

Jan. 23, 1962

D. L. KEITH
RIBBON SHIELD

3,017,981

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2 Sheets-Sheet 1

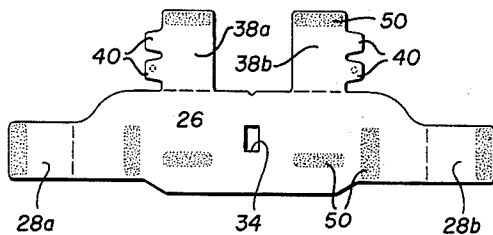


Fig. 2

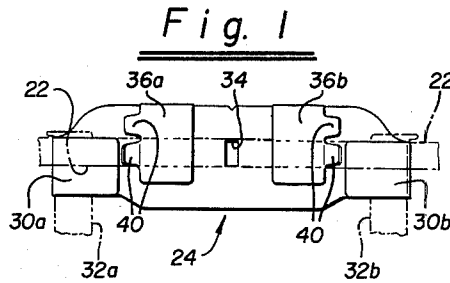


Fig. 1

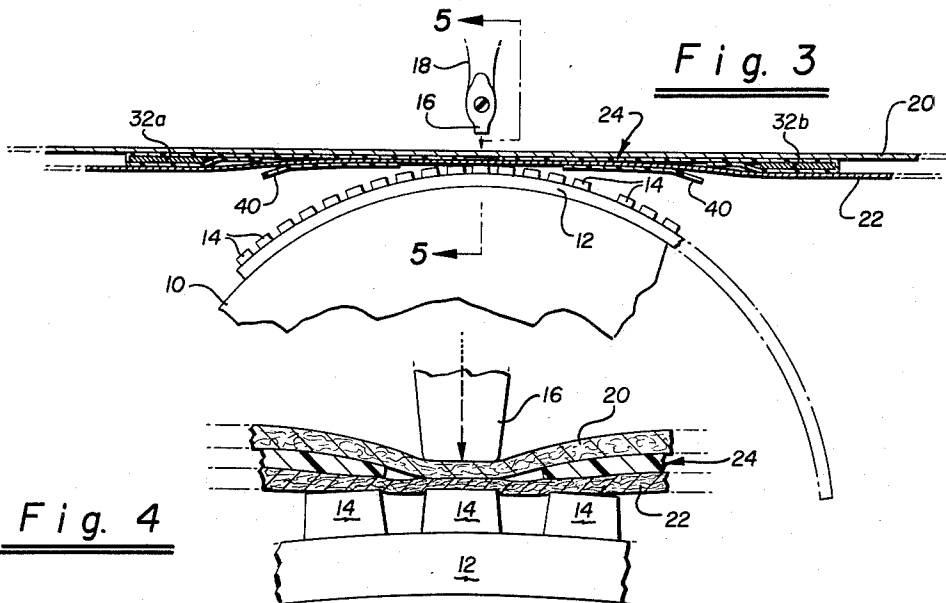


Fig. 3

Fig. 4

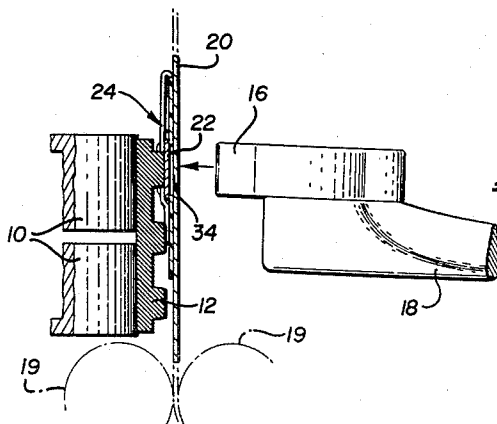


Fig. 5

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2 Sheets-Sheet 2

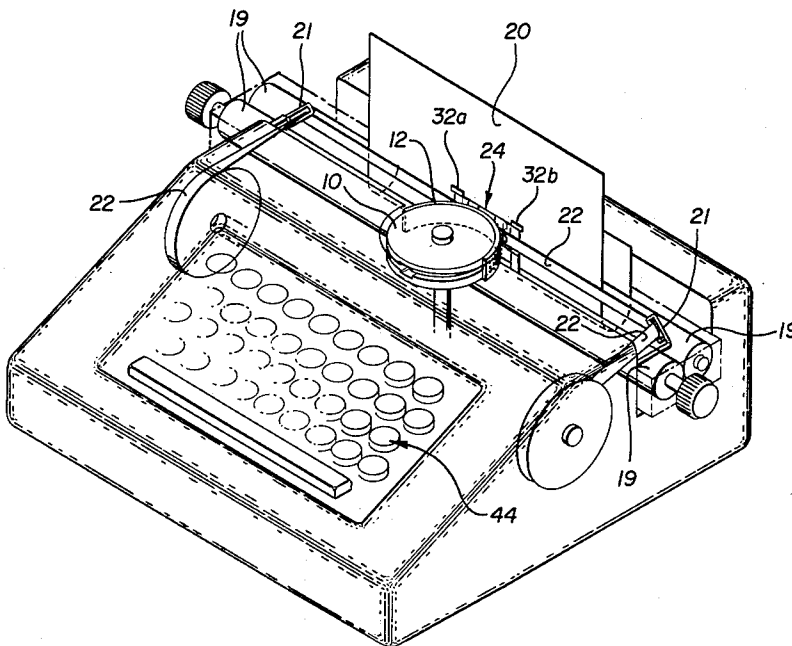


Fig. 6

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3,017,981

RIBBON SHIELD

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6 Claims. (Cl. 197—170)

The present invention relates to typing machines of the kind using arcuate plates upon whose convex surface a front of raised character types is formed. These plates are slidably supported upon the outer surface of a cylindrical anvil, and to print a selected one of the characters on the convex surface of the font plate, said plate is moved about the anvil until the selected character is located opposite a printing hammer that is normally withdrawn from the anvil but may be actuated to strike against the anvil in a direction radially thereof. The machines here under consideration comprise means for holding a sheet of paper between the anvil and the hammer, and also a mechanism for passing a pigment carrying ribbon between the anvil and the sheet of paper, and whenever a character of the font plate has been selected and has been placed opposite the hammer by appropriate rotation of the font plate about the anvil, actuation of the hammer presses the paper briefly through the ribbon against the selected character and causes a transfer of pigment from the ribbon onto the paper so that an imprint of the selected type appears upon the front side of the paper. Selection of a character occurs usually by depression of a selected key on a key board, and depression of said key is arranged to effect in quick succession appropriate rotation of the font plate upon the anvil and actuation of the printing hammer.

Since the radius of the cylindrical anvils is relatively large to provide space for many symbols on the font plate, and the curvature of the convex surface of the font plate therefore is relatively shallow, a stroke of the printing hammer through the paper against the foremost type upon the font plate may not only print the selected character upon the paper, but may also cause weak imprints of the adjacent characters on the plate to appear on the paper. For this reason it has been necessary to interpose between the ribbon and the paper a thin shield of steel or like metal provided with a central aperture or window of the size of the hammer so that the hammer may press only the small area of the paper congruent with said window into contact with the ribbon and the selected character behind the ribbon, while the adjacent areas are positively separated from the ribbon so that no ghost images can be formed thereon.

In practice, however, these ribbon shields of steel have failed to perform satisfactorily especially when used with certain types of ribbon that are specifically designed to release the pigment deposited thereon most readily and which perform therefore especially well in producing clear imprints. Instead of forming ghost letters upon the paper, each hammer stroke causes pigment from such ribbons to be transferred onto the shield, and in a relatively short time the resultant deposits reach such proportions that they flake off and soil the paper causing spots and streaks to appear thereon. For this reason it is necessary to remove the ribbon shield frequently from the machine and clean it thoroughly.

Many attempts have been made to prevent the accumulation of pigment deposits upon the shields and thus keep the paper clean, without the necessity of cleaning the shields continually. Thus, the steel shields have been coated with other metals such as nickel or with plastics. However, none of these measures prevented the formation of pigment deposits upon the shield and/or the soiling of the paper, and some interfered with the proper

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operation of the machine. The problem of contamination of the copy by pigment from deposits upon the ribbon shields therefore is still a most vexing and troublesome problem. Now as before it is necessary to dismount the ribbon shields and clean them thoroughly at frequent intervals and now as before it is necessary to avoid use of the very types of ribbon that give best performance in producing clearly defined type images.

It is an object of my invention to avoid the above described defects in the performance of typing machines of the kind referred to.

More specifically it is an object of the invention to avoid pigment deposit formation upon the ribbon shields of machines of the type referred to.

It is a particular object of my invention to provide a ribbon shield, in typing machines of the kind referred to, that prevents the formation of pigment deposits thereon, yet adequately protects the paper from the appearance of ghost images.

These and other objects of the present invention will be apparent from the following description of the accompanying drawing which illustrates a preferred embodiment thereof, and wherein

FIGURE 1 is a side elevation of a ribbon shield embodying my invention, as viewed from the ribbon side thereof;

FIGURE 2 is a side elevation of a blank from which the ribbon shield shown in FIGURE 1, is made;

FIGURE 3 is a fragmentary plan view of the printing mechanism of a typing machine of the kind referred to, showing the ribbon shield of the invention in its proper position;

FIGURE 4 is an enlarged detail view of the mechanism shown in FIGURE 3, illustrating the moment when the printing hammer presses the paper through the ribbon against a selected type;

FIGURE 5 is an enlarged fragmentary section taken along line 5—5 of FIGURE 3 and viewed in the direction of the arrows associated with said line; and

FIGURE 6 is a fragmentary perspective illustrating the location of the ribbon shield of the invention in a typing machine of the kind referred to.

I have discovered that a ribbon shield made from polytetrafluoro-ethylene, a substance known under the trade name Teflon, does not collect pigment deposits from the ribbon, or at least reduces the formation of such deposits to an extent where they do not present a serious problem even when ribbons are used that are specifically designed to release their pigment layers with special ease.

I have found that for best performance the ribbon shield made Teflon should be of a thickness of .004 inch. If a Teflon shield of lesser thickness, such as .002 inch, is used, the shield shows a tendency to stretch after a relatively short period of use and cause the window to increase in size to an extent whereat the shield does not properly separate the letters adjacent the selected type from the paper so that ghost symbols of adjacent letters appear on the paper. If the shield is made from a Teflon sheet of greater thickness, its flexibility is reduced so that a larger force is required to enable the printing hammer to bring the paper through the window into printing contact with the selected type. This does not only subject the printing hammer and the character types on the font plates to increased wear, it forms embossed depressions of the paper around the individual letters, which are visible when the original copy is reproduced.

Having first reference to FIGURES 3 and 5, the numeral 10 indicates the cylindrical anvil of a typing machine of the kind described, and supported upon the outer cylindrical surface of said anvil for rotational movement thereabout is an arcuate font plate 12 upon whose convex surface are formed three superposed rows of raised

letter types 14. Arranged opposite the anvil 10 for movement toward said anvil in a vertical plane containing a radius of the anvil, is a hammer head 16 which is mounted upon an actuating arm 18. The machine comprises means in the form of rollers indicated at 19 for holding a sheet of paper 20 in the space between the hammer head 16 and the anvil 10, and also means 21 for guiding a pigment carrying ribbon 22 through the space between the paper and the anvil 10; and held between the ribbon 22 and any sheet of paper that may have been placed into the machine for operation thereon, is the ribbon shield 24 of my invention.

Said shield has an elongated body portion 26 whose opposite ends 28a and 28b are of reduced vertical depth, as shown in FIGURE 2, and are folded and glued down upon said body portion along their end edges to form laterally positioned loops 30a and 30b (FIGURE 1) that are engaged over the upper ends of vertically extending arms 32a and 32b, respectively, which hold the shield in its proper position. Arranged centrally in the body portion 26 of the shield is a rectangular aperture or window 34 of somewhat larger area than the striking area of the hammer head 16, and arranged at either side of said aperture are guide loops 36a and 36b through which is passed the ribbon 22 as indicated in phantom lines in FIGURE 1. Said loops may be formed from projections 38a and 38b which are left at the upper edge of the blank as shown in FIGURE 2, and which are folded over and glued down on the inner surface of the blank along their end edges. The outer vertical edges of the projections 38a and 38b may be provided with a number of tabs such as shown at 40 to aid in threading the ribbon 22 through the loops 36a and 36b of the finished shield (FIGURE 1).

In practical operation, when a sheet of paper has been placed into the machine, the shield 24 separates and protects the paper from the ribbon 22 except for the small area defined by the window 34 in the center of the shield. When a letter has been selected by depression of the appropriate key on the keyboard 44 of the machine (FIGURE 6), the font plate moves about the anvil until the corresponding type 14 has moved into the plane of operation of the hammer and is located in alignment with the window 34 in the ribbon shield 24 behind the ribbon 22 (FIGURES 3 and 5). Directly thereafter the hammer head 16 is projected against the sheet of paper in the area defined by the window 34 and presses the paper through said window against the ribbon behind the shield and the selected letter type as illustrated in FIGURE 4, causing the image of the letter type to be printed upon the side of the paper adjacent the inking ribbon. In spite of the fact that the printing stroke of the hammer forces the shield of my invention tightly against the inking ribbon since the stiffness of the paper always transmits a component of the stroke to said shield, extensive tests have shown that no pigment from the ribbon is transferred to the inner surface of the shield in the area of the window 34 as is invariably the case with conventional ribbon shields in machines of the type here under consideration; and even after prolonged practical use of the machine, there is no, or at least no significant, deposit formation upon the ribbon shield of my invention so that it is unnecessary to go to the cumbersome task of dismounting and cleaning or exchanging the ribbon shield. Also, provided the thickness of the Teflon shield is at least of the order of .004 inch, even prolonged use of the shield will not produce any distortion of the shield and enlargement of its window such as might make it possible for ghost images of adjacent letters on the font plate to appear on the paper and thus necessitate the installation of a new shield.

It remains to point out that in manufacturing the ribbon shield of my invention from the blank illustrated in FIGURE 2 by folding the extensions 28a, 28b and 38a, 38b over the body portion of the blank and gluing them to said body portion along the end edges thereof to form

the loops 30a, 30b and 36a and 38b, respectively, I have found it advantageous to etch the surfaces to be glued together with a preparation consisting of metallic sodium dispersed in a solution of ether and wax, as indicated by the stapled areas 50 in FIGURE 2. Thereafter, these areas should be thoroughly washed and dried whereupon the extensions 28a, 28b and projections 38a and 38b may be folded onto the body portion of the shield and pretreated areas be bonded to each other by an Epoxy adhesive, which may be cured by subjecting the shield to a suitable heat treatment for a period of about 3 minutes.

While I have explained my invention with an exemplary embodiment thereof, it will be understood that the invention is not limited to the specific constructional details shown and described which may be departed from without departing from the scope and spirit of my invention.

I claim:

1. In a typing machine of the kind having an arcuate font plate with a number of raised character types formed thereon, an inking ribbon disposed adjacent the convex side of said plate, means for holding a sheet of paper adjacent said ribbon and a printing hammer operable to press a portion of a sheet of paper held in said holding means through said ribbon against a type of said plate to produce an imprint thereof upon the paper; a shield for protecting the paper from spurious contact with said ribbon during operation of said printing hammer, said shield being formed by a thin sheet of polytetrafluoro-ethylene and having a central aperture for permitting the hammer to press a limited area of the paper through the ribbon into printing contact with a character type on said plate.

2. In a typing machine of the kind having an arcuate font plate with a number of raised character types formed thereon, an inking ribbon disposed adjacent the convex side of said plate, means for holding a sheet of paper adjacent said ribbon and a printing hammer operable to press a portion of a sheet of paper held in said holding means through said ribbon against a type of said plate to produce an imprint thereof upon the paper, a shield for protecting the paper from spurious contact with said ribbon during operation of said printing hammer, said shield being formed by a sheet of polytetrafluoro-ethylene of a thickness of about .004 inch, and having a central aperture for permitting the hammer to press a limited area of the paper through the ribbon into printing contact with a character type on said plate.

3. A typing machine comprising an arcuate font plate having a number of character types formed thereon, an inking ribbon disposed adjacent the convex side of said plate, means for holding a sheet of paper adjacent said ribbon, a printing hammer operable to press a portion of a sheet of paper held in said holding means through said ribbon against a type of said plate to produce an imprint thereof upon the paper, and a shield for protecting the paper from spurious contact with the ribbon during operation of said printing hammer, said shield being formed by a sheet of polytetrafluoro-ethylene of a thickness of about .004 inch and having a central aperture for permitting the hammer to press a limited area of the paper through the ribbon into printing contact with a character type on said plate.

4. In a machine of the type described, a ribbon shield for protecting the paper to be printed upon from contact with the inking ribbon of the machine, said shield being formed by a thin elongated plate of polytetrafluoro-ethylene having an aperture, guide loops for the guidance of the inking ribbon past said aperture at either side of said aperture, and loops for the reception of supporting arms at its opposite ends.

5. In a machine of the type described, a ribbon shield for protecting the paper to be printed upon from contact with the inking ribbon of the machine, said shield being formed by an elongated plate of polytetrafluoro-ethylene of a thickness of about .004 inch having a central aperture, guide loops for the guidance of the inking ribbon

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past said aperture at either side of said aperture, and loops for the reception of supporting arms at its opposite ends.

6. A blank for a ribbon shield for machines of the type described comprising an elongated sheet of polytetrafluoro-ethylene of a thickness of .004 inch having a central 5

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aperture, end portions of reduced vertical depth at either side of said aperture, and projections along its top edge above and at either side of said aperture.

No references cited.