

Feb. 28, 1939.

W. G. BORCHERS

2,149,006

MANIFOLDING DEVICE

Filed March 16, 1936

2 Sheets-Sheet 1

Fig. 1.

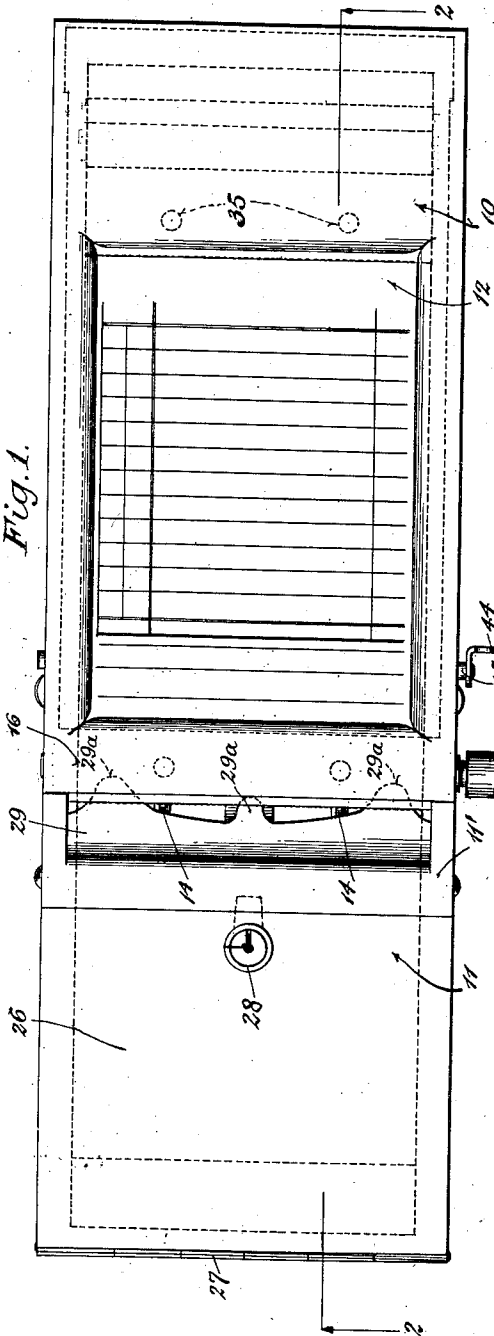
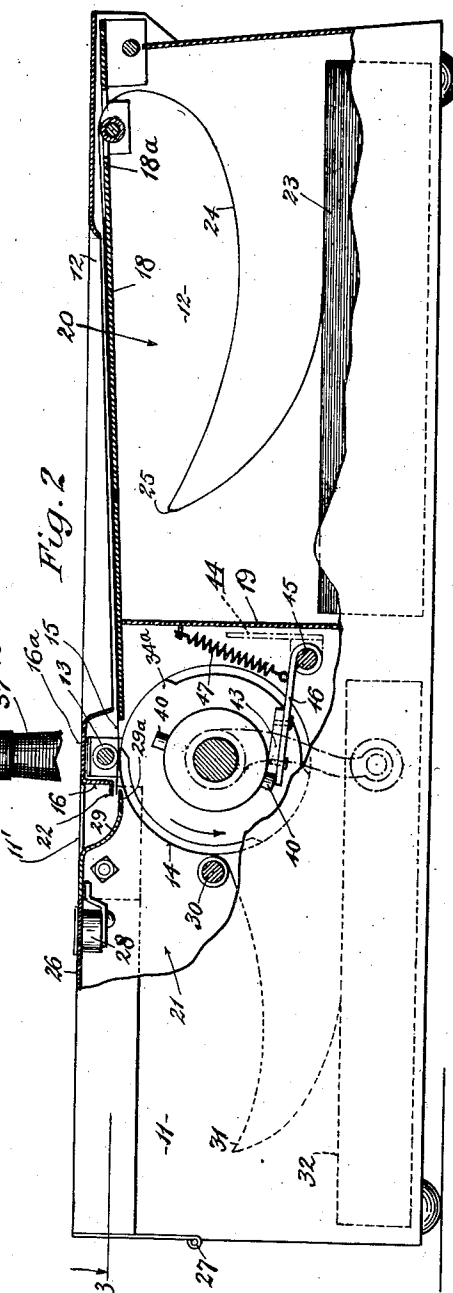


Fig. 2



INVENTOR  
BY William D. Borchers  
Thomas G. Johnson  
ATTORNEY

Feb. 28, 1939.

W. G. BORCHERS  
MANIFOLDING DEVICE

2,149,006

Filed March 16, 1936

2 Sheets-Sheet 2

Fig. 3

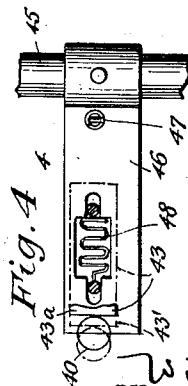
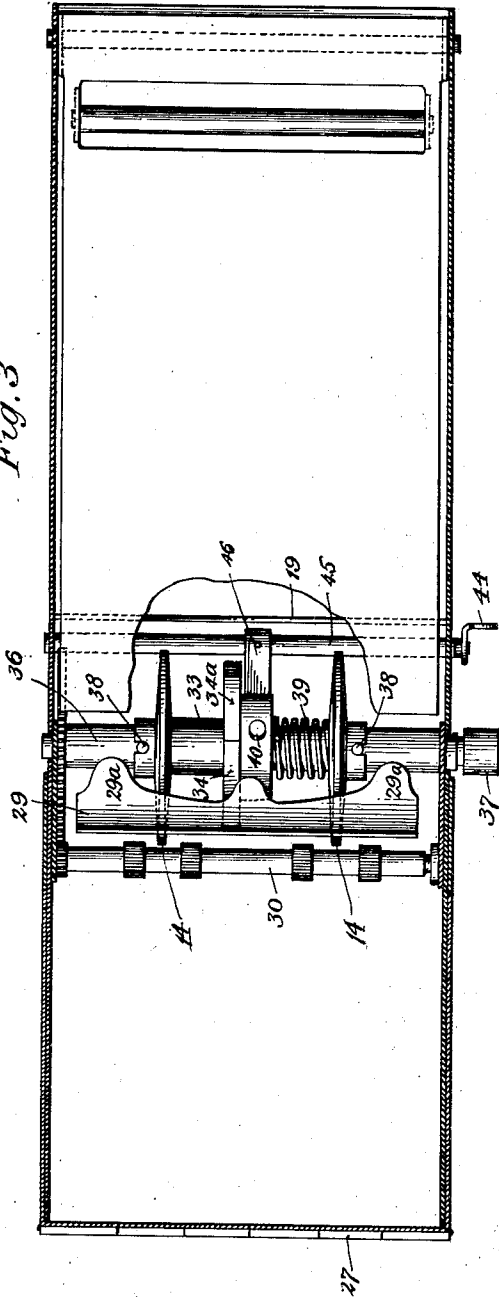
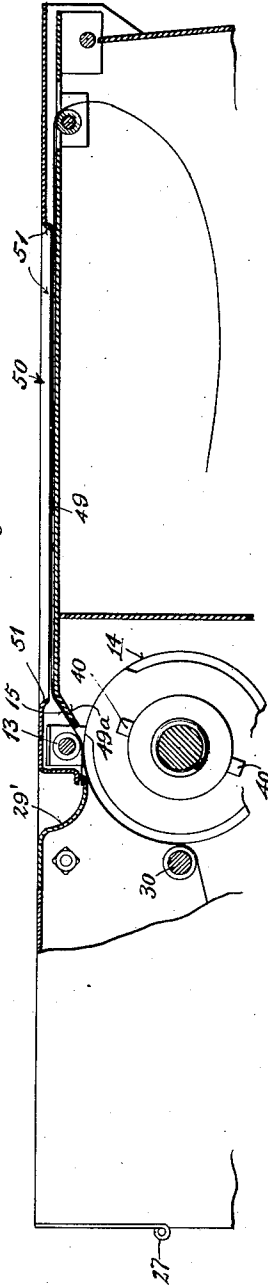


Fig. 5



INVENTOR  
BY *William D. Borchers*  
*John G. Johnson*  
ATTORNEY

## UNITED STATES PATENT OFFICE

2,149,006

## MANIFOLDING DEVICE

William G. Borchers, Hoboken, N. J., assignor to  
Autographic Register Co., Hoboken, N. J., a cor-  
poration of New Jersey

Application March 16, 1936, Serial No. 68,982

15 Claims. (Cl. 282—21)

This invention relates to manifolding registers of the type which include record strip feeding means comprising upper and lower strip-engaging members, generally of the frictional type, although sometimes otherwise constituted, as to provide, for instance, the so-called pin-wheel feed. Essentially, however, the feeding means for the record strips includes annular or rotatory elements, conjointly operated.

A cardinal aim of the invention is to provide a manifolding register the casing of which can when desired be substantially wholly made up of plane vertical and horizontal walls, and particularly a register the different portions of the top of which can be flush with one another as well over the feeding means as ahead of and beyond the same (whereby the disadvantage will be avoided of having to incorporate an upstanding hood over the feeding means for housing the overlying element thereof), yet a register wherein the element last mentioned is of sufficient diameter to give proper strip feeding but nevertheless a register so constructed that the writing platen will be not only at a convenient writing location but one to permit feeding of the strips through the register in a manner to obviate undesirable creasing or curling or permanent bias toward such curling.

All of these advantages are obtained by dropping the feeding mechanism to lower the overlying feeding element, usually a presser roller, and hereafter for convenience referred to as such, wholly or substantially below the top of the casing, and by making other and compensatory provisions including a new setting for the platen.

Of the various possible forms of the invention, two embodiments as now preferred are illustratively shown in the accompanying drawings.

In one of such embodiments, the platen is sufficiently downwardly inclined throughout its length, to allow the top of the casing over the feeding means to lie in the general plane of the casing top.

In another such embodiment, the platen is horizontal for the most part, but its end adjacent the presser roller is dipped downwardly toward the bite of the feeding mechanism; and here also the top of the casing over the feeding means is able to lie in the general plane of the entire top of the casing.

The invention will be more clearly understood, and the foregoing and other objects and advantages thereof will be fully appreciated, from the following detailed description of these preferred

embodiments as shown in said drawings, in which:

Figure 1 is a top plan view of a flush-type register wherein the platen is downwardly inclined throughout its length.

Fig. 2 is generally a vertical section, taken longitudinally of the casing and on the line 2—2 of Figure 1.

Fig. 3 is a horizontal section, taken about along the line 3—3 of Fig. 2, but showing the casing partially broken away and partially in plan.

Fig. 4 is an enlarged detailed view of certain elements of a starter associated with the feeding means.

Fig. 5 is a view similar to Fig. 2, showing the upper part of a flush-type register wherein the platen is downwardly inclined only at its end adjacent to the feeding means.

Referring to the exemplary form of the invention shown in Figures 1 to 4, the top of the casing, as will be seen from Fig. 2, is flush from end to end, that is, there is no projection above the general plane of the casing top established by the top subdivisions 10 and 11.

The top subdivision 10 is interrupted by the usual writing opening 12 in advance of the feeding means, which means is conventionally shown as including a presser roller 13 and a pair of feed disks 14. The feeding means here chosen for illustration is of a well-known type, and will be briefly described hereinafter.

This feeding means is so positioned in the casing, however, that whereas ordinarily the point of bite between the roller and disks on the record strips 15 has heretofore been placed in the general plane of the casing top, such point is here lowered well below said plane.

The feeding means is shown as low enough in the casing to allow the presser roller to be hooded over by a flat portion 16a of the casing top which is flush with the subdivisions 10 and 11 and which is part of a hood 16 for the presser roller 13. Nevertheless, the record strips 15 are advanced by the feeding means a form-length amount at each operation of said means, and always efficiently advanced, and without any creasing or curling.

In this illustrative form of the invention it will be noted that said strips, as they are withdrawn from their storage compartment, pass over a platen 18 which is downwardly inclined from end to end and in such manner as to direct the strips to have a straight-line path of travel from the receiving end 18a of the platen to beyond the de-

livery end thereof and thence to the point of bite of the feeding means.

It will further be noted that the strips 15 in thus advancing beyond the platen and to the bite of the feeding means, contact the rotary members 5 of the feeding means substantially tangentially of their point of bite and in a manner to avoid any material wrap around either of said rotary members.

Below the platen 18, the casing is divided by a transverse partition 19 which not only furnishes a support for the forward portion of the platen, but also divides the interior of the casing into a supply compartment 20 and a receiving compartment 21. Into this compartment 21 the forms of the lowermost record strip are received, as one set of forms after another on a plurality of strips 15 are, after being brought to rest on the platen 18 and there inscribed, moved by an operation of the feeding means to advance to the tear-off location 20 the forms of said set on the upper strips.

When the forms last-mentioned reach said location, the trailing edges thereof are immediately under a tear-off edge or knife 22 carried by the forward part of the hood 16 for the presser roller 13.

With the exception of the shape and location of said hood, and the consequent depression of the knife 22 below the general plane of the top of the casing, and with the exception of the downward inclination incorporated in the platen 18, the parts of the casing so far described are conventional. In the present case, and in recognition of a now favored practice in the art, the record strips are shown as stored in the supply compartment 20 in the well-known type of zigzag-folded stack or pile 23, whereof the forms of each set, one contributed by each of the strips, are interfolded in a familiar way; so that these sets are withdrawn from said stack as indicated at 24 incidental to advancement of the strips over the platen first toward writing position thereon and thereafter beyond said platen to dispose the forms to be severed below the knife 22 for tear-off of said forms at said knife along a line corresponding to a line of fold, such as seen at 25 in Fig. 2, between the form sets when stacked.

The writing opening 12 is shown as marginally subtended by portions of the top subdivision 10 which not only constitute framing members for said opening, but which, because they are laterally downwardly inclined toward the plane of the platen 18 to approach the same closely along lines within the side margins of the strips as well as transversely thereof, establish a shallow depression or well above the platen to act as a guard to hold the strips to advancement along the length of the platen and in the plane of the upper surface thereof. As will be seen most clearly in Fig. 2, these framing portions for the sides of the opening 12 are shaped so as to incline laterally more and more toward the platen as the lowermost end of the platen is approached.

Also as the casing is shown, the same in the top subdivision 11 thereof has a depression or well forward of the knife 22. This depression is in that part 11' of the top subdivision 11 which is fixed in place forward of a door 26 hinged at 27 and which can be unlocked at 28 to obtain access to the compartment 21. Said depression is established by a wall 29 struck from the top part 11' and shaped cross-sectionally as shown in Fig. 2. Such shaping of the wall 29 provides a lowermost portion which is substantially horizontal, and which projects below knife 22 and toward the bite

between the presser 13 and said disks 14 but is spaced somewhat above the peripheries of said disks; the spacing last referred to being for the purpose of allowing the lowermost of the strips 15 to pass over said disks as far as a familiar guide roller 30 and thence to pile up as indicated at 31 in a stack 32 in the compartment 21.

As illustrated most clearly in Figure 1, the lowermost horizontal portion of the wall 29 is shaped as a rudimentary comb including a plurality of tongues 29a extended beyond the main body of such comb toward the point of bite of the feeding means, at points across the casing removed from the zones of engagement of the feeding instrumentalities relative to the strips 15. In the present case there are three such tongues, of which the two terminal ones are further extended into the path of travel of the strips over the platen than is the median one. These terminal tongues as shown are well toward the side margins of the strips and beyond the feed disks 14. Such or an equivalent shaping of the lowermost portion of the wall 29 facilitates initial threading of the strips in the register, and insures efficient downward divergence of the lowermost strip into the compartment 21, as all the strips are advanced form-length amounts on each operation of the feeding means.

Beyond its comb-carrying portion the wall 29 is curvilinearly upwardly extended toward the flat surface of the top subdivision 11; thus providing a deflector for a group of forms being advanced to tear-off location which guides such group for disposition above said top subdivision 11 incidental to their arrival at tear-off location.

It will be noted that at no time during their passage through the register are the forms of the strips 15 given any sharp changes of direction of a kind to crease or impart permanent curling thereto. They pass straight down along the platen 18, to and through the bite of the feeding means and thence onto the deflector 29; and only as the forms to be severed are advanced beyond said deflector are they given any curvature. This latter, however, is one of considerable radius lengthwise of the forms, since if they are thin and limp they will tend to arch in such manner that their central portions will curve according to a considerable radius of curvature over the top subdivision 11 in advance of the rounded upper edge of the deflector, whereas, if they are of comparatively thick or stiff paper they will thus arch but according to even a greater radius of curvature. Forms arriving at the tear-off location, moreover, are immediately severed long before any permanent bias toward curvature could be imparted.

The downward inclination of the platen 18 toward the bite of the feeding means has been found to offer no inconvenience whatever to a clerk in writing on the forms while they are in writing position.

Briefly to describe the feeding means shown: One of the feed disks 14 is fixed on one end of a sleeve 33. The opposite end of this sleeve bears against a hubbed circular plate 34 mutilated to provide a pair of diametrically opposite starter elements having arcuate strip-impelling surfaces for engaging portions of the lowermost strip 15 removed from the strip-arresting form-registering apertures 35 whenever the feeding means is operated to advance the strips a form-length amount. As is well known in the art, the preceding operation of said means which advanced the set of forms to writing position on the platen, terminated when the bites between the two feed

disks 14 and the presser roller 13 entered said apertures to arrest strip feeding. A form-length advance of the strips 15 is effected by a complete revolution of an operating shaft 36, turned by means of a handle 37. Both feed disks 14 are locked to said shaft for turning therewith by the pin and slot connections shown at 38 in Fig. 3. These pins are held in their slots by an expansile coil spring 39; the spring 39 also serving to press the hubbed plate 34 against the sleeve 33 with sufficient friction to cause said plate to rotate with the disks except when prevented by a stop means including either one of a pair of cylindrical studs 40 radially projected from the hub portion of the plate. When either of these studs 40 engages a block 43, during a revolution of shaft 36, further movement of the plate 34 in the direction of the arrow shown in Fig. 2 is arrested, so that when said shaft has completed its revolution that one of the two starter elements 34a which is other than the one which started the strip-feeding operation being effected by said revolution, is placed in proper position to start the next strip-feeding operation, provided the block 43 is moved to free the stud 40 now engaged by it. Freeing of this stud is accomplished by manually operating a starter including an up-standing finger-piece 44 at one side of the casing. On swinging this finger-piece toward the left in Fig. 2, a rock shaft 45 is turned, to lower an arm 46 fixed thereon and which carries the block 43. On releasing the finger-piece 44, arm 46 is swung upwardly by a spring 47, and the top of the block 43 strikes the lower end of the stud 40 just previously engaged by the end of the block, thus freeing the plate 34 for frictional drive with the disks 14. Such a striking of the top of the block 43 against the lower end of said stud 40, follows from the fact that the block is slidably mounted on the arm 44 as shown in Fig. 4 and is spring urged at 48 to move along the arm toward the free end thereof a sufficient distance to throw the end 43a of the block to about the relocation indicated in Fig. 4 at 43', that is, so as to cause the block partially to underlie said stud as indicated at 40' in Fig. 4. When after this the handle 37 is operated through a full revolution for a strip-feeding operation, the plate 34, carrying one of the starters 34a in effective position, will move with the feed disks 14 until the stud 40 other than the one last-mentioned again engages the block 43, at an intermediate point in such strip-feeding operation. Following this engagement, said stud moves the block 43 until it is restored to its position shown in full lines in Fig. 4, whereupon the plate 34 is again halted.

In Fig. 5 a form of the invention is shown wherein the top of the casing is flush from end to end as in Fig. 2, and at the same time the platen, indicated at 49, is substantially horizontal and uniplanar from end to end, except for an end portion 49a adjacent to the bite of the feeding means, which end portion is dipped or downwardly inclined to send the record strips 15 toward said bite. The feeding means partially illustrated, it will be noted, is the same as that hereinabove described in connection with Figures 1 to 4.

With the platen 49 thus dipped at 49a, the strips engage the presser roller 13 somewhat in advance of the point of bite on the strips between said roller and the feed disks 14, but there is not such a wrap of the strips about any part of the feeding means as to interfere with proper advancement of the strips when the feeding means

is operated or to impart any appreciable curling tendency to the strips even when left at rest for a considerable length of time in engagement with the presser roller 13.

The horizontal part of the platen 49 is shown as lowered somewhat, to obtain the advantages of a shallow well at the writing opening 50 and a guard to hold the strips to advancement along the main length of the platen, as shown in Figures 1 and 2; this well being established by laterally downwardly inclining the portions 51 at the top of the casing which frame the writing opening.

The writing opening in the present case does not extend appreciably beyond the upper limit of the dipped end portion 49a of the platen. Thus, when a form is in writing position on the platen, any part thereof to receive writing is on a substantially horizontal part of the platen. Also, with said platen substantially horizontal the frame portions for the sides of the opening 50 are shaped to incline laterally toward the platen in an identical way from end to end of said opening.

The dipped portion 49a of the platen, not only does not crease the forms, but it is so slightly removed from the leading edges of the forms when in writing position on the platen that no permanent curling is imparted to the general lengths of the forms, no matter how long a set of forms be arrested in writing position. In no case, will a form be given other than a fleetingly sustained change of direction between the main and the tapered portion of the platen at other than a terminal part of a form closely adjacent to an end of that form.

The flat top of the casing in Fig. 5 is equipped as shown with a hood over the roller 13, a tear-off edge or knife at the forward bottom portion of such hood, and a comb-carrying deflector provided by a wall struck out from the casing top; all similar to the parts as previously described in connection with Figures 1 to 4, except that the deflector of Fig. 5, marked 23', is shaped to provide a somewhat deeper pocket ahead of the knife than is provided by the deflector 23 of Fig. 2, and except that the front vertical wall of the hood which carries said knife is lowered correspondingly. The variations just referred to have been found to be advantageous in preventing the forms from taking on any tendency toward permanent curl from being guided and advanced over a platen terminally dipped as in Fig. 5.

Variations and modifications may be made within the scope of this invention, and portions of the improvements may be used without others.

I claim:

1. In a manifolding register, the combination of record strip feeding means including overlying and underlying annular strip-engaging members; a casing intermediate the ends of which said feeding means is located, said casing having a top including top subdivisions substantially flat and substantially flush with each other ahead of and beyond the feeding means location, and said overlying member being wholly disposed below the general plane of said top subdivisions; and strip-guiding means for permitting the casing to have a substantially flush top at as well as ahead of and beyond said feeding means, said guiding means including a writing platen over which a strip is advanced by operation of the feeding means, said platen having a strip-guiding surface downwardly inclined throughout a substan-

tial portion of its length toward the bite on said strip of the members of the feeding means.

2. In a manifolding register, the combination of record strip feeding means including overlying and underlying annular strip-engaging members; a casing intermediate the ends of which said feeding means is located, said casing having a top including top subdivisions substantially flat and substantially flush with each other ahead of and beyond the feeding means location, and said overlying member being wholly disposed below the general plane of said top subdivisions; and strip-guiding means for permitting the casing to have a substantially flush top at as well as ahead of and beyond said feeding means, said guiding means including a writing platen over which a strip is advanced by operation of the feeding means, said platen being downwardly inclined at its end portion adjacent to the feeding means and extending over one of the strip-engaging members.

3. In a manifolding register, the combination of record strip feeding means including overlying and underlying annular strip-engaging members; a casing intermediate the ends of which said feeding means is located, said casing having a top including top subdivisions substantially flat and substantially flush with each other ahead of and beyond the feeding means location, and said overlying member being wholly disposed below the general plane of said top subdivisions; and strip-guiding means for permitting the casing to have a substantially flush top at as well as ahead of and beyond said feeding means, said guiding means including a writing platen over which a strip is advanced by operation of the feeding means, said platen being downwardly inclined and substantially uniplanar over its strip-guiding surface.

4. In a manifolding register, the combination of a casing having a generally flush top; strip-feeding means including overlying and underlying annular strip-engaging members, said means located intermediate the ends of the casing and substantially wholly below the top thereof; a hood overlying the overlying strip-engaging member; and means for guiding a strip during advancement by said feeding means so that said strip is held to paths of travel in advance of and beyond the feeding means considerably above the level of the point of bite between said strip-engaging members, said guiding means including a platen for supporting the strip and inclined throughout its length toward the point of bite between said strip-engaging members.

5. The manifolding register defined in claim 4, wherein said guiding means includes depressions in the casing top, said depressions carrying strip-guiding surfaces both inclined downwardly toward the feeding means.

6. The manifolding register defined in claim 4, wherein said guiding means includes depressions in the casing top, said depressions carrying strip-guiding surfaces both inclined downwardly toward the feeding means, and wherein that end portion of the guiding surface in the depression ahead of the feeding means which is closer to the latter is shaped lengthwise of the casing in substantially smooth continuation of a straight line between said surface and the point of bite between said strip-engaging means.

7. The manifolding register defined in claim 4, wherein said guiding means includes depressions in the casing top, said depressions carrying strip-guiding surfaces both inclined downwardly to-

ward the feeding means; wherein that end portion of the guiding surface in the depression ahead of the feeding means which is closer to the latter is shaped lengthwise of the casing in substantially smooth continuation of a straight line between said surface and a point of bite between said strip-engaging means; and wherein the guiding surface last-mentioned is throughout a length thereof coextensive with a form-length of the strip free of any such sharp changes of direction as would tend to crease or permanently curl the strip during advancements thereof through and rests thereof within the register.

8. The manifolding register defined in claim 4, wherein said guiding means includes depressions in the casing top, said depressions carrying strip-guiding surfaces both inclined downwardly toward the feeding means, and wherein the guiding surface in the depression ahead of the feeding means has a general line of downward extension at less angle to the horizontal than the similar line of extension of the guiding surface in the depression beyond the feeding means.

9. In a manifolding register, the combination of record strip feeding means including overlying and underlying annular strip-engaging members; a casing having a substantially horizontal top portion below which the overlying member of the feeding means is wholly located, said portion having a writing opening therein; a strip-guiding means in the casing below said top portion for supporting the strips for writing through said opening and for directing the strips downwardly toward the bite of said feeding members, said top portion beyond said opening being extended over said feeding means and such extended part of the top portion being substantially flush with the remainder thereof, the casing having a top portion beyond the feeding means which is substantially flush with the first-mentioned top portion, the second-mentioned top portion adjacent to the feeding means being downwardly inclined toward the bite of the feeding members and overlying one of the feeding members to provide a strip-guiding means for directing the strips upwardly beyond said bite.

10. In a manifolding register, the combination of record strip feeding means including overlying and underlying annular strip-engaging members; a casing having a substantially horizontal top portion below which the overlying member of the feeding means is wholly located, said portion having a writing opening therein; a strip-guiding means in the casing below said top portion for supporting the strips for writing through said opening and for directing the strips downwardly toward the bite of said feeding members, said top portion beyond said opening being extended over said feeding means and such extended part of the top portion being substantially flush with the remainder thereof, the casing having a top portion beyond the feeding means which is substantially flush with the first-mentioned top portion, the second-mentioned top portion adjacent to the feeding means being downwardly inclined toward the bite of the feeding members to provide a strip-guiding means for directing the strips upwardly beyond said bite, the downwardly inclined part last referred to being provided with spaced fingers directed toward said bite.

11. In a manifolding register, the combination of a record strip feeding means including overlying and underlying annular strip-engaging members; a casing having a substantially horizontal top portion below which the overlying

member of the feeding means is wholly located, said portion having a writing opening therein; a strip-guiding means in the casing below said top portion for supporting the strips for writing through said opening and for directing the strips downwardly toward the bite of said feeding members, said top portion beyond said opening being extended over said feeding means and such extended part of the top portion being substantially flush with the remainder thereof, the casing having a top portion beyond the feeding means which is substantially flush with the first-mentioned top portion, the second-mentioned top portion adjacent to the feeding means being downwardly inclined toward the bite of the feeding members to provide a strip-guiding means for directing the strips upwardly beyond said bite, the downwardly inclined part last referred to being provided with spaced fingers directed toward said bite and extending over a part of the underlying feeding member, which latter member is of larger diameter than the overlying feeding member.

12. In a manifolding register, the combination of record strip feeding means including overlying and underlying annular strip-engaging members; a casing intermediate the ends of which said feeding means is located, said casing having a top including top subdivisions substantially flat and substantially flush with each other ahead of and beyond the feeding means location, and said overlying member being wholly disposed below the general plane of said top subdivisions; and strip-guiding means for permitting the casing to have a substantially flush top at as well as ahead of and beyond said feeding means, said guiding means including a writing platen over which a strip is advanced by operation of the feeding means, said platen having a strip-guiding surface having a substantial portion of its length downwardly inclined with respect to the top of the casing and toward the bite on said strip of the members of the feeding means.

13. In a manifolding register, the combination of record strip feeding means including overlying and underlying annular strip-engaging members; a casing intermediate the ends of which said feeding means is located, said casing having a top including top subdivisions substantially flat and substantially flush with each other ahead of and beyond the feeding means location, and said overlying member being wholly disposed below the general plane of said top subdivisions; and strip-guiding means for permitting the casing to have a substantially flush top at as well as ahead of and beyond said feeding means, said guiding means including a writing platen over which a strip is advanced by operation of the feeding means, said platen being downwardly inclined with respect to the top of the casing and substantially uniplanar over its strip-guiding surface.

14. In a manifolding register, the combination of a casing having a generally flush top; strip feeding means including overlying and underlying annular strip-engaging members, said means located intermediate the ends thereof; a hood overlying the overlying strip-engaging member; and means for guiding a strip during advancement by said feeding means so that said strip is held to paths of travel in advance of and beyond the feeding means considerably above the level of the point of bite between said strip-engaging members, said guiding means including a platen for supporting the strip and inclined throughout its length with respect to the top of the casing and toward the point of bite between said strip-engaging members.

15. In a manifolding register, the combination of a casing having a generally flat top; strip feeding means disposed on the casing; and a platen disposed within the casing for supporting the strip during advancement by said feeding means, said platen lying in a plane which is inclined with respect to the top of the casing.

WILLIAM G. BORCHERS.