March 29, 1960 W. D. WINDERS, SR., ET AL 2,930,632

MANIFOLD BUSINESS FORMS AND METHOD OF PRODUCING THEM

Filed March 6, 1958 2 Sheets-Sheet 1

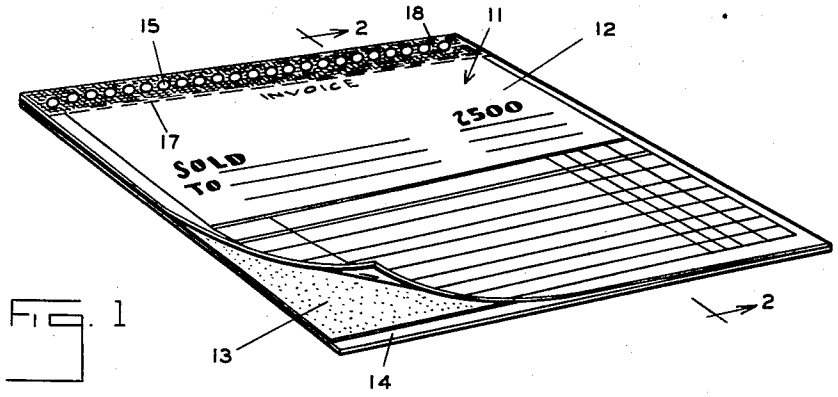


Fig. 1

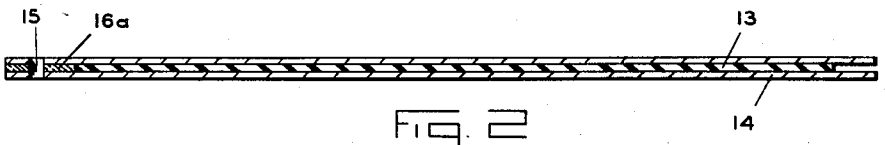


Fig. 2

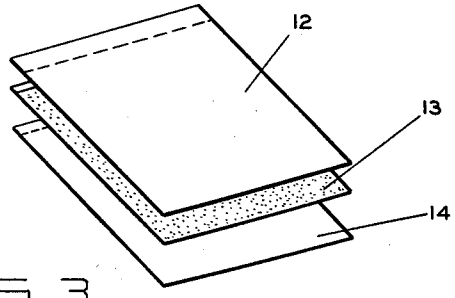


Fig. 3

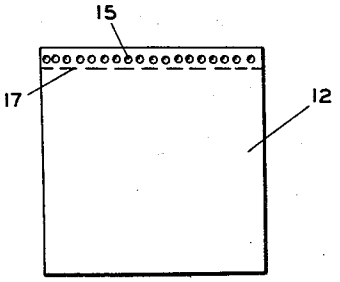


Fig. 4

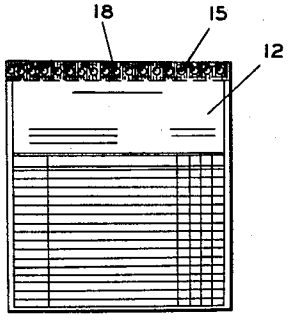


Fig. 5

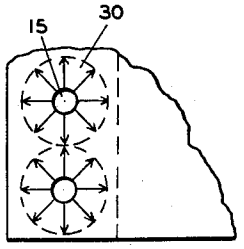


Fig. 6

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March 29, 1960 W. D. WINDERS, SR., ET AL 2,930,632

MANIFOLD BUSINESS FORMS AND METHOD OF PRODUCING THEM

Filed March 6, 1958 2 Sheets-Sheet 2

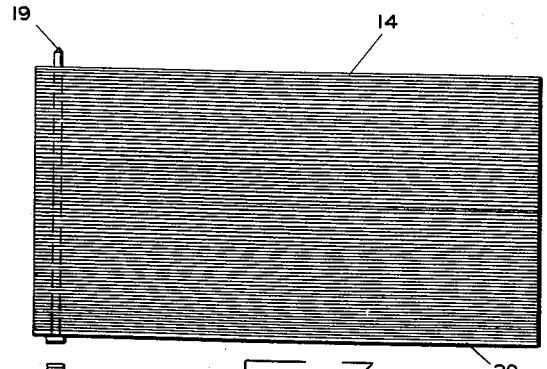


Fig. 7

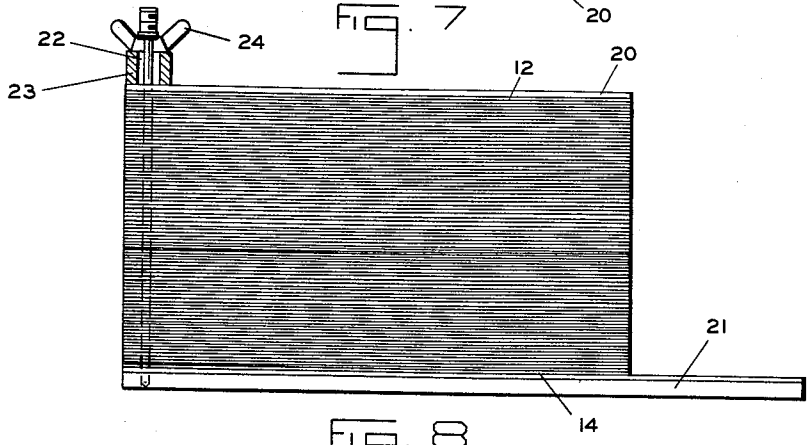


Fig. 8

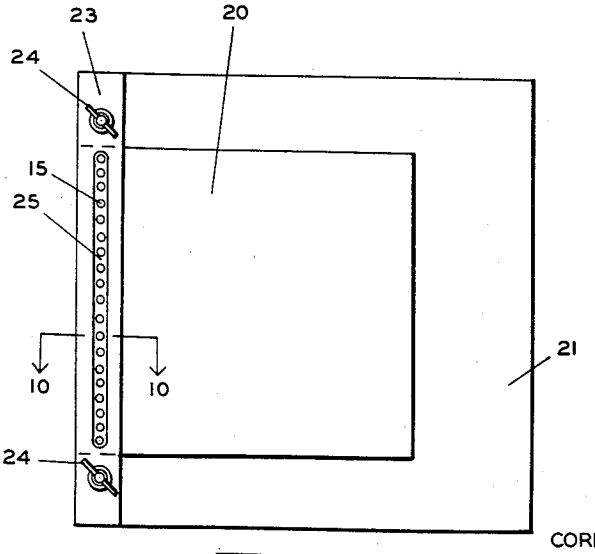


Fig. 9

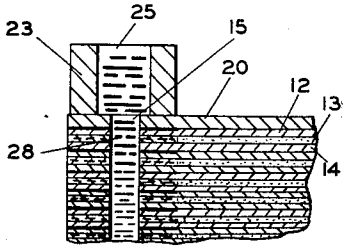


Fig. 10

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MANIFOLD BUSINESS FORMS AND METHOD OF PRODUCING THEM

William D. Winders, Sr., and William D. Winders, Jr., Columbus, Ohio

Application March 6, 1958, Serial No. 719,591

1 Claim. (Cl. 282—22)

Our invention relates to manifold business forms and method of producing them. It relates to that type of manifold business form which is composed of a plurality of separate sheets, usually including at least one transfer sheet or carbon, which are joined together at one edge by means of an adhesive to form a manifold unit. In the accompanying description, we will refer to our invention as being applicable to a form including a carbon transfer sheet but it will be understood that it is also applicable to manifold forms which use transfer sheets or coatings of the chemical type rather than the carbon type.

It is customary to make this type of manifold form unit in large quantities on complicated and expensive high-capacity production machines. We have determined that there is a need whereby these manifold form units could be produced in reasonable quantities by the users of these form units without investing in complicated and expensive machinery. Different types of form units are needed for various purposes and it would be desirable to produce these different units in reasonable numbers as needed for a particular purpose.

It is the main object of our invention to provide a novel, simple, and inexpensive process using simple and inexpensive equipment whereby manifold transfer forms can be produced in reasonable numbers economically.

Another object of our invention is to provide a manifold transfer form which has novel characteristics.

Various other advantages will be apparent.

According to our invention, we select the various sheets to form the manifold unit and assemble them into the separate group-forming units. To secure the sheets of each group together at one edge, we apply adhesive in a novel manner. The adhesive is applied through punches adjacent one edge of the sheets so that it will seep outwardly from the punches between the sheets and cause them to adhere to each other. This is accomplished while the groups are in a pile and some means must, therefore, be provided to prevent the group units from adhering together. We provide for this by printing or otherwise applying adjacent to the punched edge a coating, which is applied either to the top surface of the uppermost sheet of each group or to the bottom surface of the lowermost sheet of each group. This coating will be of such a nature that the adhesive will not adhere thereto. Thus, adjacent upper and lower sheets of each group will not adhere to each other and, therefore, the units will not adhere.

Our invention is illustrated in the accompanying drawings in which:

Figure 1 is a perspective view of a manifold form unit of three superimposed sheets produced according to our invention.

Fig. 2 is a sectional view taken along line 2—2 of Figure 1.

Figure 3 is a perspective view showing the three separate sheets to be joined in the manifold form unit.

Figure 4 is a plan view of one of the sheets showing how it is punched before being joined into the manifold unit.

Figure 5 is a view of the topmost sheet of a unit showing it printed along an area adjacent the punched attaching edge with ink so that adhesive will not stick to that area.

Figure 6 is an enlarged detail showing the annular areas between the sheets and adjacent the punches which carry the adhesive that causes adjacent sheets of the manifold unit to adhere to each other.

Figure 7 is an edge view of a pile of sheets and illustrates one of the first steps in assembling the separate sheets into group-forming units.

Figure 8 is a similar view and illustrates the next step of clamping all the sheets together preparatory to applying the adhesive.

Figure 9 is a plan view of the assembly of Figure 8.

Figure 10 is an enlarged vertical sectional view taken along line 10—10 of Figure 9 showing how the adhesive will seep between the adjacent sheets onto annular areas around the punches.

With reference to the drawings, in Figures 1 to 6 we have illustrated a manifold form 11 produced according to our invention. As previously indicated, this form 11 may consist of a unit composed of a selected number of sheets, some of which are transfer sheets. In these drawings, we have illustrated the form unit 11 as being composed of two main sheets with a third intermediate transfer sheet of the carbon type. Thus, in Figure 1, we have shown the unit 11 as comprising the top sheet 12 which is a printed form of a suitable type, the intermediate carbon sheet 13, and the bottom sheet 14. These sheets are all secured together at one edge which is provided with a plurality of longitudinally spaced perforations or punches 15 which extend completely through the form unit. As indicated in Figure 2, the attaching edge of the intermediate carbon sheet 13 is preferably formed with a narrow strip or wick area 16*a* which is more absorbent than the carbon part of the sheet. Each of the sheets preferably is provided with a perforated or weakened tear line 17 to facilitate separation from the attaching edge. The attaching edge of the top sheet 12 is printed along a narrow band 18, between the tear line 17 and the adjacent edge, for a purpose which will be described more in detail.

In forming the unit 11, the three sheets 12, 13, and 14 are first selected. They are then provided at their attaching edges with a set of the punched openings 15. These openings may be placed in any desired spaced relationship and they may serve as the openings for incorporation of the forms or individual sheets into loose-leaf binders if this is desired. The topmost sheet 12 is shown in Figure 4 but this figure can represent any of the sheets. The next step is preferably the printing of the top sheet 12 which may be any desired printed form and which is illustrated in Figure 5 after printing. During the printing of the sheet 12, the band of ink 18 is also preferably printed thereon. This ink will be such that it will prevent adhesive from soaking into this printed band area. As pointed out previously, this printed area 18 could just as well be on the lower surface of the lowermost sheet 14 but the following description will refer to it as being on the top surface of the topmost sheet 12.

The next step is indicated in Figure 7 where the sheets are assembled in inverted sequence to form groups of three sheets which will provide for the various units 11. They will be so assembled that the printed band 18 of each unit will be contacting the adjacent area of the sheet 14 of the unit next below. The sheets may be assembled in a stack on pointed pins 19 which extend

upwardly from the heavy cardboard or sheet **20**. The sheet **20** will be punched in the same manner as the individual sheets.

When the individual sheets are thus assembled into groups to form the desired units as a stack resting on the cardboard **20**, they are placed on a clamp board **21** which may be of a suitable type such as that shown in Figure 8. This board **21** may be provided with a pair of upstanding threaded clamping pins **22** which are anchored to one edge of the clamp board **21**. To transfer the stack to the board **21**, it is merely necessary to invert the stack of Figure 7 and properly align the pins **22** with the proper pair of selected openings **15** in the stack. After the stack is positioned on the board **21**, a clamping bar **23** is slipped over the pins **22** and clamping wing nuts **24** are threaded on the upper ends of the pins **22** so as to cause the bar **23** to clamp the sheets down against the board **21**. It will be noted that the heavy sheet of cardboard **20** will now be on top to protect the topmost sheet **12** of the stack, it being understood that all the sheets **12** of all groups will now be uppermost.

It will further be noted from Figure 9 that the clamp bar **23** is provided with a slot **25** which extends almost the full length of the form sheets but terminates slightly within the side edges thereof. This slot **23** provides a trough for adhesive. Adhesive in liquid form is now applied in this trough and is allowed to flow down into the various punches **15**, as shown in Figure 10, or it may actually be directed into each bore with a funnel or dripper. This adhesive will seep out radially from all of the columns **28**, corresponding to the punches **15**, and will seep between the individual sheets as indicated by the arrows in Figure 6. The degree of clamping of the sheets together on the clamp board **21** will be sufficient to prevent free flow of the adhesive but sufficient flow around the punches **15** to cover the desired annular area **30**. Thus, between each pair of adjacent sheets there will be adhesive covering a small annular area **30** around each punch **15**. This adhesive will also flow between the lowermost sheet **14** of any unit and the uppermost sheet **12** of the unit next below in the stack. However, because of the printed band **18** on the topmost sheet of the lower unit, this adhesive will merely stick to an annular area of the sheet **14** surrounding each punch **15** and not to the corresponding area of the sheet **12**. Therefore, the adjacent units **11** will not adhere but can be readily separated when the adhesive dries. Excess adhesive may be poured from the trough **27** and the punches **15**, and the clamped stack of units **11** are allowed to dry sufficiently. Then the units **11** can be taken from the board **21** and separated as desired.

The adhesive will penetrate and stick to the absorbent strip **16*a*** along the carbon sheet but, as previously indicated, carbon paper need not necessarily be employed. It is only necessary that the attaching edge of each sheet be such that the adhesive will adhere thereto. Also, the area **18** need not be printed with ink but can be treated with some other substance which will prevent the adhesive from adhering thereto.

It will be apparent that this invention provides for a simple and inexpensive process using simple and inexpensive equipment whereby manifold transfer forms can be produced as desired. Each of these transfer forms will consist of a plurality of superimposed sheets, one preferably being a transfer sheet of a suitable type, the individual sheets being joined to each other along an annular area surrounding each punch formed therein adjacent its edge, the attaching punched edge of either the uppermost sheet of the unit or the lowermost sheet of the unit being treated with a substance which makes it non-absorbent to the adhesive used in adhering the sheets of the unit together.

According to the provisions of the patent statutes, the principles of this invention have been explained and have been illustrated and described in what is now considered to represent the best embodiment. However, it is to be understood that, within the scope of the appended claim, the invention may be practiced otherwise than as specifically illustrated and described.

Having thus described our invention, what we claim is:

The method of producing multiple copy business forms from writing sheets and impression-transfer sheets which have first areas of impression-transferring material and second areas devoid of such material and which are more absorbent than the first areas, which comprises assembling in alternating vertically stacked order a plurality of said writing sheets and impression-transferring sheets with each of the impression-transferring sheets disposed between two of said writing sheets, forming vertically extending apertures inwardly from the margin and through said sheets in line with the second areas, applying a liquid adhesive within said apertures and causing at least a portion of said adhesive to be absorbed by the second areas in the regions thereof adjacent said apertures, and thereafter causing said adhesive to set to thereby adhesively secure said sheets to one another in the said regions.

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