Jan. 15, 1946. H. P. CURMODE ET AL 2,392,976

PERFORATED MULTIPLE PART FORM SHEET

Filed Oct. 15, 1943

FIG. 1

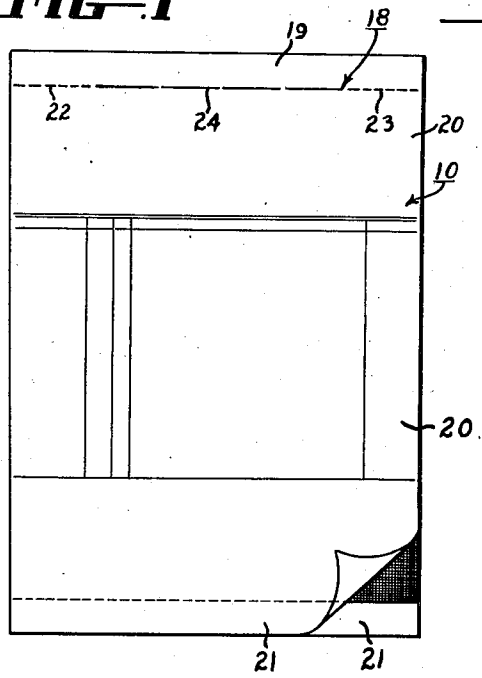


FIG. 2

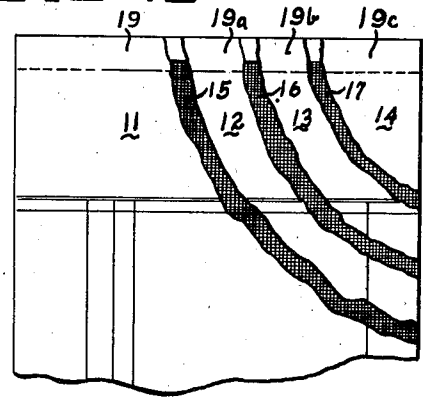
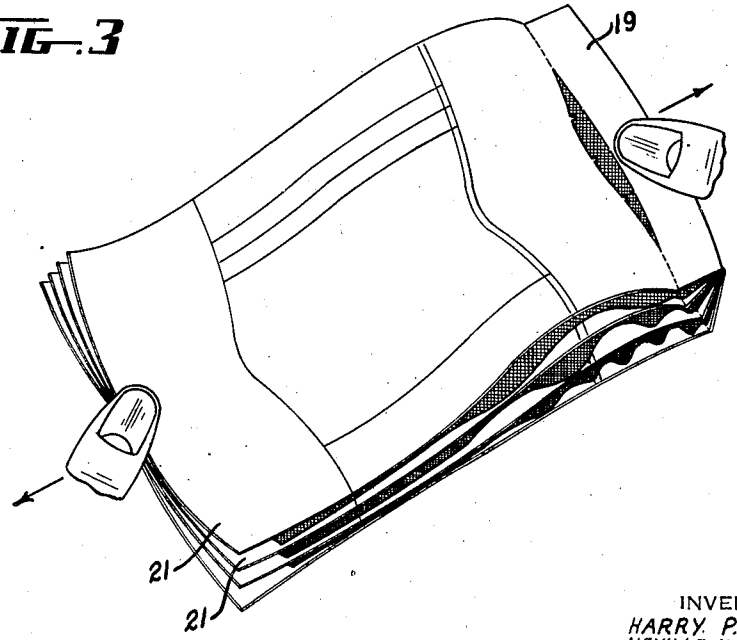


FIG. 3



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PERFORATED MULTIPLE PART FORM SHEET

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10 Claims. (Cl. 282—22)

This invention relates to multiple copy form sets having carbon sheets interleaved between paper sheets, and particularly to the means for retaining the individual sheets of paper and carbon in adjacent secured relationship in a set and for providing means for readily separating the paper sheets and withdrawing the interleaved carbon sheets from therebetween.

An object of the invention is to provide a multiple sheet form set having primary sheets and interleaved secondary sheets therebetween wherein the individual sheets are retained to a stub member in such a manner that all or any of the primary sheets can be removed from the stub of the set by merely pulling on opposite ends of the set without the necessity of a sudden snap action or jerk to initiate the separating movement of the sheets from the stub of the set.

Another object of the invention is to provide a multiple copy form set in accordance with the foregoing object wherein the individual sheets of the form set are attached to a stub member by means of a perforated line that is relatively strong adjacent opposite edges of the sheets and relatively weak in the center portion of the sheet whereby separation of the sheets from the stub member occurs from the center of the sheets toward the opposite edges thereof.

A still further object of the invention is to provide a multiple sheet form set wherein the sheets are perforated across the same with relatively small perforations adjacent opposite edges of the sheets to provide a relatively stronger bond between the parts of the sheets adjacent the edges thereof than occurs in the center part of the sheet wherein relatively long perforations are provided for weaker purposes.

Further objects and advantages will become apparent from the drawing and the following description.

In the drawing:

Figure 1 is a plan view of a multiple sheet form set constructed in accordance with the teaching of this invention.

Figure 2 is a plan view of a multiple sheet form set wherein the various individual sheets of paper and carbon have been broken away to illustrate the various layers that may compose the plural sheet set.

Figure 3 is a perspective elevational view illustrating the manner by which the multiple copy form set of this invention separates along the line of perforation across the top of the sheet so as to remove the carbon sheets from between the individual paper sheets and sever the paper sheets from the stub member that holds the form set together.

One of the major difficulties in the use of multiple sheet form sets is the severance of the individual sheets of a form set from the stub of the set. Many of the previous multiple sheet form sets that have been produced use perforations across the sheets of the set and then provide specially arranged corners on the set that can be grasped between the fingers of an operator whereby the set can be given a quick snap to begin the severance of the sheets from one edge to the other of the same. In the usual multiple copy form sets the carbon sheets are interleaved between the paper sheets and permanently attached to the stub member so that when the individual paper sheets are severed from the stub member, the carbon sheets will be removed from between the individual paper sheets. However, it has been extremely difficult to teach operators to properly hold and snap the multiple copy form sets whereby the functioning of the severance operation of the individual sheets from the stub of the set can be properly performed. If the set has any great number of sheets it becomes extremely difficult for women operators to apply sufficient snap to the form set to initiate the severance or tearing operation simultaneously on all of the copies of the set.

The invention disclosed herein overcomes the difficulties that have been previously evperienced in this connection so that an operator using a multiple sheet form set of any number of sheets and weight of paper, can readily initiate the severance operation of the individual sheets of the set.

The multiple sheet form set 10 of this invention consists of a plurality of individual sheets 11, 12, 13 and 14. These individual sheets have carbon sheets 15, 16 and 17 interleaved therebetween so that an impression placed upon the top sheet 11 will be transferred to all of the lower sheets 12, 13 and 14. Each of the individual sheets 11, 12, 13 and 14 are provided with a line 18 of perforations extending from one edge to the other across the sheets whereby one end 19 of each of the sheets is adapted to form a stub element from which the main body 20 of the sheet is severed. The stub elements 19, 19*a*, 19*b* and 19*c* of the sheets 11, 12, 13 and 14 are secured together along the upper edge thereof so that all of the individual sheets are secured together in juxtaposed position. The carbon sheets 15, 16 and 17 are suitably secured to one of the paper sheets adjacent the same,

the carbon sheets 15, 16 and 17 being attached to the adjacent paper sheet in the stub end of the form set. The opposite ends of the carbon sheets 15, 16 and 17 are somewhat shorter than the paper sheets 11, 12, 13 and 14, as illustrated in Figure 1, whereby there is provided an area between the paper sheets that is not covered by a carbon sheet and may be referred to a thumb-grasp or finger-grasp area 21.

From the foregoing description it will now become apparent that if the paper sheets 11, 12, 13 and 14 are grasped between the fingers of the operator in the finger-grasp area 21 and the stub 19 is grasped between the fingers of the opposite hand of the operator and the sheets severed along the perforation line 18 that the stub element 19 and all of the carbon sheets will be removed from the individual paper or primary sheets, and the carbon sheets will be withdrawn from between the paper sheets.

To provide for easy manipulation of this severing or tearing operation of a multiple sheet form set the perforation line 18 on each of the paper or primary sheets 11, 12, 13 and 14 is provided with a series of relatively small perforations 22 and 23 extending toward the center of the sheet from opposite edges of the sheet. Between the short lines of relatively small perforations 22 and 23 there is provided a line of relatively long perforations 24 that is in alignment with the short lines of small perforations 22 and 23. The single line of perforation is therefore composed of two lengths of perforations whereby the long perforations 24 in the center of the sheet provide a line of weakness that is substantially weaker than the line of weakness provided by the small perforations 22 and 23.

When assembling the individual paper sheets together the lines of perforations are placed in juxtaposed relationship as illustrated in Figure 2. The short lines of small perforations 22 and 23 provide means whereby the edges of the individual paper sheets will be maintained in a relatively strong condition to resist any tendency of tearing of the sheets from the edges toward the center. In fact, the small perforations may be stopped short of the edge of the sheet so that the sheet edges will be continuous thereby further resisting any tendency toward tearing of the sheet edges at the perforation line.

By referring to Figure 3 the operation of severing, or tearing, the stub end 19 from the individual sheets and removing the carbon sheets from between the paper sheets will become apparent. When the operator grasps the stub end 19 between the fingers of one hand and the finger-grasp area 21 at the opposite end of the set between the fingers of the opposite hand and pulls in opposite directions, as illustrated by the arrows, the perforations 24 will be the first to permit severance of the stub ends 19 from the primary sheets of the multiple sheet form because the center portion of the perforation line composed of the long perforations 24 is the weakest point of connection between the stub end 19 and the body 20 of the sheet. It will also become apparent that the operation illustrated in Figure 3 causes a movement of the sheet at the center thereof before any other part of the sheet has a tendency to move and thereby the tearing force is concentrated at the center or weakest part of the line of perforation. It will now become apparent that with the center perforation 24 being broken, as illustrated in Figure 3, that there is a definite tearing action developed along the perforation line consisting of the small perforations 23 and since this tearing action is developed by an angular movement of the edges of the stub end 19 and the body 20 of the sheets it will be apparent that the perforation lines 22 and 23 can be readily severed even though they are naturally stronger in their attaching relationship between the stub end 19 and the body 20 of the sheet when the sheet is in flat condition, as illustrated in Figure 1.

There is a further inherent severance operation obtained when the operator applies force in opposite directions upon one of the form sets constructed in accordance with the teaching of this invention. That is, there is a natural tendency for the paper sheets to buckle in the center and cause a spreading or separation of the sheets relatively to one another to increase the space between the same as illustrated in Figure 3, note the edges of the sheets and the condition of the carbon paper therebetween. This spreading action is aided by the tendency of the carbon paper to crumple between the paper sheets thus forcing them apart. When this operation occurs, and the operator's thumb is upon the stub end 19, the pressure of the thumb will naturally apply the pressure of severance to the line of perforations closest to the point of pressure application, which in this instance would be the top sheet 11. After the top sheet 11 begins tearing and the severance line 24 begins to open, the pressure of the thumb will be automatically transferred to the next lower sheet and cause severance of this sheet in the same manner. Thus, there is provided means whereby the individual sheets are initiated in severance individually and sequentially from the top to the bottom of the pack so that the operator thus is not required to sever all of the sheets simultaneously. It will thus become apparent that the severance of the multiple form set constructed in accordance with this invention requires substantially less effort on the part of the operator than when all of the sheets must be initiated in severance simultaneously by a snap action between opposite ends of the set and along one edge of the same. The method of individual severance of the sheets of a multiple sheet set thus becomes an improvement over the method of simultaneous severance of a plurality of sheets in a multiple sheet set.

While the invention illustrated and described herein constitutes a preferred form thereof, yet it is understood that the invention is capable of modification without departing from the spirit of the invention, and that all such modifications as fall within the scope of the appended claims are intended to be included herein.

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

1. A multiple sheet form set having substantially coinciding perforated lines extending across the set upon which the sheets of the set are severed from a stub portion of the set, said perforation line being characterized by a short series of relatively short perforations adjacent each edge of the set joined by an intermediate series of perforations of substantially greater length, said intermediate series extending for at least one-third of the total width of the sheet.

2. A multiple sheet set wherein the sheets are joined together in a stub portion of the sheet each sheet having a perforated line of weakness extending across the same, substantially coincident with the said lines of the other sheets and

along which the sheets are severed from the stub end, each line of weakness being characterized by having the central perforated portion of substantially less strength than the end perforated portions, whereby the severance of the line of weakness occurs initially in the center portion of the sheet, said central portion being at least one-third of the total length of the line.

3. A paper sheet having a perforated line of weakness extending substantially across the same to divide the sheet into two parts, said line of weakness being characterized by having the central perforated portion of substantially less strength than the end perforated portions, said central portion being at least one-third the total length of the line whereby severance of the sheet begins at the center portion of the line of weakness when a pull is applied to opposite ends of the sheet in the middle portion thereof.

4. A multiple sheet set having a plurality of sheets provided with lines of weakness to divide the same into two parts and along which the parts of the sheets are severed and including other sheets interleaved between the first mentioned sheets that are secured to one of said parts of said first mentioned sheets and removed from interleaved relationship from between the first mentioned sheets when the first mentioned sheets are separated along the lines of weakness therein, said lines of weakness being characterized by portions adjacent opposite edges of the sheet respectively having relatively short perforations to attach the two parts of said first mentioned sheets relatively strongly and an intermediate portion joining said first mentioned portions having perforations that are longer than the first mentioned portions whereby the center portion of the two parts of the first mentioned sheets are held together rather weakly whereby separation of said two parts along the line of weakness begins at the center portion thereof.

5. A multiple sheet form set that includes in combination, a plurality of principal form sheets each having a perforation tear line extending across the sheet to divide the same into two parts and secured together in the area comprising one of the parts, said perforation line being weaker in the central portion thereof than adjacent the edges of the sheet, and secondary sheets interleaved between and substantially coextensive with said principal form sheets and secured to said one part on one side of said perforation line, said interleaved sheets having a cut-away area at the end of the principal form sheets opposite to the location of the perforation line whereby to provide a finger-grasp area, said weakened central portion being at least one-third of the total length of said tear line.

6. In a multiple sheet set, a plurality of superposed form sheets joined together at one end edge, each sheet having a weakened perforated tear line adjacent to said edge and substantially coinciding with the tear lines of the other sheets, each tear line being characterized by a central perforated portion and end perforated portions, said central portion being weaker than said end portions and extending for at least one-third of the total length of the line whereby the free ends of the sheets may be separated as a unit from the set by a pull applied centrally of the sheets substantially normal to said tear lines.

7. In a multiple sheet set as in claim 6, other sheets interleaved between the form sheets and joined thereto along said end edge, said other sheets being substantially coextensive with said form sheets except for a limited grasping area centrally of the free ends of said sheets.

8. In a multiple sheet form set, a plurality of superposed form sheets secured together along one side edge, each sheet being divided into stub and main sections by a weakened tear line parallel to said edge and substantially coinciding with the tear lines of the other sheets, each said line consisting of first sets of relatively short slits adjacent the respective ends of said line and a second set of longer slits connecting said first sets whereby all main sections may be simultaneously separated from the stub sections by a single pull centrally of and normal to said lines.

9. In a multiple sheet set, a plurality of superposed sheets, each sheet having a weakened perforated tear line extending across the sheet and substantially coinciding with the tear lines of the other sheets, each tear line being characterized by a central perforated portion and end perforated portions, said central portion being weaker than said end portions and extending for at least one-third of the total length of the line whereby the corresponding superposed parts of the sheets may be separated along the tear lines from the adjacent corresponding superposed parts of the sheets by a pull applied centrally of the sheets substantially normal to said tear lines.

10. In a multiple sheet set, a plurality of superposed sheets, each sheet having a weakened perforated tear line extending across the sheet and substantially coinciding with the tear lines of the other sheets, each tear line being characterized by a central perforated portion and end perforated portions, said central portion being weaker than said end portions whereby the corresponding superposed parts of the sheets may be separated along the tear lines from the adjacent corresponding superposed parts of the sheets by a pull applied centrally of the sheets substantially normal to said tear lines.

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