Jan. 14, 1941. M. C. STERN 2,228,419

METHOD AND APPARATUS FOR PROVIDING MANIFOLD PAPER WITH MULTIPLE COPY SHEETS

Original Filed Oct. 9, 1939 2 Sheets-Sheet 1

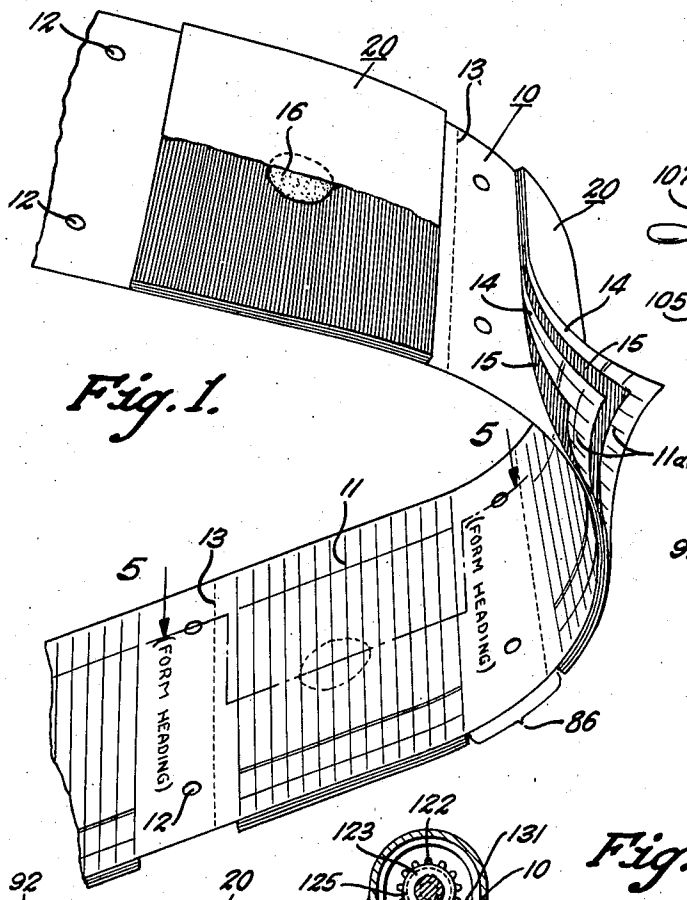


Fig. 1.

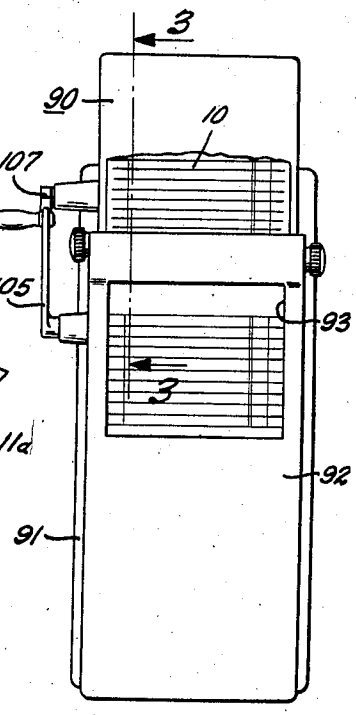
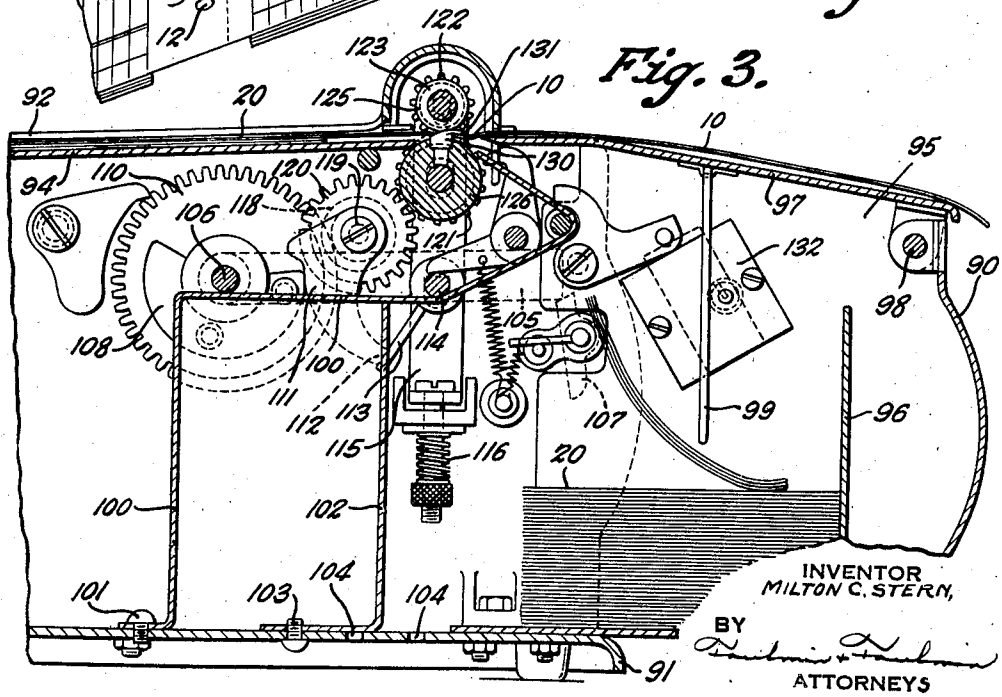


Fig. 2.

Fig. 3.



INVENTOR
MILTON C. STERN,

BY

ATTORNEYS

Jan. 14, 1941. M. C. STERN 2,228,419

METHOD AND APPARATUS FOR PROVIDING MANIFOLD PAPER WITH MULTIPLE COPY SHEETS

Original Filed Oct. 9, 1939 2 Sheets-Sheet 2

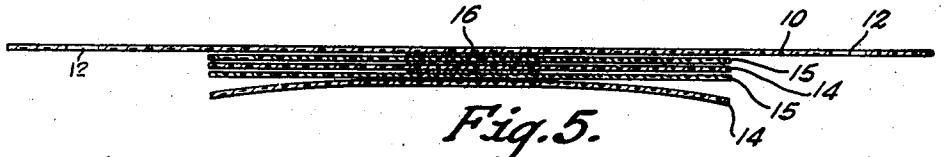


Fig. 5.

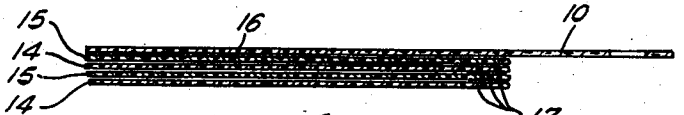


Fig. 6.

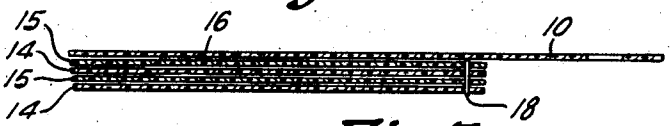


Fig. 7.

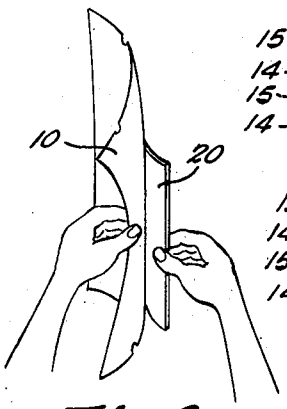


Fig. 8.

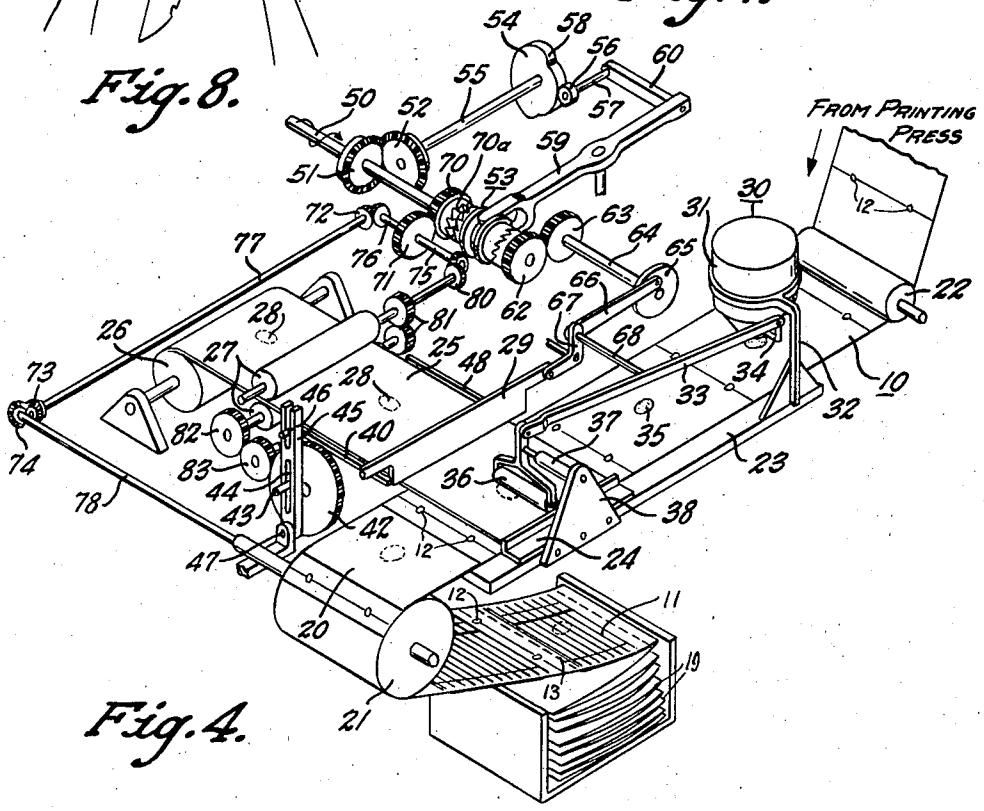


Fig. 4.

INVENTOR
MILTON C. STERN,
BY

ATTORNEYS

Patented Jan. 14, 1941 2,228,419

UNITED STATES PATENT OFFICE

2,228,419

METHOD AND APPARATUS FOR PROVIDING MANIFOLD PAPER WITH MULTIPLE COPY SHEETS

Milton C. Stern, Dayton, Ohio, assignor to The Egry Register Company, Dayton, Ohio, a corporation of Ohio

Original application October 9, 1939, Serial No. 298,667. Divided and this application March 11, 1940, Serial No. 323,355

10 Claims. (Cl. 270—52)

This invention relates to manifolding devices and more particularly to a machine and method of loading packs of multiple copy forms onto a continuous paper sheet at spaced intervals which are adapted for use in manifolding devices such as billing machines, autographic registers, typewriters, and the like mechanisms. This application is a division of my copending application Serial No. 298,667, filed October 9, 1939, and is disclosed in part in my copending application 298,666, filed October 9, 1939.

It is one object of this invention to effect a material saving in carbon paper and manifold paper copy sheet as used in manifolding devices.

Another object of this invention is to eliminate the necessity of processing carbon paper in order that it may be properly positioned between the copy sheet forms and enfolded.

Another object is to provide a machine and method of loading carbon paper in the form of built-up packs, comprising multiple copy sheets having interleaved carbon paper for duplicating the writings, onto a continuous paper web or sheet which is to be subsequently written upon and multiple copies made thereof.

Another object is to devise an economical copy sheet for manifolding devices in which the carbon paper or equivalent copy producing means together with adjacent copy sheet forms is positioned so as to cover only the writing space provided at intervals along the web upon which writing or markings are to be made. In this way a substantial saving in carbon paper as well as manifold copy sheet material is effected without lowering the efficient use of the copy web forms.

Another object is to provide an apparatus and method for removably positioning built-up multiple copy sheets in packed form on one side of a continuous manifold paper web which is adapted to be folded and used in manifolding devices.

Another object is to provide a fan-folded continuous web of manifold material having multiple carbon copy sheets in the form of packs detachably adhering to one side of the continuous web at spaced intervals and wherein the carbon copy sheets are aligned with the original and copy sheet forms so as to accurately reproduce markings or writing made on any portion of the original sheet provided for this purpose.

Another object is to devise an improved manifold paper web having carbon copy sheet pack forms attached at spaced sections therealong so that after use the carbon or duplicating paper means can be readily detached from the copy sheets without injury thereto and used over again.

This invention is described with particular reference to the use of carbon paper manifold sheets but it will be understood that this invention is applicable for use with various types of material arranged on continuous or discontinuous webs and adapted for use in devices or mechanisms of this general nature.

These and other objects will appear from the following description taken in connection with the drawings.

In the drawings:

Figure 1 is a perspective view of a section of my improved manifold web having detachably spaced packs of multiple carbon sheet forms;

Figure 2 is a plan view of an autographic register device utilizing the manifold paper web of this invention and showing the web positioned for use therein;

Figure 3 is a fragmentary sectional view through the device illustrated in Figure 2, taken on the line 3—3, showing the use of the manifold web of this invention in an autographic register;

Figure 4 is a diagrammatic perspective view of a machine for positioning the multiple copy forms on the reverse side of a continuous web or sheet provided with spaced printed forms thereon and wherein the web with attached copy forms is fan-folded into a pack suitable for use in manifold devices;

Figure 5 is a sectional view taken through the manifold paper web shown in Figure 1, taken on the line 5—5, illustrating the spot gluing of the carbon and copy sheets onto the continuous paper web;

Figures 6 and 7 are similar sectional views of the web illustrating different modifications for attaching the carbon paper and copy sheets to the web;

Figure 8 is a perspective view illustrating the method of manually removing the pack of multiple manifold sheets from a used original sheet form.

Manifold web construction

Referring to Figures 1, 5, 6 and 7, there is illustrated a continuous manifold web constructed in accordance with this invention wherein a paper web 10 is provided having spaced printed forms 11 on one side with spaced holes 12 and transverse perforations 13 formed therebetween to provide for longitudinally aligning and severing the forms in use. Mounted opposite the forms on the reverse side of the web 10 are multiple copy sheets 14 which are interleaved

with carbon paper 15. Printed forms 11a on the copy sheets 14 correspond to those on the continuous web 10 and are substantially in alignment and registration therewith.

The individual carbon paper and copy sheets are squarely aligned with the web 10 and detachably pinned or glued to each other and to said web as at 16 (Figure 1). Alternatively the copy paper sheets and carbon paper 14 and 15, respectively, may be fastened together by the use of glue or adhesive, as shown at 17 (Figure 6) or by stapling means, as illustrated at 18 (Figure 7). Any suitable means may be utilized for detachably securing the carbon paper and copy sheets together and in turn fastening them to the web so long as the carbon paper and copy sheets are readily detachable.

Preferably the paper web or continuous sheet 10 is previously processed so as to provide it with spaced printed forms, as illustrated in Figure 1, but it will be obvious that the manifold web need not have forms printed thereon where it is desired to omit the same and provide suitable means for positioning the writing web and attached copying sheets so that the manifold web may be used efficiently.

Loading of manifold web with multiple copy sheets

For positioning the multiple copy sheet pack, generally designated 20, on the back of the continuous web 10 opposite the printed forms 11 the mechanism illustrated in Figure 4 is employed.

The web 10 preferably as it comes from the printing press or previous processing mechanism whereby it is provided with spaced printed forms and tear-off hinge sections therebetween, is drawn by suitable gripper rolls 21 and guide roll 22 so as to advance the web over the table 23. The web is moved along over the table and aligned by the elongated L-shaped guide means 24 positioned on the outer edge of the table. The side of the web opposite the printed forms is in upward position as it is moved over the table and a continuous sheet of multiple copy sheet 25 is fed transversely thereover from the storage roll 26 by means of the gripper rolls 27. The copy paper and carbon sheet make up the continuous multiple copy sheet member 25 and the built-up carbon and copy sheet layers are detachably held together at predetermined intervals by stapling or spot gluing, as illustrated at 28. It will be appreciated that any pracitcal number of carbon copy forms may make up the copy pack sheets 25.

In loading the multiple copy sheet 25 onto the back of the web 10 the copy sheet is squarely arranged thereover so as to be properly aligned with the paper web forms. Movement of the paper web and carbon copy sheet 25 is synchronized so that registration of the copy sheet with the spaced forms on the opposite side of the web 10 is effected, after which the movement of the webs and copy sheets is momentarily stopped while the copy sheet 25 is suitably attached and thereafter severed from the continuous copy sheet 25 along the edge of the paper web by means of a knife 29, as illustrated in Figure 4, or other appropriate cutting mechanism. The web 10 is then moved forward over the roll 21 and fan-folded along the perforated sections 13 into the form of a pack as at 19.

Carbon and copy sheet attaching means

For securing the pack of multiple copy sheets 25 onto the back of the forms making up the continuous web or sheet member 10, a gluing mechanism generally designated 30 is provided. This comprises a glue or adhesive dispensing means 31 which is mounted on a support 32 and arranged in such a manner that the glue is dispensed centrally onto the web 10. The dispensing of the glue or adhesive onto the web is automatically actuated by reciprocation of the lever 33 and coacting member 34 to deliver a small quantity of glue or adhesive in the form of a spot 35 onto the back of the web 10 as the web is moved thereunder.

If desired the adhesive may be dispensed in the form of a spray and will be delivered onto the surface of the web centrally between the tear-off sections as illustrated in Figure 4.

Attached to the opposite end of the lever 33 is a pressing roller member 36 which is adapted to be reciprocated above the pivot support means 37 to lightly press the copy sheet and interleaved carbon paper layer 25 against the adhesive portion 35 on the web and secure it in place prior to severing the copy sheet layer from the continuous sheet. The roller 36 is suitably positioned above the web and copy sheet by means of the pivot arm 37 which is mounted at the outer end in the uppermost portion of the end plate member 38 attached to the table 23.

Provision may also be made for vertically and horizontally adjusting the position of the pressing roller 36 to accommodate the thickness of the paper web and carbon sheets. In some instances, where the weight of the carbon paper and copy sheets is sufficient, the use of the pressing roller 36 may be omitted.

To prevent the copy sheet material from contacting the wet glue or adhesive as the copy sheet layer is advanced across the web 10, a reciprocable platform member 40 is arranged to be moved outward transversely over the web 10 and beneath the multi-copy sheet layer 25 supporting it out of contact with the wet glue portion of the web until the same is in proper position to be brought in contact with the web. Preferably the platform 40 will be provided with square upturned outer edges 48 to maintain the copy sheet layer 25 in proper alignment during positioning of the copy sheets onto the web. After the copy sheet layer 25 has been positioned over the web 10, the member 40 is retracted, as shown in Figure 4, so as to lower the copy sheet material onto the web in contact with the glue 35.

Means for reciprocating the member 40 is provided for by the gear wheel 42 which carries a crank pin 43 working in a longitudinal slot 44 of the rod 45. The upper end of the rod 45 is slotted to accommodate the pin 46 which is secured to the side of the platform 40. The opposite end of the member 45 is pivoted at 47 so that it can be rocked back and forth to reciprocate the platform 40 outward and backward over the table 23.

Driving mechanism for manifold loading mechanism

The mechanism illustrated in Figure 4 is preferably automatically actuated and is arranged to be operated by a suitable prime mover, not shown, which is arranged to continuously drive the shaft 50, attached gears 51 and 52 and the two-way clutch gearing generally designated 53. A cam member 34 is provided for controlling the clutch mechanism 53 and is rotated by the gear 52 and connecting shaft 55. Cam roller 56 is

positioned on the shaft 57 and is arranged to roll over the cam surface 58 to move the pivoted fork 59 by means of the outermost attached arm member 60 which is pivotally secured to the outermost end of the cam roller shaft 57. Reciprocation of the fork 59 actuates the clutch 53 so as to connectingly drive the web and copy sheet 25 and associated mechanism, and when shifted to the opposite position connects the mechanism for positioning the copy sheet 25 onto the web and severing it from the copy sheet roll.

When the clutch is shifted to the right, as shown in Figure 4, the gear 62 is engaged and driven which in turn actuates the gear 63, shaft 64, driving wheel 65, reciprocating the knife member 29 by means of the rod 66 and bellcrank 67. The application of adhesive, and actuation of the roller 36 are brought about when the driving connection is made through the member 68 which is attached to one arm of the bellcrank 67 and reciprocates the dispensing actuating member 33. During the gluing of the copy sheets to the web 10 and severing of the copy sheet layer 25 it will be noted the web and copy sheet remain stationary.

Upon shifting the lever 59 to the left the gear 70 is engaged by the teeth 70*a* of the clutch and is rotated. Rotation of the gear 70 brings about movement of the web 10 and copy sheet 25 by means of the train of gears 71, 72, 73, 74 and connecting shafts 75, 76, 77 and 78. Suitable gearing 80, 81, 82 and 83 is provided for actuating the gripper rolls 27 to draw the superimposed copy sheet layer 25 from the roll 26 and reciprocate the platform 40. The latter is reciprocated by means of the gear 42 which is rotated by the gear 83 to swing the member 45 back and forth and slidably engage the pin 46 to reciprocate the platform 40.

It will be observed that the cam means 54 controls the mechanism so that the feeding of the web and the copy sheet 25 into position to be glued together and the dispensing of the adhesive onto the web and severing of the copy sheet layer are performed automatically and in proper sequence. By this method of loading the copy sheet onto the back of the manifold forms, a considerable saving of carbon paper and copy sheet material is effected. In this instance the multiple copy sheet or packs 25 are positioned over the writing space only, as shown in Figure 1, and the space between the forms which is not used for writing purposes, as at 86, is left free of copying material.

Use of improved manifold web in manifolding devices

In Figures 2 and 3 there is shown an autographic register device which is adapted for utilizing the improved manifold sheet forms of this invention. The register device is of conventional construction and comprises a casing 90 mounted on a base 91. A hinged cover portion 92 is provided having a writing opening 93. Suitably positioned therebeneath is a writing table 94. The forward end of the device comprises a storage compartment 95 for receiving the copy sheet packs 20 which are detached, in use, from the original writing sheet 10.

To maintain the copy sheet packs 20 aligned with one another an upstanding guard member 96 is positioned in the forward part of the compartment 95. A lid 97 is pivoted on the transverse rod 98 mounted in the side walls of the storage section. Depending from the underside of the lid 97 is a swingable copy sheet guide finger member 99.

The rear wall of the storage compartment 95 comprises an S-shaped partitioning member 100. This member is preferably made of one piece, as illustrated in Figure 3, and is attached at its lower extremity to the bottom of the device by suitable set screws 101. A guide plate member 102 is adjustably attached by the set screw means 103 which are adapted to be positioned in any one of the holes 104 so as to align the rearward edges of the copy pack sheets 20.

It will be understood that in use suitable length sections of the web sheet 10 with attached copy sheet which have been fan-folded, as shown in Figure 4, are positioned in the manifolding device.

In the autographic register device shown in Figures 2 and 3, the web 10 and attached copy forms are fed forward through the machine by turning the crank 105 and associated shaft 106. The handle 105 is adapted to be grasped and turned through a circle during which movement the web feeding and ejecting mechanism is actuated to complete one cycle of operation, after which the handle comes to rest against a stop pin 107. For starting another cycle of operations, the pin 107 is pushed inward by the finger of the operator when grasping the handle in the usual manner.

Shaft 106 carries a master gear 110 and a spreading cam 108. This spreading cam engages the cam follower arm 111 and an extended finger 112 which abuts against the arm 113 carried on the cam shaft 114. Cam shaft 114 extends through the lifting plates 115 on either side of the register which are yieldingly held by the spring 116 in their lowered position. The master gear 110 drives the pinion 118 on the stud 119 carried by the side wall of the device. Also mounted on the stud is the gear 120 which drives the gear 121. Gear 121 rotates the gear 122 of the upper roller 123. This roller is carried at either end of the lifting plates 115. The projecting ends of the roller fit loosely in the side walls of the device. The upper roller 123 is provided with a knurled sleeve 125 which cooperates with the lower knurled sleeve on the roller 126 for drawing the manifolding web 10 through the device.

Aligning pins 130 are mounted so as to be driven at a slower rate of speed and independently of the ejecting mechanism. The aligning pins 130 are adapted to engage in the holes 12 of the web 10 as it is drawn through the device and longitudinally align the form so that each cycle of operation will advance the web the proper distance to expose the form upon which writing is to be made. The overhanging ledge means 131 on the pins 130 act as holding means when the paper is pulled upwardly to tear it off after the original sheet form has been ejected as shown in Figure 3. In operation of the device the original writing web portion 10 will be ejected while the copy sheet pack 20 is detached therefrom as the web is ejected out over the cover portion 97. Suitable locking means 132 is provided for preventing unauthorized operation of the device.

It will be understood that this article of manufacture can be produced in a variety of ways and that this invention is not limited to the particular machine shown or to the exact method of mounting the manifold material onto the paper web. Further the invention is not limited to the continuous form of sheets as it is obvious that discontinuous webs may be used. It is also under-

stood that I desire to secure within my invention such modifications as may be necessary to adapt it to varying conditions and uses.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. An improved method of providing material to be written or marked upon with manifolding paper and copy sheet means, comprising the steps of (*a*) arranging said manifold paper and copy sheet together and aligning them to form the manifold sheet papers, (*b*) detachably fastening said copy sheet papers together at intervals, and (*c*) securing the same onto said material to be written upon at spaced intervals.

2. An improved method of providing a continuous paper web which is to be written or marked upon with manifold paper sheet means, comprising the steps of (*a*) bringing said manifold paper sheet comprising writing and carbon paper sheets in aligned superimposed relationship to form the number of copies desired, (*b*) fastening said carbon sheet and writing papers together at spaced intervals, (*c*) superimposing said assembled manifold paper on said paper web, (*d*) severing said manifold paper along the edge of said web so as to provide a copying means on the back thereof, and (*e*) fan-folding said web and attached manifolding means in the form of a fan-folded pack.

3. An improved method of providing a continuous web of paper with attached manifold paper means, comprising the steps of (*a*) providing manifold paper consisting of writing sheet with interleaved carbon paper, (*b*) detachably fastening the manifold paper sheets together at spaced sections, and (*c*) detachably attaching severed portions of the build-up manifolding members at spaced intervals along one side of said continuous paper web.

4. An improved method of providing a continuous web of paper with manifold paper means, comprising the steps of (*a*) providing aligned writing paper and copy sheets to form a continuous sheet of manifold papers, (*b*) detachably fastening the manifold paper members together, (*c*) detachably attaching severed portions of the build-up manifolding members at spaced intervals along one side of said continuous paper web, and (*d*) fan-folding the continuous web in the form of a pack.

5. In a method of providing material to be written upon to produce multiple copies, the steps of providing a master original sheet, providing a plurality of superimposed sheets of carbon paper and of paper to be written upon by impressing on the carbon paper, said sheets being of the same substantial dimensions and of lesser lengths than the main original sheet; and collating the carbon and paper sheets into a detachable pack and detachably attaching said pack to the main sheet on the underside thereof.

6. An improved method of loading multiple manifolding sheets comprising interleaved carbon paper onto the underside of a continuous web of paper which is to be subsequently written upon, comprising moving the web of paper therealong, simultaneously advancing a continuous sheet of manifold papers transversely thereover, said manifold sheet comprising aligned writing paper sheet and interleaved carbon paper, said aligned manifold paper sheet being positioned on the back of said web and attached thereto, said attached manifold sheet portion being severed from said continuous manifold sheet after the same is secured to said web.

7. An improved method of loading a continuous master manifold paper web sheet with multiple manifold paper forms having interleaved carbon sheets, comprising positioning prealigned superimposed manifold paper having interleaved carbon sheet onto said web at spaced intervals therealong, and detachably securing said multiple manifold papers and web sheet together so as to provide a continuous writing paper sheet having manifold paper sheet in the form of a pack attached thereto.

8. An improved method of loading a continuous manifold paper web with multiple manifold paper sheet having interleaved carbon paper in the form of individual packs at spaced intervals along said web, comprising aligning superimposed manifold paper sheet and carbon paper and detachably securing said superimposed manifold sheets together at intervals, transversely positioning said manifold paper sheet material on said web, detachably securing the adjacent manifold paper sheet thereto and severing said manifold paper sheet material and interleaved carbon paper along the edge of said web, and fan-folding the continuous web having the attached manifold paper sheet material in the form of a pack.

9. An improved method of loading multiple manifold sheet material having interleaved carbon paper onto the reverse side of a master continuous web with spaced forms on the opposite side thereof, comprising transversely positioning a continuous sheet of built-up manifold paper material having interleaved carbon paper onto said web at spaced intervals therealong so as to register with the spaced forms on the opposite side of the master web, severing said continuous built-up manifold paper sheet and interleaved carbon paper along the edge of said web, and fan-folding the continuous master web between the spaced manifold paper sheet forms into a pack.

10. An improved method of providing a continuous sheet of writing material with multiple manifold paper sheet packs having interleaved carbon paper, comprising superimposing manifold paper sheet and interleaved carbon paper, aligning the sheets and detachably securing the sheets together, and removably securing portions of said aligned manifold paper material onto said continuous writing paper sheet at spaced intervals along said writing sheet.

MILTON C. STERN.