May 27, 1952 L. L. DRITZ 2,598,042

HOLE CUTTER FOR USE WITH FRAGILE BODIES

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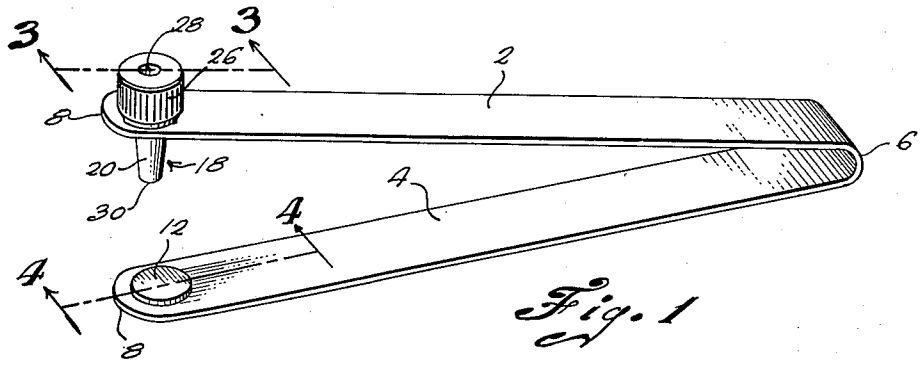


Fig. 1

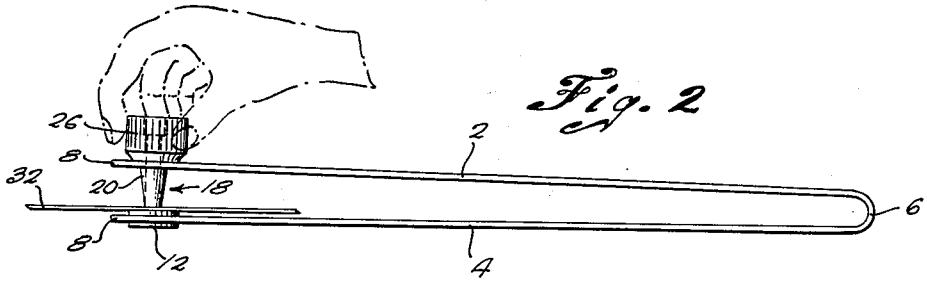


Fig. 2

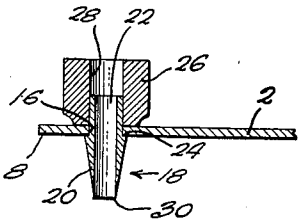


Fig. 3

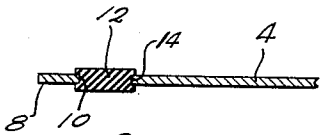


Fig. 4

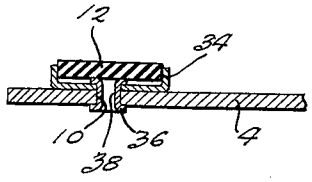


Fig. 5

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HOLE CUTTER FOR USE WITH FRAGILE BODIES

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5 Claims. (Cl. 164—119)

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The present invention relates to a hole cutter particularly adapted for use with fragile bodies.

It is often necessary to form holes of carefully controlled dimensions at precise points on sheets which, because of their fragile nature, are not susceptible for use with hole punchers or cutters of conventional construction. For example, if a single thin sheet of tissue paper be apertured by means of a conventional paper punch, the hole formed therein will usually be extremely rough at the edges and often the sheet itself will be torn or otherwise deformed by reason of the punching operation. Apparently the inherent strength and rigidity of the tissue paper is insufficient to withstand the strains placed upon it by the punch. A somewhat similar effect obtains when thin or soft woven fabrics are similarly acted upon. Thus, if a thin silk sheet is punched, the fibres will be pulled and ripped rather than cleanly severed, and the resultant aperture is not only unsightly but constitutes a sector from which runs or tears are likely to develop.

It nevertheless is often necessary that holes be formed in such fabrics in a neat and precise manner. For example, dressmaking patterns such as are used by the home dressmaker are normally imprinted upon very thin tissue sheets, and many styles of such patterns do not have apertures at the points where many dressmaking operations are to be performed on the fabric of which the dress is to be constructed, but instead have printed marks. In the use of these patterns the tissue sheets are placed over and properly aligned upon the dress fabric and it is necessary that the fabric itself be marked in accordance with the markings on the pattern. The accepted method of marking is to project chalk, crayon or pencil through the pattern at the points in question so as to leave some indicia on the dress fabric. If the marking implement be pushed through the pattern tissue paper, the hole made thereby will be very unsightly and the pattern will be so damaged as to impair its continued life, it being understood that the same pattern, once it has been caused to conform to the figure of an individual, is often used over and over again. Also, it is often desired to form neat and precisely located holes in the dress fabric itself or in the relatively fragile lining thereof.

It is the prime object of the present invention to devise a structure particularly adapted for the cutting of holes in fragile sheets in such a way that the holes will be neat and clean and the fragile sheet will be undamaged.

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Another object of the present invention is to devise such an instrument which is simple in construction and operation, which is dependable, which is relatively fool-proof, which is extremely inexpensive to manufacture, and which may be easily adapted for the cutting of holes of various sizes.

Yet another object of the present invention is to devise a hole cutter particularly adapted for use with thin tissue paper dress patterns for the cutting of holes therein at appropriate points.

To the accomplishment of the foregoing objects and such other objects which may hereinafter appear, the present invention relates to the construction of a hole cutter as defined in the appended claims and as set forth in this specification, taken together with the accompanying drawings, in which:

Fig. 1 is a side perspective view of the hole cutter of the present invention;

Fig. 2 is a side view showing the hole cutter in use;

Fig. 3 is a side cross-sectional view taken along the line 3—3 of Fig. 1;

Fig. 4 is a side cross-sectional view taken along the line 4—4 of Fig. 1; and

Fig. 5 is a view similar to Fig. 4 but illustrating another embodiment.

The cutter comprises a pair of elongated arms 2 and 4, joined together at one end 6 and being unconnected at the other and free end 8. The connection at the joined end 6 is resilient and is so constructed that the arms 2 and 4 will normally assume the position disclosed in Fig. 1 in which the free ends 8 are appreciably separated one from the other, the resilient connection permitting the two arms 2 and 4 to be moved toward one another until they assume the position disclosed in Fig. 2, this motion being opposed by the resiliency of the connection between the arms. In the preferred form here illustrated, each of the arms 2 and 4 are formed of thin metal sheet material and are integrally joined together at 6, the material, such as spring steel, having a resiliency such that the bend at 6 imparts the desired characteristics to the arms 2 and 4. This disclosed method of construction also makes fabrication extremely simple and economical. The two arms 2 and 4 and their connection 6 may be stamped from a single metal sheet in the form of a continuous strip and that strip may then be bent to the shape disclosed in Fig. 1. Obviously a large number of such strips may be simultaneously formed and simultaneously bent, thus materially reducing cost of construction. The two

arms 2 and 4 as formed are disposed one above the other.

One of the arms, here disclosed as the arm 4, in one embodiment, illustrated in Fig. 4, is provided with an aperture 10 near its free end 8 and a soft pad 12 of, for example, rubber, is secured within the aperture 10. As may best be seen from Fig. 4, the rubber pad 12 is provided with a peripheral recess 14 into which the edges of the aperture 10 are received and, because of the softness of the pad 12, it may, when its usefulness is at an end, be removed from the aperture 10 merely by pushing it out therefrom, after which a new pad 12 may be forced thereinto.

The alternative embodiment illustrated in Fig. 5 discloses a structure in which fabrication of the pad 12 and its replacement in the hole cutter are facilitated. To that end, a cup 34 is secured to the upper surface of the arm 4 by means of eyelet 36 which passes through the aperture 10. The rubber pad 12 is shaped in a manner complementary to the interior of the cup 34 and is so dimensioned as to fit snugly inside said cup, frictional engagement between the sides of the cup 34 and the sides of the pad 12 sufficing to retain the pad 12 in position. When it is desired to replace the pad, all that is necessary is for a pencil or other tool to be inserted up through the hollow bore 38 of the eyelet 36 so as to force the pad 12 out of the cup 34. A new pad 12 may be inserted into the cup 34 merely by the application of pressure thereto.

The other arm, here disclosed as the arm 2, is also provided at a point near its free end 8 with an aperture 16 and the cutter generally designated 18 is mounted therein. This cutter may take the form of a tube 20 having an upper portion 22 passable through the aperture 16 and projectable thereabove and having a shoulder 24 engageable with the underside of the arm 2 so as to limit its position with regard thereto. A handle in the form of a knurled knob 26 is secured to the portion 22 of the tube 20, the knob 26 having a central bore 28 which encompasses the upwardly projecting portion 22 of the cutter 20 and is secured thereto either by a press-fit, a weld, adhesive or by any other means. The tube 20 terminates at its lower end projecting downwardly from the arm 2 in a sharp edge 30 which defines the cutting edge. The apertures 10 and 16 in the arms 4 and 2 respectively are so positioned that when the arms 2 and 4 are moved together, the cutting edge 30 of the cutter 18 will rest upon the upper surface of the pad 12.

The manner of use of this device will in the main be fully apparent from an examination of Figs. 1 and 2. The two arms 2 and 4 normally assume a separated position so that the cutting edge 30 is spaced from the pad 12. A sheet 32 of tissue paper or other thin fragile material is inserted between the arms 2 and 4 until the area where a hole is to be formed overlies the pad 12. The operator's hand grasps the handle 26 and pushes the arm 2 toward the arm 4 until the cutting edge 30 of the cutter 18 just touches the upper surface of the sheet 32. Only one hand is required for this operation and hence if any precise adjustment of the sheet 32 is necessary in order that the cutting edge 30 be in exactly proper position on the sheet 32, the other hand of the operator is free to grasp the sheet 32 and make the necessary adjustment. Thereafter, continued downward pressure is exerted on the handle 26 and at the same time the handle 26 is rotated, thus causing the cutting edge 30 to rotate. This pressure causes a deformation of the upper surface of the pad 12, but only to a very slight degree, and the hole in the sheet 32 is cut rather than punched therein. As a result, the edges of the hole are neat and clean, the fibres of the sheet 32 are cut and not severed, and hence the sheet 32 is undamaged. The portion of the sheet 32 which has been excised normally remains inside the hollow portion of the tube 20, but because both the tube 20 and the handle 26 are centrally apertured, these excised portions may be removed from the cutter 18 either by passing a pin down through the bore 28 in the handle 26 and the hollow central portion of the tube 20, or by merely blowing therethrough.

If different sized holes are to be formed, the handle 26 need merely be removed from the portion 22 of the tube 20, after which the tube 20 may be removed from the aperture 16, and a new tube having the desired internal dimensions can be substituted therefor. After a relatively large number of holes have been cut by this device, the upper surface of the pad 12 may be so severely cut by the cutting edge 30 as to require replacement of the pad. This may, as has already been set forth, be conveniently accomplished. It will be noted that before a pad 12 need be replaced, it can be turned over so that its formerly unmarred lower surface will become its upper surface.

By reason of the elongated nature of the arms 2 and 4, this device can easily be used with dress patterns or the like since the arms are ordinarily long enough to reach any central portion of the pattern without having to deform, fold or bend the edges thereof. Since only one hand is required for the manipulation of this device, great accuracy is obtainable, the other hand of the operator being free to perform and required adjustments.

The device itself is exceedingly inexpensive to construct and simple to assemble. In the illustrated embodiment it is composed of but four parts, the arms 2 and 4 defining one part, the pad 12 defining the second, the tube 20 defining the third, and the handle 26 defining the fourth. All of these parts are made of relatively inexpensive material, are susceptible of mass production, need not be manufactured to precise tolerances, and may be assembled by even the most unskilled help.

While but one embodiment of this invention has been here illustrated, it will be apparent that many variations may be made in the details thereof all within the spirit of the invention as defined in the appended claims.

I claim:

1. A hole cutter for use with fragile bodies comprising a pair of elongated arms resiliently joined together at one end and free at the other end, said arms normally assuming a separated position but being movable together, a pad of soft rubber-like material near the free extremity of one arm, and a cutter freely rotatably but nontranslatably mounted near the free extremity of the other arm, said cutter comprising a handle for rotating the same and a cutting edge projecting toward said one arm and so positioned as to engage said pad when said arms are moved together, said fragile body being insertable between said separated arms and said cutter and said pad cooperating to cut a hole in said body when said arms are moved together and said cutter is rotated, said cutter being manually rotatable to any desired degree and in any desired di-

rection or directions as said arms are moved together.

2. A hole cutter for use with fragile bodies comprising a pair of elongated arms resiliently joined together at one end and free at the other end, said arms normally assuming a separated position but being movable together, a pad of soft rubber-like material near the free extremity of one arm, and a cutter freely rotatably but non-translatably mounted near the free extremity of the other arm, said cutter comprising a tube passing through said other arm and having a cutting edge projecting toward said one arm and so positioned as to engage said pad when said arms are moved together, and a handle secured to said tube on the other side of said other arm from said cutting edge access to said handle being unobstructed, said fragile body being insertable between said separated arms and said cutter and said pad cooperating to cut a hole in siad body when said arms are moved together and said cutter is rotated, said cutter being manually rotatable to any desired degree and in any desired direction or directions as said arms are moved together.

3. A hole cutter for use with fragile bodies comprising a pair of elongated arms integrally connected at one end and free at the other end, said arms being formed of a resilient bendable material and normally assuming a separated position but being movable together, a pad of soft rubber-like material near the free extremity of one arm, and a cutter freely rotatably but non-translatably mounted near the free extremity of the other arm, said cutter comprising a handle for rotating the same and a cutting edge projecting toward said one arm and so positioned as to engage said pad when said arms are moved together, said fragile body being insertable between said separated arms and said cutter and said pad cooperating to cut a hole in said body when said arms are moved together and said cutter is rotated, said cutter being manually operated to any desired degree and in any desired direction or directions as said arms are moved together.

4. A hole cutter for use with fragile bodies comprising a pair of elongated arms integrally connected at one end and free at the other end, said arms being formed of a resilient bendable material and normally assuming a separated position but being movable together, a pad of soft rubber-like material near the free extremity of one arm, and a cutter freely rotatably but non-translatably mounted near the free extremity of the other arm, said cutter comprising a tube passing through said other arm and having a cutting edge projecting toward said one arm and so positioned as to engage said pad when said arms are moved together, and a handle secured to said tube on the other side of said arm from said cutting edge access to said handle being unobstructed, said fragile body being insertable between said separated arms and said cutter and said pad cooperating to cut a hole in said body when said arms are moved together and said cutter is rotated, said cutter being manually rotatable to any desired degree and in any desired direction or directions as said arms are moved together.

5. A hole cutter for use with fragile bodies comprising a long thin strip of resilient bendable material bent intermediate its length so as to define a pair of elongated arms integrally connected at one end and free at the other end and normally assuming a diverging position but being movable together, registering apertures in said arms near the free ends thereof, a shouldered tube having a depending cutting edge freely rotatably but non-translatably mounted in the aperture in the upper of said arms with its shoulder bearing against the undersurface of said arm and a portion of said tube extending above the upper surface of said arm, a knob fixed to said extending tube portion and having a bore in line with and communicating with the interior of said tube, said tube and knob defining a manually-rotatably cutter, the top surface of said upper arm adjacent said knob being clear of obstruction so that access to said knob is free, and a pad of soft rubber-like material in the aperture in the lower of said arms, said fragile body being insertable between said separated arms and said cutter and said pad cooperating to cut a hole in said body when said arms are moved together and said cutter is rotated, said cutter being manually rotatable to any desired degree and in any desired direction or directions as said arms are moved together.

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