No. 721,116. PATENTED FEB. 17, 1903.

R. C. WILLIAMS.

MANIFOLDING REGISTER.

APPLICATION FILED SEPT. 10, 1902.

NO MODEL. 3 SHEETS—SHEET 1.

Fig. 1.

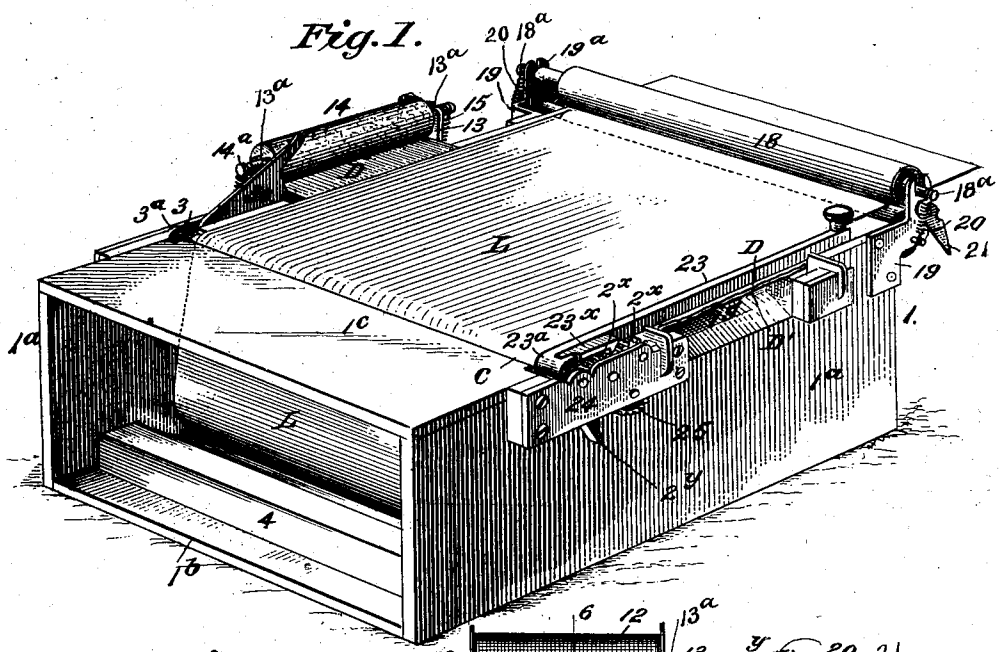
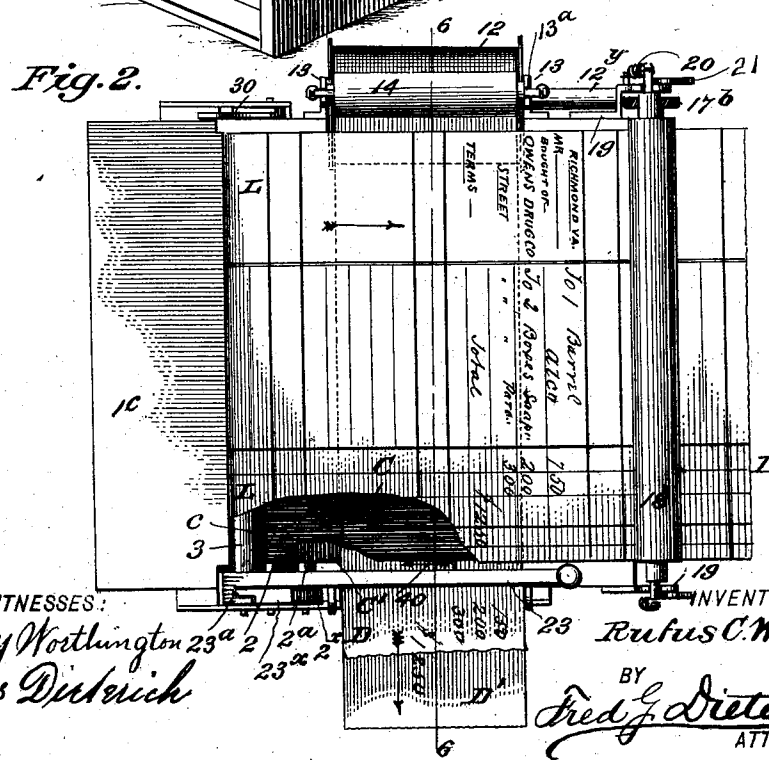


Fig. 2.



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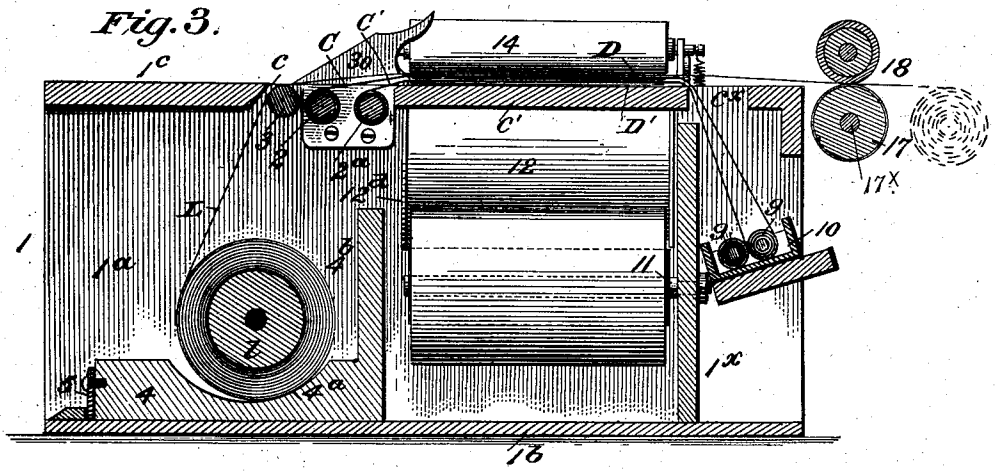
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NO MODEL. 3 SHEETS—SHEET 2

Fig. 3.



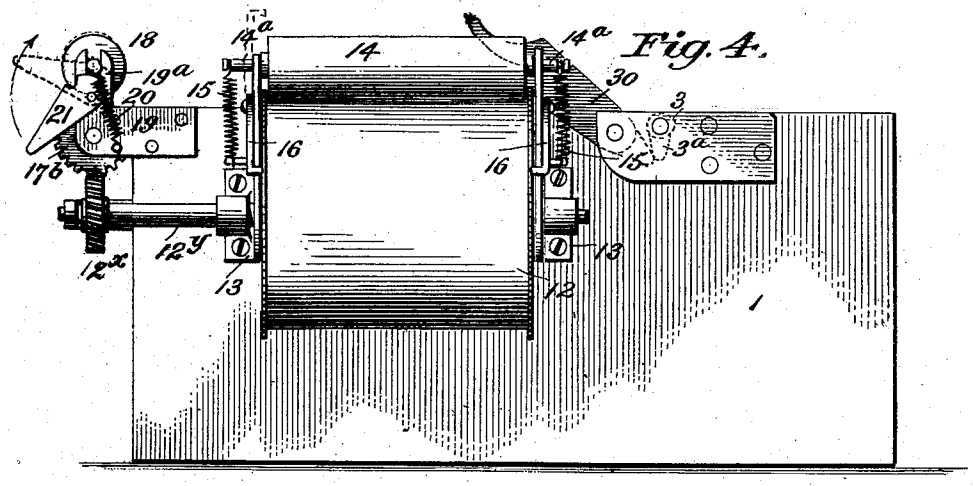
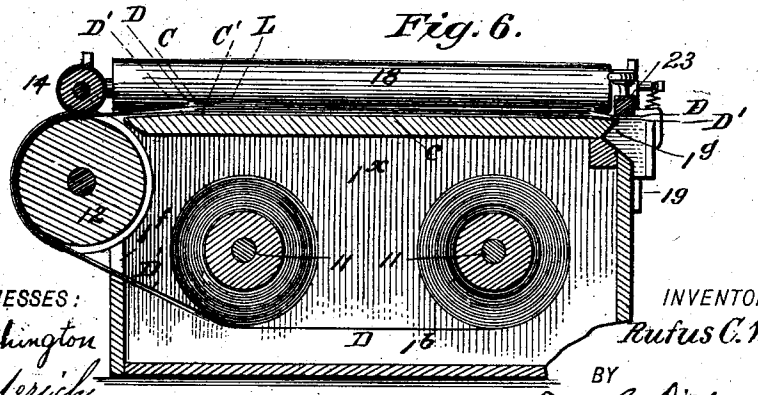


Fig. 4.

Fig. 6.



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NO MODEL. 3 SHEETS—SHEET 3.

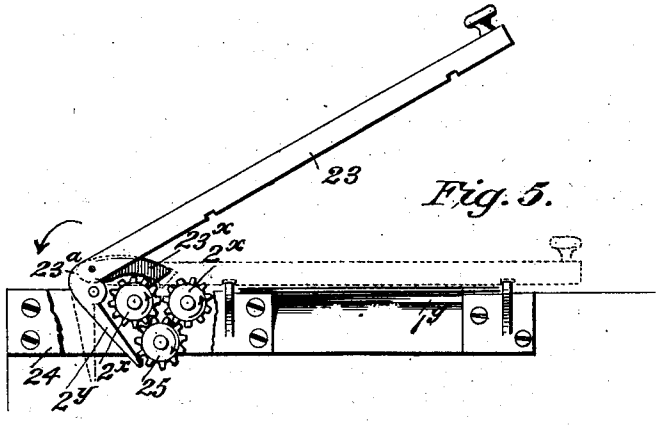


Fig. 5.

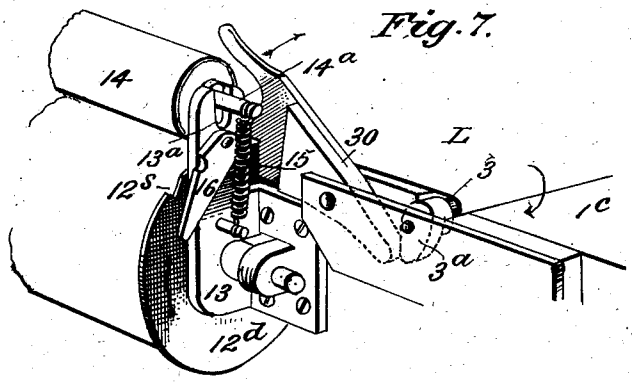


Fig. 7.

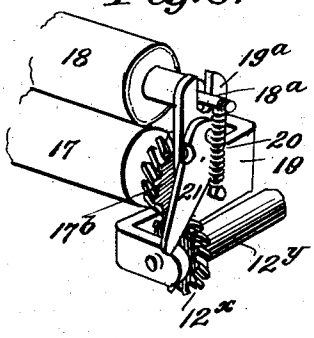


Fig. 8.

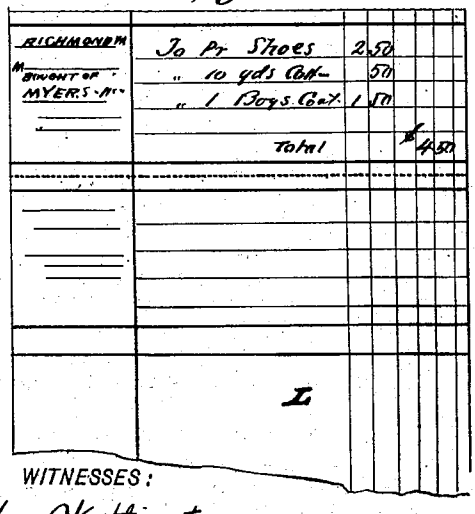


Fig. 9.

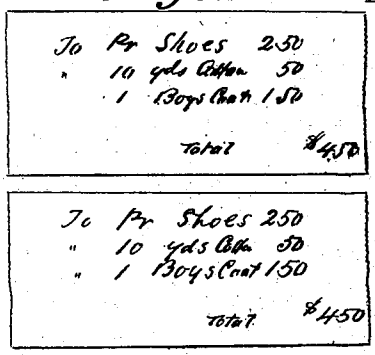


Fig. 10.

Fig. 11.

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UNITED STATES PATENT OFFICE.

RUFUS C. WILLIAMS, OF RICHMOND, VIRGINIA.

MANIFOLDING-REGISTER.

SPECIFICATION forming part of Letters Patent No. 721,116, dated February 17, 1903.

Application filed September 10, 1902. Serial No. 122,893. (No model.)

To all whom it may concern:

Be it known that I, RUFUS C. WILLIAMS, residing at Richmond, in the county of Henrico and State of Virginia, have invented a new and Improved Manifolding-Register, of which the following is a specification.

This invention relates generally to carbon transferring devices for manifolding an entry or record, and more particularly refers to that type of machines designed for the production of a record in duplicate or triplicate, one copy of which is usually retained and the others utilized as cashier and customer tickets or slips.

One of the serious objections to be found in many of the appliances of the character stated now in general use is the great waste of paper and the irregularity of the feed devices for governing the size of the cashier and customer tickets and a corresponding irregular feed of the main record or ledger account sheets, which are usually retained within the machine.

Registering-machines of the kind referred to have heretofore been provided, in which the operation of shifting the record or entry and the duplication is effected by a crank-operated gearing. This method of feeding the tablet or sheet members experience has demonstrated is not reliable and one requiring great care in the handling of the crank, so that an excessive movement of the tablet and other sheets is not produced.

My invention primarily seeks to provide a manifolding-register capable of producing a duplicate, triplicate, or greater number of copies of the record, in which the operating mechanism is compactly arranged, capable of being conveniently operated without special skill or attention, and in which the coöperation of the feed mechanism for the main record or ledger and the manifold-sheets is such as to effect a predetermined movement of the several sheets, whereby the degree of movement of one set of sheets is accurately determined by the movement of the other sheet or sheets, and whereby waste or unnecessary use of paper is reduced to the minimum and the carbon sheet or sheets held entirely out of view and from being engaged by the hands during the ordinary use of the machine.

My invention comprehends a suitable casing or supporting-frame, which includes a writing-surface over which the main record, or as hereinafter termed the "ledger-sheet," and the duplicate, together with the transfer or carbon sheets, travel, and a duplicate set of feed devices which are coöperatively joined by intermediate gearing and arranged to permit of the movement of the duplicate sheets in one direction and the simultaneous movement of the ledger-sheet in a direction at right angles to the movement of the duplicator-sheets.

Another and essential feature of my invention lies in a new and novel manner of removably supporting the ledger and a duplicator-sheet holding rolls within the casing, the manner in which the duplicator-sheets are located relatively to the writing-surfaces of the frame, whereby the ends thereof can be conveniently gripped with the fingers without engaging or clamping the carbon-sheets, and whereby the said duplicator-sheets can be readily pulled outward to a tearing-off position, means for gradually feeding or changing the position of the carbon-sheets being also coöperatively joined with the record and slip sheets feeding devices to effect a movement of the carbon at each pulling out of the duplicator-sheets.

In its more complete nature my invention includes a special combination of feeding mechanisms controlled by the pull strain of the duplicator-sheets to effect a proper movement of the ledger-sheet simultaneously with the movement of the duplicator-sheets and a means for positively limiting the movement of both the duplicator and ledger sheets after each operation of making a complete record or entry.

In its more subordinate features my invention consists in certain details of construction and peculiar combination of parts, all of which will hereinafter be fully described, and specifically pointed out in the appended claims, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view of my improved register manifolding-machine. Fig. 2 is a plan view of the same, the duplicator-sheets being shown as partly drawn out and

the ledger-sheet correspondingly advanced from the normal or entry position. Fig. 3 is a vertical longitudinal section of the complete machine, the parts being in the position shown in Fig. 1. Fig. 4 is an elevation of the sheet-feeding side of the machine. Fig. 5 is a view illustrating the carbon-sheet-lever-actuating mechanism, the lever being elevated to permit of gripping the free ends of the duplicator-sheets to pull out the duplicate record-slips. Fig. 6 is a transverse section taken on the line 6 6 of Fig. 2. Fig. 7 is a detail view of the stop devices for limiting the feed of the duplicator and the ledger sheets. Fig. 8 is a similar view of the gear connections that join the duplicator-sheets and the ledger-sheet-feed mechanisms. Fig. 9 is a diagram of a preferred form of ledger-sheet used in my machine. Figs. 10 and 11 illustrate a set of duplicate cashier and customer slips hereinafter referred to.

In the practical construction my machine comprises a casing or writing-desk 1, which includes the sides 1^a 1^a, bottom 1^b, a partially-closed upper end, an open lower end, and a table or writing-surface 1^c, which forms the top of the casing. Near the lower end the writing surface or top 1^c has a wide transverse slot *c*, in which is mounted the carbon-sheet-take-up rolls 2 2^a, which are disposed in the same horizontal plane one in advance of the other and presently again referred to, and the ledger-sheet guide-roll 3, which is also in the horizontal plane of the rolls 2 2^a and in advance thereof, as clearly shown in Fig. 3.

In my construction of machine the same is more especially designed for the utilization of a record or ledger sheet (designated by L) in a roll form, and to loosely and detachably mount the same in the machine to provide for conveniently and quickly fitting the same in an operative position or removing it from the machine as conditions may make desirable I provide a holder 4, slidable in the open front end of the machine and which is formed with a concaved seat 4^a to receive the ledger-roll *l* and a vertical ledger-piece 4^b adjacent the said seat, which serves to hold the roll portion *l* to its seat, and to prevent the holder 4 from moving out of the casing 1 a latch or detent 5 of any approved construction is provided, as shown.

The preferred form of ledger-sheet L used in my machine is of a width substantially that of the internal width of the casing, whereby to provide a sheet sufficiently wide, so that one end thereof may be utilized for displaying advertising or other matter at each end of the divisional or entry portions thereof at one edge and ample space at the other edge for making the desired entries or record, and the entry or record end of the said ledger is ruled the entire length of the sheet L, whereby continuous dollars and cents columns are provided.

In the construction illustrated means are provided for triplicating—that is, for producing two records or slips in addition to the ledger-record—and for such purpose two carbon-sheets C C′ are employed which have one end connected to the rolls 2 2^a, and the said sheets C C′ pass over the top or writing section *c*′, extended and fed lengthwise of the machine and having their upper portion extended down through a transverse slot c^x in the casing-top 1^c and wound on a pair of gravity-held metal rolls 9 9, which are loosely supported in the transversely-held trough 10, detachably supported at an incline in the upper end of the casing, as shown. The rolls 9 9 by reason of the inclination of the trough gravitate toward the lower end of the said trough, and thereby produce a sufficient tension on the carbon-sheets to keep them taut and in proper shape to be intermittently fed between the ledger and duplicate sheets to present a fresh or good working copy surface. The two carbon-sheets have a superposed position relatively to each other, are fed in unison, and the lowermost carbon-sheet passes between the lower and upper duplicator-sheets D D′, and the other carbon-sheet C passes between the sheet D and the ledger-sheet L. The duplicator-sheets D D′ are also of a roll form, and the roll portions thereof are mounted within the casing 1 on longitudinally-projecting spindles 11 11, that extend inwardly from the cross portion 1^x of the casing and in a like horizontal plane. The free ends of the sheets D D′ extend laterally from the spindle-supports 11 11 and out through a slot 1^f in the feed side of the casing, from whence in a superimposed condition they pass over a combined guide-feed and stop-roll 12, whose contacting surface is roughened, preferably, by an emery covering to produce a good frictional contact between it and the sheets D D′, whereby when the sheets are manually drawn out, as will hereinafter be more fully explained, the movement of the said sheets will impart a rotary motion to the said roll 12, the reason for which will presently appear. The sheets D D′ pass from the roll 12 transversely across the writing-surface *c*′ of the casing-top between the carbon-sheets C C′ and under the ledger-sheet L and are movable in a plane at right angles to the movement of the said ledger-sheet L. The roll 12 is journaled in a pair of brackets 13 13, mounted on the casing-frame, the upper ends of which are slotted vertically, as at 13^a 13^a, to receive the trunnions 14^a 14^a of the presser-roll 14, having a felt or other yielding covering to press the sheets D D′ against the roll 12, and to keep the said roll 14 in a proper operative position and from moving too freely or loosely over the roll 12 and also to effect a desired pressure of the said roll 14 against the roll 12 springs 15 15 are provided, which connect the trunnions and the brackets 13. To hold the roll 14 out

of contact with the roll 12 and the sheets D D′, when it is desired to adjust the said sheets a lift-pawl 16 is used for each end of the roll 14, which is pivotally mounted on the brackets 13 13 and arranged when turned up to the position shown in dotted lines in Fig. 4 to elevate the roll 14.

At the upper end of the machine is journaled a means for automatically feeding the ledger-sheet outward to a predetermined distance as the record or duplicate slips are pulled out to be torn off of the sheets D D′, and the said means consist of a roll 17, journaled transversely on the upper end of the casing with its upper face in a plane with the top thereof and a felt or other covered superposed roll 18. The roll 17 has a friction-surface whereby to firmly engage the ledger-sheet L, which during the operation of the machine passes between the rolls 17 and 18, and the roll 17 is journaled in brackets 19 19 on the end of the casing, which are slotted, as at 19^a, to receive the trunnions 18^a 18^a of the roll 18, which trunnions are firmly held in the slots and the roll 18 against the roll 17 by the springs 20. Lift-pawls 21 21 also cooperate with the trunnions 18^a of the roll 18 and hold the said roll from a feed contact with the roll 17, when so desired. The shaft 17^x of the roll 17 has a worm-gear 17^b, which meshes with a worm 12^x on the extended portion 12^y on the shaft of the roll 12, whereby motion imparted to the roll 12 is transmitted to the roll 17.

At that side of the machine opposite the one in which the roll 12 is mounted the casing has an undercut or beveled portion 1^g in register with the free ends of the sheets D D′, and operable over the said portion 1^g and in the longitudinal plane thereof is a lever 23, which serves a double function. First, it acts as a means for operating the carbon-sheet mechanism and, secondly, as a straight edge to aid in tearing off the duplicate slips. The end 23^a of the lever 23 is fixedly joined with the transversely-disposed guide-roll 3, which is held adjacent the carbon-take-up rolls, whereby when lifted, as hereinafter described, it rocks the roll or guide-bar 3 in the direction indicated by the arrow in Fig. 5 to bring a cam-lug 3^a, mounted on one end of the roll 3, into contact with the gravity-dropped stop-pawl 30, which engages with the disk member 12^d, rotatable with the feed-roll 12 and which has a peripheral stop 12^s, that coöperates with the pawl 30.

In the practical construction of my invention the correlation of the disk 12^d, its stop 12^s, and the pawl 30 is such as to provide for a predetermined feed of the sheets D D′ outward at each operation of the machine.

The carbon-take-up rolls 2 2^a each have a cog-gear 2^x 2^x on the end adjacent the lever 23, and the gear-equipped ends of said rolls are journaled in a bracket 24, in which is mounted an idler-gear 25, which meshes with the gears 2^x 2^x to impart motion to the said gears in the same direction. The lever 23 has a gravity-pawl 23^x connected therewith, which engages with one of the gears 2^x, and it also has a pendent brake member 2^y, which engages the idler-gear 25 on the lift movement of the said lever 23.

The manner in which my improved machine is adjusted for use and its operation are explained as follows: The supply-rolls from which the sheets D D′ extend are properly fitted on their spindles within the casing, and the two sheets D D′ are passed through the feed and guide rolls 12 and 14 and extended laterally over the writing-face of the machine-top 1^c. The carbon-sheets, which are loosely supported, but under tension in the upper end of the machine, are then brought up over the top 1^c and passed lengthwise of said top at right angles to the sheets D D′, one of said carbon-sheets being disposed over each of the sheets D D′, and the ends thereof are made fast to the rolls 2 2^a. The roll of record or ledger sheet paper, which is loosely mounted on the removable holder, is then placed in the open and front end of the machine, and the free end of the sheet L is passed up over the guide and rock roll 3 lengthwise over the top of the uppermost transversely-disposed sheet D and carried out through the feed-rolls at the upper end of the machine, as shown, and, if desired, the free end of the ledger-sheet may be connected with a take-up roll, as indicated in dotted lines in the drawings, the latter roll being, however, not essential, as the sheets L may be torn off in suitable lengths and bound to form an ordinary ledger-book. After the sheets D D′ have been adjusted with their outer ends over the undercut or finger recess at the side of the machine the lever 23 is turned down over the said ends, and thereby secures the ends from buckling upward or fitting loosely. The parts being operably arranged, the salesman fills out the bill on the ledger-sheet in the usual way, and by reason of the correlative arrangement of the several sheets the carbon-paper is held out of sight and free from contact with the hands of the writer. The entries made on the ledger-sheet are transferred to the sheets D D′ and produce the cashier and customer slips. The entry having been completed, the operator lifts the lever 23, and by such action he effects a slight feed of the carbon-sheets toward the inner end of the machine, (see the arrow 40,) which movement is limited by reason of the brake member of the lever engaging with the idler-gear 25. The lifting of the lever 23 also trips the pawl 30 out of a locked engagement with the stop 12^s on the disk 12^d of the feed-roll 12 and at the same time exposes enough of the ends of the sheets D D′ to enable the operator to grip the same without interfering with the adjacent edges of the carbon or ledger sheets to partially withdraw the sheets D D′ and turn the roll 12

and its disk 12^d sufficient to bring the disk stop 12^s out of alinement—that is, an interlocking position—with the pawl 30. The lever 23 is then closed down to produce a solid tearing edge and to prevent the sheets D D′ tearing off under the ledger and carbon sheet edges, and at the same time the pawl 30 is free to gravitate with its locking portion onto the peripheral edge of the disk 12^d to engage the stop 12^s when the said stop comes around again. After the lever 23 is closed down the operator pulls the sheets D D′ outward to the limit—that is, until the stop 12^s again engages the pawl 30—it being understood that the several gear connections between the ledger-sheet-feed devices and the roll 12 are such that when the sheets D D′ have been pulled out to the limit the ledger-sheet will have advanced the distance of one of its divisional bill-head or entry sections.

From the foregoing description, taken in connection with the accompanying drawings, it will be apparent that the several parts of my machine can be adjusted to produce a positive feed of the paper sheets with such accuracy and predetermined degrees that the waste of paper is reduced to the minimum. Furthermore, no special manipulation, such as crank or other hand manipulating motions usually required in other types of machines of this class for shifting the register and manifolding sheets, is required, as the ordinary or pull action on the duplicate sheets to a tearing-off position effects the proper feeding of the ledger-sheet, and the automatically-operating check devices for the roll 12 and the rolls 2 2^a accurately limits the outward-pulling distance of the sheets D D′ and the intermittent movement of the carbon-sheets.

The arrangement of the several parts as shown admits of compactly assembling them to act in a positive manner without danger of being broken or disarranged under ordinary careless manipulation thereof.

While the detailed arrangement of parts shown and described represents a preferred construction, it is manifest that the said details may be varied or modified without departing from the spirit of my invention or the scope of the appended claims.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a manifolding-register, comprising a suitable casing or frame, having a writing-surface, a record-receiving sheet movable over the said surface in one direction, a duplicating-sheet and a carbon-sheet therefor, said duplicating-sheet being movable over the writing-surface and under the record-sheet, and in a direction at right angles thereto, and said carbon-sheet movable over the duplicating-sheet and in the same direction as the record-sheet, and means controlled by the movement of the duplicating-sheet for shifting the record-sheet, for the purposes described.

2. In a machine as described, a casing having a writing-surface, a duplicating-sheet, and a carbon-sheet therefor mounted over the said writing-surface, said carbon-sheet being movable in the same direction as the record-sheet, a record-sheet mounted over the duplicating-sheet and the carbon-sheet therefor, and means controlled by the outward pull on the duplicating-sheet for moving the record-sheet in a direction at right angles thereto, and simultaneously with the movement of the said duplicating-sheet, as set forth.

3. In a machine as described, a casing having a writing-surface, a duplicating-sheet movable transversely over the said surface, a ledger or entry sheet movable upon the duplicating-sheet, a transfer-sheet transposed between the ledger or entry sheet and the duplicating-sheets, said transfer-sheet being movable in the same direction as the ledger or entry sheet, and an automatically-operated feed mechanism for moving the ledger-sheet over the duplicating-sheet at right angles to the movement of the said duplicating-sheet during the operation of pulling it out to its tearing-off position.

4. In combination with the casing, having a writing-surface; a record or entry sheet movable thereover in the longitudinal direction of the casing, a duplicating-sheet and a carbon-sheet disposed under the record-sheet, said duplicating-sheet being movable at right angles to the movement of the record-sheet, said carbon-sheet being movable in the same direction as the record-sheet and means for intermittently moving the carbon-sheet in a direction at right angles to the movement of the duplicating-sheet substantially as shown and for the purposes described.

5. In a machine as described, a casing having a writing-surface, a duplicating-sheet movable transversely over the said surface, a ledger or entry sheet movable over the duplicating-sheet in a direction at right angles thereto, a transfer-sheet disposed between the entry and duplicating sheets, the outer end of the duplicating-sheet being normally beyond the adjacent edge of the ledger or entry sheet and the transfer-sheet, means whereby the duplicating-sheet is severed on the line beyond the adjacent edge of the ledger or entry sheet and the transfer-sheet, a feed mechanism for advancing the ledger or entry sheet, said feed mechanism including a drive-roll held in frictional engagement with the duplicating-sheet, and adapted when the said duplicating-sheet is pulled outward to its tearing-off position, to impart rotation to the ledger or entry sheet feed mechanism, substantially as shown and described.

6. In a machine as described, a casing having a writing-surface, a duplicating-sheet movable transversely thereover, a ledger or entry sheet movable over the duplicating-sheet

and in a direction at right angles thereto, a transfer-sheet interposed between the entry and the duplicating sheets, a feed mechanism for advancing the ledger or entry sheet, said feed mechanism including a roller having frictional engagement with the duplicating-sheet, and adapted, when the said duplicating-sheet is drawn out, to rotate and actuate the ledger-sheet-feeding mechanism, and a stop, for the said feeding mechanism to limit the outward-pull movement of the duplicating-sheet, for the purposes described.

7. In a machine of the character stated, the combination with a frame having a writing-surface, a duplicating-sheet movable thereover, a carbon-sheet held to coöperate therewith, and a ledger-sheet movable over the duplicating-sheet in a direction at right angles thereto, and a feed mechanism for advancing the ledger-sheet, said feed mechanism including a roller held in frictional engagement with the duplicating-sheet and set in motion by pull upon the said sheet; of a stop for the said feed mechanism to limit the extent of movement thereof, said stop including a gravity-dropped detent, a lever for shifting the said detent, said lever being movable over the outer end of the duplicating-sheet, and under its normal adjustment to form a tearing edge, as set forth.

8. In a manifolding means as described, the combination with a frame, having a writing-surface, a duplicating-sheet movable over the said surface, and a ledger or entry sheet movable over the duplicating-sheet at right angles; of an intermittently-movable carbon-sheet between the entry and duplicating sheets, and means for effecting the intermittent movement of the carbon-sheet, as specified.

9. In a manifolding means as described, the combination with the entry and the duplicating sheets; of a transferring device consisting of a carbon-sheet held between the entry and duplicating sheets, said carbon-sheet adapted to move in the same direction as the entry-sheet and at right angles to the duplicating-sheet, a bobbin member, to which one end of the carbon-sheet is attached, said member being detachably mounted in a plane below the imprinting or writing surface of the carbon-sheet, and a take-up roll for the other end of the carbon mounted below the plane of the said writing-surface.

10. In a manifolding means as described, the combination with a main frame or casing, having a writing-surface, a duplicating-sheet, and an entry or ledger sheet, movable over the said surface; of a transferring means consisting of a carbon-sheet for coöperating with the entry and duplicating sheets, a take-up roll mounted below the plane of the writing-surface of the table, to which one end of the carbon-sheet is attached, a trough detachably mounted at a downward incline in the frame, and a roller for receiving the other end of the carbon loosely mounted in the said trough, for the purposes stated.

11. In a manifolding-machine as described, a casing having a writing-surface, a duplicating-sheet roll mounted in the casing, the free end of said sheet extending through one side of the casing and over the writing-surface, a record-sheet roll mounted on the casing at right angles to the duplicating-sheet roll, the free end of said record-sheet extending up over the writing-surface and the duplicating-sheet in a direction at right angles thereto, a transfer-sheet for coöperating with the record and duplicating sheets, said transfer-sheet being adapted to move in the same direction as the ledger or entry sheet at right angles to the duplicating-sheets, a feed device for engaging the free end of the record-sheet and advancing it at each complete operation of the machine, a guide-roll at one side of the casing over which the duplicating-sheet passes, for engaging the said sheet and rotatable by contact therewith, and gear connections joining the said guide-roll and the record-sheet-feed mechanism for imparting motion to said mechanism when the guide-roll is turned, as set forth.

12. In a manifolding-machine of the character described, the combination with a manually-movable duplicating-sheet, and a stop for the same, including an automatically-locking detent; of a carbon-sheet, a feed mechanism therefor, including a pivoted lever, a take-up roll to which one end of the carbon is attached, gears for turning the roll, a cam, a brake, and a gear-actuating pawl coöperatively joined with said pivoted lever, the cam being arranged to trip the stop for the manually-movable duplicating-sheet, the said gear-actuating pawl operating to turn the carbon-take-up roll as the lever is lifted, and the said brake arranged to engage the carbon-roll-actuating gear when the lever reaches the limit of its lift, as set forth.

13. In a manifolding-machine of the character described, the combination with an open-ended casing having a writing-surface, and a duplicating-sheet movable thereover; of a ledger or record sheet roll, a holder loosely and detachably mounted in the open end of the casing, said holder having a transverse seat to receive the record-sheet roll, and having a vertical guide at its inner end, the free end of said record-sheet roll being passed above the said guide, the writing-surface of the casing and over the duplicating-sheet in a direction at right angles to the said sheet, and a transferring-sheet for the record and the duplicating sheets, all being arranged substantially as shown and for the purposes described.

14. In a machine of the character described, the combination with the casing having a writing-surface, a duplicating-sheet, extended and movable over the writing-surface of the casing in a transverse direction, a ledger or

record sheet movable over the duplicating-sheet in a direction at right angles thereto, a finger-recess in that side of the casing over which the outer end of the duplicating-sheet is drawn, and a pivoted lever-arm disposed over the outer extremity of the duplicating-sheet, and the said finger-recess, adapted when raised to permit of a free grip of the outer end of the duplicating-sheet, and when lowered to form a solid tearing straight edge, substantially as shown and described.

RUFUS C. WILLIAMS.

Witnesses:
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J. H. MULLEN.