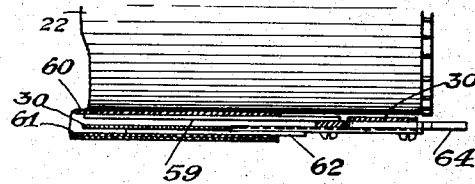


Fig. 11

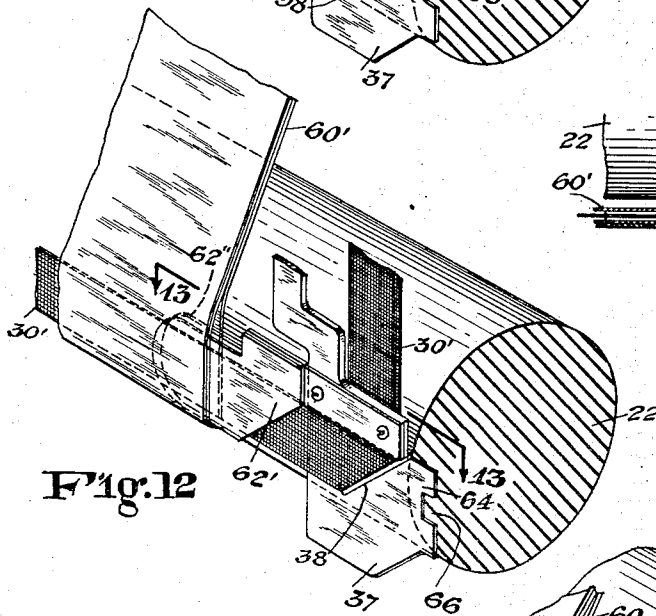


Fig. 12

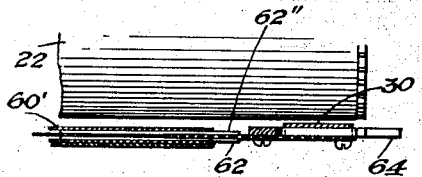


Fig. 13

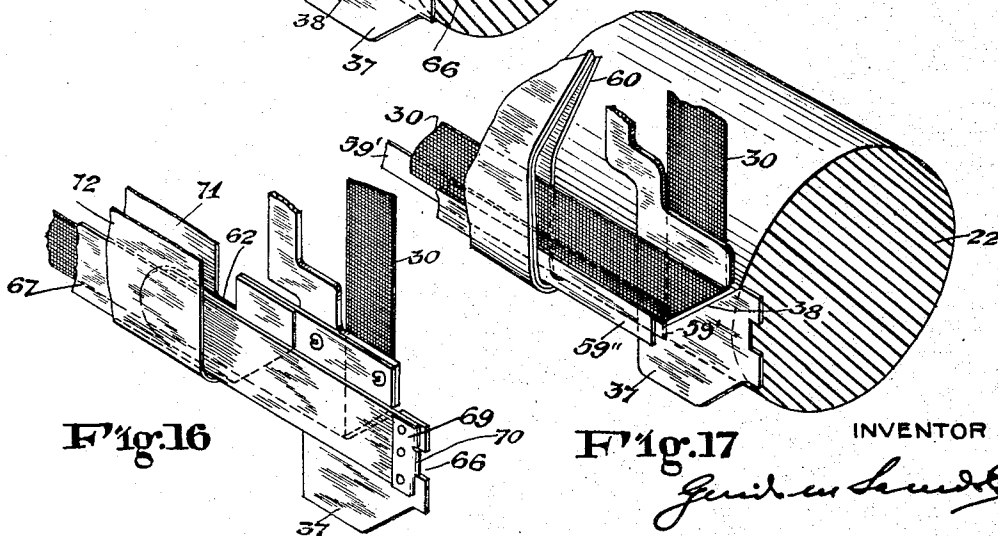


Fig. 16

Fig. 17

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UNITED STATES PATENT OFFICE

2,092,780

MEANS FOR PREVENTING SMUDGING BY
INTERLEAVED PRINTING RIBBONS

Guido M. Sacerdote, Bayside, N. Y.

Application August 10, 1934, Serial No. 739,249

4 Claims. (Cl. 197—153)

This invention relates to copy producing and manifold devices for typewriters and like machines where a printing ribbon, or ribbons, are employed in lieu of carbon sheets for producing copies. More particularly the invention refers to improvements for preventing smudging of the paper sheets by the ribbon, or ribbons, due to rubbing of their contacting surfaces during advancing movements of either the ribbon, or ribbons, or the paper sheets, or both.

In manifold devices for typewriters, such as described for instance in two other patent applications filed by me, entitled Ribbon advancing mechanism filed July 6, 1934, Serial No. 734,016 and Reversible ribbon feed mechanism filed July 6, 1934, Serial No. 734,015, copending herewith, at least an auxiliary ribbon is employed besides the ribbon forming part of the standard equipment of a typewriting machine, said auxiliary ribbon being caused to run in front of the platen for the entire length thereof in correspondence of the printing line. Said auxiliary ribbon is usually inserted between two copy sheets, the front sheet being transparent so that when the keys are struck two copies are thereby simultaneously produced.

Means must be provided for advancing the auxiliary ribbon at a rate sufficient to prevent its becoming dry, since it is well known that for a ribbon to retain its effectiveness it must be allowed to regenerate by contact with the portion thereof which was previously wound upon a reel.

The feed of the auxiliary ribbon may be step by step, following the striking of each key, but is more generally effected by advancing the ribbon a material distance each time the carriage is returned to the starting point. In either case, I have found that the ribbon feed must not fall below a certain minimum if the clarity of the printing is to be retained for the entire length of the line. This advancing movement of the ribbon, which, as stated, is usually interleaved between two sheets, causes the ribbon to rub against the surfaces of the sheets and this frequently results in the copies being smudged and rendered partly or totally unfit for use.

This drawback has been found to be serious enough to materially interfere with the adoption of ribbon-equipped manifold devices. As a result of numerous experiments I have found that smudging occurs mostly along the edges of the sheets, the central part thereof being generally free from it.

The primary object of this invention accordingly is to provide in a device of the character

specified, novel and improved means for preventing smudging of copy sheets by a printing ribbon interleaved therebetween.

Another object is to provide extremely simple and effective means for protecting the edges of copy sheets from contact with a printing ribbon interleaved therebetween, said means being such as not to interfere with the advancing movement of the ribbon itself.

Other objects and advantages of the present invention will more fully appear as the description proceeds and will be set forth and claimed in the appended claims.

My invention is illustrated by way of example in the accompanying drawings, in which:

Fig. 1 is a fragmentary front vertical section through the top of the frame of a typewriting machine, equipped with a manifold attaching embodying my invention;

Fig. 2 is a cross vertical section of the same in an enlarged scale;

Fig. 3 is a detail horizontal section through line 3—3 of Fig. 2;

Fig. 4 is a detail cross section showing the ribbon guiding means in a position different from that shown in Fig. 2;

Fig. 5 is a similar view showing said ribbon-guiding means in still another position;

Fig. 6 is a fragmentary front view in elevation, in an enlarged scale, illustrating the ribbon guiding means at one side of the device, equipped with means for preventing smudging of the copy sheets;

Fig. 7 is a detail cross section through line 7—7 of Fig. 6, showing the printing ribbon in one of its printing positions;

Fig. 8 is a similar view showing the printing ribbon in another of its printing positions;

Fig. 9 is a similar view illustrating a somewhat different construction of the means for preventing smudging;

Fig. 10 is a fragmentary view in perspective of the device shown in Fig. 6;

Fig. 11 is a detail horizontal section through line 11—11 of Fig. 10;

Fig. 12 is a fragmentary view in perspective of the arrangement shown in Fig. 9;

Fig. 13 is a detail horizontal section through line 13—13 of Fig. 12;

Fig. 14 is a detail front view in elevation, illustrating the use of a strap for preventing back-printing by the auxiliary ribbon;

Fig. 15 is a detail view in perspective of the means for attaching said strap in position;

Fig. 16 is a detail view in perspective showing

said strap applied to the arrangement of either Fig. 10 or Fig. 12; and

Fig. 17 is a detail view in perspective illustrating another modified construction of smudge preventing means, also embodying my invention.

Referring to Figs. 1 to 8, 10 and 11, 20 designates the frame of an Underwood typewriter, on which is mounted a carriage 21, carrying the platen 22. On said carriage is mounted a manifold attachment frame 23, secured onto the carriage at each end thereof by means of screws 24. Said attachment frame is formed with two side uprights, 25, 26, and a shaft 27 runs across said uprights and carries at each end one of the auxiliary ribbon reels 28, 29.

A clutch mechanism (not shown), such as described for instance in my other two patent applications above referred to, is provided, whereby one or the other reel may be operatively connected to said shaft so as to function as a take-up reel for the ribbon 30, while the other functions as a paying reel. The shaft is rotated always in the same direction by some suitable driving mechanism, operative during the return movement of the carriage.

For instance, the driving mechanism may include a worm wheel 31 mounted on the shaft, a worm 32 mounted on a vertical shaft 33, and a drum 34, also mounted on said shaft, actuated by a tape 35 attached at one end to the typewriter frame; a unidirectionally operative clutch device (not shown) being interposed between drum 34 and shaft 33, causing said drum to drive said shaft when the typewriter carriage is moved to the line starting position.

The driving mechanism also has been fully described in my other two patent applications above referred to, and like the ribbon feed mechanism is shown and described here only by way of example in order to assist in better understanding the invention. It will be understood, however, that any suitable driving and ribbon feeding mechanisms can be used, these mechanisms not forming a part of the present invention.

As clearly shown in Fig. 1, the auxiliary ribbon 30 runs from one of the reels, 28, over an idler roller 36 at the front, then downwardly to the guide member 37, having a 45° deflecting slot 38, then horizontally along the platen in correspondence of the writing line to another deflecting slot 39, provided in a guide member 40 at the other end, then upwardly to another guiding roller 41, and reel 29. It is thus seen that by virtue of this arrangement the take-up reel will pull the auxiliary ribbon along the writing line each time the ribbon feed is operative, the other reel paying the ribbon in accordance with the angular movement of the take-up reel.

In the arrangement shown, ribbon guiding members 37, 40 form part of an articulated ribbon guiding structure, which makes it possible to easily move the ribbon in and out of its operative position in order to facilitate its insertion between and removal from the copy sheets. Said ribbon guide members are fixed on a common shaft 42, which is rotatably mounted through a tubular member 43, extending between and rigidly connecting two arms to each other, such as shown at 44, in Fig. 2, said arms being pivotally mounted at 45 onto the frame uprights 25, 26.

The frame consisting of the two arms 44 and tubular connection 43, and the frame consisting of shaft 42 and two ribbon guide members 37, 40, together form a knee joint structure, which permits swinging movement of guide members 37,

together with shaft 42 about the axis of said shaft 42. The frame formed by ribbon guide members 37, 40 and shaft 42 may be operated by means of fingers, such as 46, forwardly extending from each of member 37, 40, whereas the frame formed by the two arms 44 and tubular connection 43 may be operated by means of an extension 47 integral with one of said arms.

Said extension is so shaped that by applying the thumb thereagainst, and pressing the first finger against the spring pressed lever 48, pivoted at 49 to the lower extension of arm 44, a tooth 50, carried by said lever 48, can be disengaged from a notch 51, in order to make it possible to swing the frame formed by said two arms 44 and tubular connection 43 from the normal operative position, shown in Fig. 2, to the position shown in Figs. 4 and 5, where tooth 50 can engage another notch 52.

Each arm 44 is preferably formed integral with a segmental portion 53, concentric with tubular connection 43, said segments functioning as friction shoes, adapted to retain guide members 37, 40, at any angular position with respect to arms 44. To this end, said guide members are each provided with a spring contact member 54, better shown in Fig. 3, pressing against the surface of corresponding friction shoe 53, so that the frame formed by guide members 37, 40, and shaft 42, may be set at its lowermost position, shown in Fig. 2, or at any other angular position along friction shoes 53, as shown for instance in Fig. 5.

The notches 51, 52, are preferably provided in a segment 55, which is capable of a limited rocking motion about pivot 45, and which may be set at two or three different angular positions close to one another, as defined by notches 56, which may be engaged by a spring-actuated pin 57, controlled by a knob 58.

The purpose of notches 56 is to set segment 55 at two or three angular positions, so as to cause the upper, lower, or middle portion of the auxiliary ribbon to remain opposite the writing line on the platen. This is obviously done in order to fully utilize the width of the ribbon for writing purposes.

As before stated, I have found that in order to produce uniformly good copies, it is necessary to advance the auxiliary ribbon a substantial length as each new line is started, in order to always present to the typing action a section of ribbon which has not had a chance to dry up while traveling from one end of the platen to the other. On the other hand, the relatively extended movement of the ribbon thus produced means a prolonged rubbing contact of the ribbon with the copy sheets, and consequent smudging of the sheets, a highly objectionable occurrence. I have noticed that the heaviest smudging occurs at the edge portions of the copy sheets, that is, in correspondence of the portions of the ribbon which are closest to its points of support and are, therefore possessed of greater stiffness than at the middle portion thereof. In other words, the contact, and consequent friction, between the ribbon and the copy sheets appear to be more intimate at the edges than at the middle portion of the sheets.

I have found that by providing suitable means for protecting the edge portions of the sheets against direct contact with the ribbon, smudging can be effectively eliminated. I have also found that by preventing direct contact between the lower edge of the ribbon and the copy sheet inserted between said ribbon and the platen, the

tendency of the ribbon to follow the platen when rotated in a reverse direction, a frequent cause of the ribbon becoming wedged between the platen and the paper guide, is also effectively overcome.

In the arrangement shown in Figs. 1, 6, 7, 8, 10 and 11, I illustrate an embodiment of my invention in which a very thin strip of metal, 59, is provided, connecting the rear surfaces of ribbon guide members 37, 40, said strip extending in front of the platen and having its upper edge slightly overlapping the lower edge of the ribbon 30, so as to leave the useful surface of the ribbon practically unimpaired. Thus in Fig. 7 it is seen that while the ribbon guide members and the ribbon itself are set at the highest operative position, where the lower portion of the ribbon remains in front of the writing line, strip 59 is still below the writing line; while in Fig. 8, where the ribbon has been lowered so that its central portion remains in front of the writing line, strip 59 occupies a still lower position.

The strip 59 constitutes an effective protection against smudging for the copy sheet 60 at the rear. An equally effective protection for the transparent sheet 61 at the front is obtained by providing the ribbon guide members 37, 40, with shields 62, 63, inwardly extending from the front surfaces thereof over the end portions of the horizontal tract of the ribbon 30, as clearly shown in Figs. 1 and 6. Said shields are made of very thin, preferably springy laminated material, for instance, sheet steel, and are preferably curved outwardly so as to be bulging in a transverse direction, as shown in Figs. 7 and 8, in order to more effectively separate the edges of the front copy sheet from the underlying ribbon. At the same time, being made, as stated, of very thin metal, said shields will easily yield to whatever pressure will be exerted by the paper thereagainst and will not interfere with the printing action of the type when the carriage is at either one of its end positions. The relation between the sheets, the ribbon, strip 59 and the shields is, of course, shown in Fig. 8 in exaggerated measure in order to assist in a proper understanding of the invention.

If desired, the same type of shield as used for the front of the ribbon can also be used at the rear, in place of the longitudinally extending strip 59. Such a construction is illustrated in Figs. 9, 12, 13, where it is seen that the marginal portion of the front copy sheet is protected from direct contact with the ribbon 30' by a shield 62', while the marginal portion of the rear copy sheet 60' is protected from direct contact with the ribbon by another similar shield 62''.

Conversely, it is also possible to substitute a longitudinal strip similar to strip 59 in place of the front shields 62, 63, if desired, such a construction being shown in Fig. 17, where the rear strip is designated by the numeral 59' and the front strip by numeral 59''.

In the various figures the ribbon guide members 37, 40 are shown formed with an outwardly extending ear portion 64, 65, formed with a notch 66. This construction has the purpose of providing means for inserting a protecting strap 67 in front of the ribbon 30, as clearly shown in Figs. 14, 16; said strap being provided at one end with an elastic portion 68, and having each end equipped with a clip, such as shown at 69, in Figs. 14, 15, said clip having a hook extension 70, adapted to engage the corresponding notch 66.

The purpose of said strap, which is preferably

made of thin non-absorbent material, such as waxed tape, for instance, is to prevent the copy ribbon from printing on the rear surface of the sheet at the front thereof. This is necessary when only one copy having to be produced besides the original, the copy sheet shown at 71, in Fig. 16, is placed between the copy ribbon and the platen, and the original sheet 72 is placed directly in front of the ribbon. On the other hand, at times it is advantageous to have the printing also appear on the rear surface of the original sheet; for instance, it is desirable to use such a method of producing originals in writing checks, in order to obtain effective protection against the possibility of alterations; and in such cases, the use of the strap 67 will therefore be omitted.

The strap itself and the means for applying it to the copy producing attachment form the subject of a separate patent application, entitled Printing ribbon covering device filed August 10, 1934, Serial No. 739,248, copending herewith, and, therefore, a more detailed description thereof is deemed to be unnecessary. It is, of course, obvious that, if desired, the use of protective strap 67 can also be omitted when only one copy is to be produced besides the original by using a copy ribbon adapted to print on one side only, but such a type of ribbon is likely to dry out rather quickly, due to the lack of contact between its ink impregnated layers when wound upon the reels.

From the foregoing it is thus seen that I provide very simple and effective means whereby smudging of the copy sheets can be eliminated and the usefulness of a ribbon manifold device very considerably increased. My inventive idea may be applied in ways different from those shown and the drawings, therefore, should be understood as being intended for illustrative purposes only and not in a limiting sense.

I accordingly reserve the right to carry my invention into practice in all those ways and manners which may enter, fairly, into the scope of the appended claims.

I claim:

1. In a device of the character described comprising a platen the combination, with a ribbon extending along said platen adapted to be interleaved between two sheets, and end supports therefor, of means attached to and inwardly extending from said supports, preventing direct contact between the marginal portions at least of one of said sheets, and said ribbon, the major portion of the surface of said ribbon facing said means, intervening between said supports, being left exposed for type impressions along the line of type impact, and means for advancing said ribbon longitudinally of said platen.

2. In a device of the character described comprising a platen the combination, with a ribbon extending along said platen adapted to be interleaved between two sheets, and end supports therefor, of means attached to and inwardly extending from said supports, both in front and at the rear of said ribbon, preventing direct contact between the marginal portions at least of said sheets, and said ribbon, while clearing the major portion of the surface of said ribbon intervening between said supports, along the line of type impact on said platen.

3. In a device of the character described comprising a platen the combination, with a ribbon extending along said platen adapted to be interleaved between two sheets, and end supports therefor, of a thin strip extending between said

- supports, at the rear of said ribbon, one of the edges of said strip overlapping a relatively narrow edge portion of said ribbon, and a shield member attached to, and inwardly extending from each support along the corresponding front end portions of said ribbon, preventing direct contact between said ribbon and the marginal portions of the sheet in front thereof, the portion of both the front and rear surfaces of said ribbon, intervening between said shield members along the line of type impact on said platen, being left exposed for simultaneous type impression on said two sheets.
4. In a device of the character described comprising a platen the combination, with a ribbon extending along said platen adapted to be inter-

leaved between two sheets, and end supports therefor, of a thin strip extending between said supports, at the rear of said ribbon, the upper edge of said strip overlapping a relatively narrow lower edge portion of said ribbon, and a shield member attached to, and inwardly extending from each support along the corresponding front end portions of said ribbon, preventing direct contact between said ribbon and the marginal portions of the sheet in front thereof, the portion of both the front and rear surfaces of said ribbon, intervening between said shield members along the line of type impact on said platen, being left exposed for simultaneous type impression on said two sheets.

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