May 9, 1967 HEINZ-HERMANN SCHMITZ 3,318,595

FASTENING DEVICE

Filed Dec. 28, 1964

FIG. 1

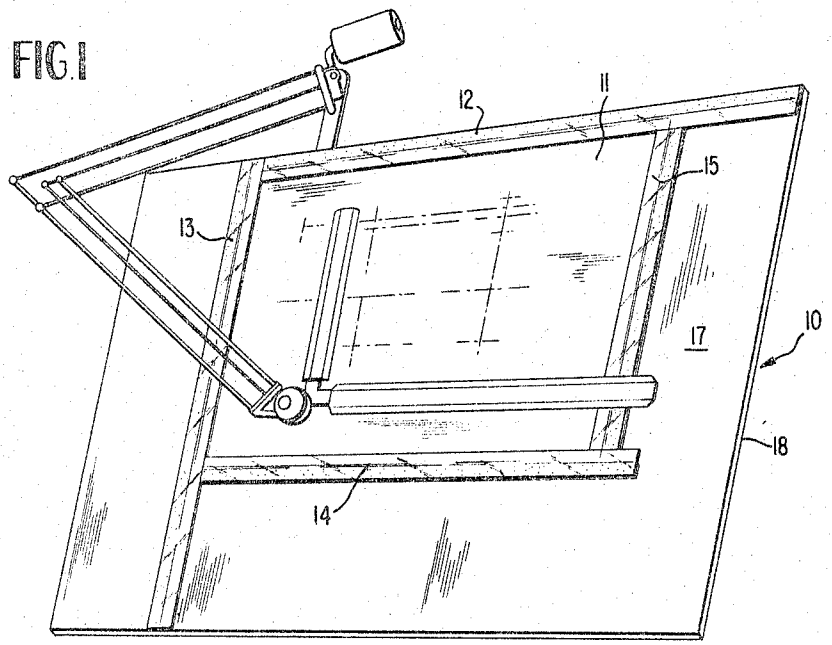
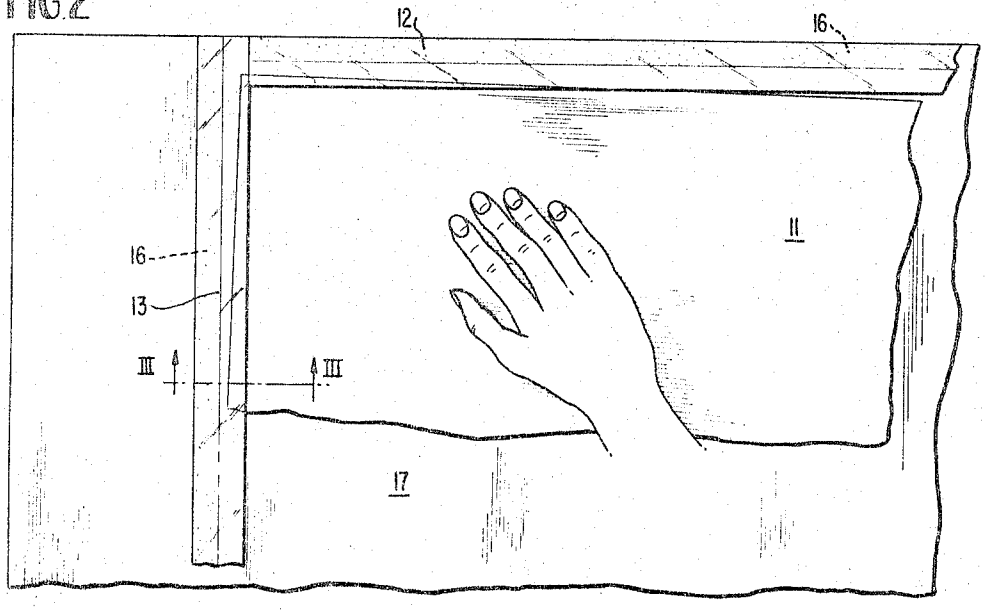


FIG. 2



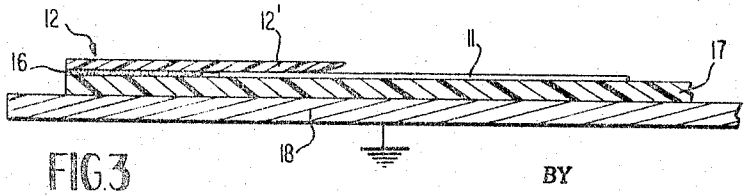


FIG. 3

INVENTOR
HEINZ-HERMANN SCHMITZ

BY Dicke & Craig

ATTORNEY

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FASTENING DEVICE

Heinz-Hermann Schmitz, 7 Franziskanerstrasse, 4152 Kempen, Germany

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11 Claims. (Cl. 269—289)

The present invention relates to a fastening device, and more particularly to a puncture-free fastening device for fastening paper or foil sheets on drawing boards, reproduction walls or the like.

A puncture-free fastening of paper or foil sheets to drawing boards or reproduction walls involves a number of inconveniences and disadvantages which present obstacles either during drawing work or when fastening or releasing such paper or foil sheets. While the thumb tack continues to be the simplest and easiest remedy, its use is barred for plastic drawing materials and valuable drawing foil sheets. Drawing sheets are taped to an increasing extent, using strips of self-adhesive tape coated on either one or both sides, which must be applied with great care, and which nevertheless will in most cases leave objectionable residues.

Magnetic devices which are very expensive, are quite suitable, especially for reproduction purposes, but they are not suitable for drawing boards where they would be in the way of the drawing tools or they would require very complicated apparatus and installations.

The electrostatic charge in plastics is an ideal means of fastening light to medium-heavy papers and foils, only its effect is not long lasting so that, e.g., drawing sheets, which may at the beginning have shown good adhesion, often come off overnight and thus slip off the board.

According to the present invention, a device for fastening drawing and reproduction copy sheets is used which utilizes from one to three different systems and forces of adhesion, as may be required and possibly all in combination, and which thereby achieves the degree of fastening which may be required for a given application with the minimum possible efforts and expenditures in each case.

Accordingly, it is an object of the present invention to provide a fastening device for fastening paper or foil sheets on drawing boards or reproduction walls which avoids, by extraordinarily simple means, the shortcomings and drawbacks encountered with the prior art devices.

Another object of the present invention resides in the provision of a fastening device for paper or foil sheets which entails no obstruction to the drawing implements used normally with drawing boards and which additionally excells by its simplicity in the mounting and unmounting of the sheets.

A further object of the present invention resides in the provision of a fastening device which is simple in construction, effective for its intended purposes, and relatively inexpensive.

A still further object of the present invention resides in the provision of a fastening device for fastening sheets onto drawing boards or onto reproduction walls which assures safe and long-lasting mounting of the sheets and foils and which is relatively independent of changes in climatic conditions, especially in humidity of the surrounding air.

Another object of the present invention resides in the provision of a fastening device of the type described above which can be used repeatedly and is absolutely safe against tearing or damage to the edges of the sheets or foils.

A still further object of the present invention resides in the provision of a fastening device fastening sheets

onto drawing boards which does not obstruct the drawing tools and implements, such as rulers, triangles, T-squares, and the like.

Still another object of the present invention resides in the provision of a fastening device for paper sheets and plastic foils which eliminates the danger of tearing or damaging the edges and corners of the sheets and foils yet holds the sheets and foils safely in place.

Still a further object of the present invention resides in the provision of a mounting and fastening device for paper sheets and plastic foils which facilitates greatly mounting and unmounting of the sheets and foils from drawing boards and the like.

These and other objects, features, and advantages of the present invention will become more obvious when taken in connection with the accompanying drawing which shows, for purposes of illustration only, one embodiment in accordance with the present invention, and wherein:

FIGURE 1 is a somewhat schematic perspective view of a fastening device in accordance with the present invention, used with a drawing board,

FIGURE 2 is a partial plan view, on an enlarged scale, of a corner of the fastening assembly of FIGURE 1 in accordance with the present invention, and

FIGURE 3 is a somewhat schematic partial cross-sectional view on a greatly enlarged scale and taken along line III—III of FIGURE 2.

Referring now to the drawing wherein like reference numerals are used throughout the various views to designate like parts, reference numeral **10** generally designates a drawing board which may be of conventional type but preferably is of a construction to be more fully described hereinafter. The sheet or foil of drawing **11** either of paper or any conventional plastic material is mounted and fastened onto the drawing board **10** by means of the fastening device in accordance with the present invention. The latter comprises a plurality of holding rails **12, 13, 14,** and **15** each made of transparent or translucent plastic material, such as polyvinyl chloride or polystyrene. Each holding rail **12, 13, 14,** and **15** is provided over about one-half of its width, that is over about 12 to 15 mm. of its width of about 30 to 35 mm. on one side thereof with a layer of conventional self-adhesive material schematically indicated in FIGURE 3 by reference numeral **16** which is covered, as is also conventional, by a protective strip prior to use of the holding rail, such protective strip being adapted to be removed or pealed off in any conventional manner.

In FIGURE 3 the sheet **11** of paper is shown slipped underneath the portion **12'** of the holding rail **12** not provided with self-adhesive material whose free edge is bent up slightly to facilitate insertion of the sheet.

To increase the holding force produced by electrostatic charge, it is preferable to use a plastic base **17** of any suitable material, for example, polyvinyl chloride, and in order to delay the disappearance of the electrostatic charge, a metal plate **18** is preferably used which is grounded for the purpose as schematically indicated in FIGURE 3.

By way of a practical example use is made of approximately 35 mm. wide and about 0.25 to 0.5 mm. thick transparent holding rails made from polyvinyl chloride ("Astralon") which allow electrostatic pick-up and which in their longitudinal direction are provided at one edge with a 12–15 mm. wide self-adhesive tape **16** which is coated on both sides thereof. These rails **12, 13, 14,** and **15** frame the sheet **11** to be fastened in the manner to be described more fully hereinafter.

Broadly speaking, the procedure for mounting the fastening means of the present invention is to arrange at first

two holding rails at a right angle to each other so that it is possible to slip the sheet into the angle formed by the two rails after the free edges thereof have been raised. In the case of larger sheet sizes, the other two edges of the sheet are then fastened by means of identical plastic holding rails, while with smaller sheet sizes a fastening of two or three edges often is sufficient.

More specifically, for purposes of mounting and fastening a drawing sheet **11** onto the drawing board **10**, at first, the base **17** on which the drawing sheet is to be mounted is cleaned in any conventional manner. Next, a relatively long holding rail **12** is selected having transparent edge portion whose protective strip (not shown) is removed from the self-adhesive tape portion **16** thereof. This holding rail **12** is then mounted flush with the upper edge of the drawing board, as indicated in FIGURE 1. The holding rail **12** is thereupon pressed onto the drawing board so as to adhere securely thereto by means of self-adhesive tape portion **16**. Next, a line perpendicular to the left end of the holding rail **12** and at a distance of the width of the holding rail, in the illustrated embodiment, 35 mm., is laid out on the drawing board **10** by means of a pencil or the like along the left end of the holding rail **12**. A shorter holding rail **13** with transparent self-adhesive edge is, upon removal of the protective strip thereof, accurately placed upon the drawing board with the outer edge thereof along the thus laid-out mark and is secured thereto by placing the holding rail **13** with the self-adhesive material facing the support **17**. The two holding rails **12** and **13** thus mounted form a permanent holding angle which is thereupon electrostatically charged by rubbing the same by means of a charging cloth, made for example from wool or nylon fibers.

Next the drawing sheet **11** is placed upon the board, is straightened out and is thereupon slipped at first under the left holding rail **13**, preferably with the free edge thereof slightly bent up as shown in FIGURE 3 to facilitate installation. Next, the sheet **11** is placed into proper position on the board by being similarly slipped under the free edge of the upper holding rail **12** and is adjusted into the correct position until a slight clamping thereof by the rails **12** and **13** is noticed.

Next, the holding rail **14** is installed, if necessary, in such a manner that the inner edge of the self-adhesive tape portion **16** thereof is spaced about 2 mm. from the edge of the sheet **11**. Finally, the holding rail **15** is installed in the manner similar to that of the holding rail **14**, again leaving a space of about 2 mm. between the inner edge of the self-adhesive tape portion **16** and the edge of the drawing sheet. Such spacing facilitates expansion or "working" on the part of the drawing sheet **11**. The holding rails **14** and **15** are thereupon also electrostatically charged in the same manner as holding rails **12** and **13** by rubbing the same with the charging cloth. The parts of the plastic base **17**, not covered by the drawing sheet **11**, may now be discharged again in any conventional manner if dust accumulation thereon is to be avoided.

For removing the drawing sheet only the right holding rail **15** has to be removed if a sheet of similar size is to be used again. For sheets or foils of other sizes, also the lower holding rail **14** has to be removed and adjusted. Upon removal of the holding rails the places where the tape portions thereof adhered to the base **17** should always be cleansed by means of any suitable solvent such as benzine, carbon tetrachloride, or the like.

It can be readily seen that the fastening device of the present invention protects the drawing sheets or foils against damages along the edges thereof yet permits sufficient freedom of movement for proper use. Additionally, the drawing sheet remains clean and undamaged while the exchange of sheets can be undertaken rapidly and without difficulties.

The fastening effect increases the further the edge of the sheet is inserted underneath the holding rail towards the self-adhesive edge thereof. When using suitable self-adhesive compounds of flexible formulation, the adhesion of the edge of the sheet **11** to the self-adhesive edge of the rail is clearly noticeable.

It is only when the sheet is exposed to a violent to-and-fro-stress by a beginner working with drawing tools and utensils that it may be advisable to tape down one edge of the sheet by a very narrow strip of the self-adhesive edge of the tape portion **16** of the holding rail. Although the holding rail or strip will then keep the sheet firmly in place, it can be released with relatively very great simplicity and ease as compared with customary ordinary self-adhesive tapes, the reason for this being the considerably greater thickness of the holding rail. Repeated and frequent use of these holding strips or rails is possible before it becomes necessary to renew or replace the self-adhesive edges thereof.

The holding strips or rails become especially effective with plastics drawing materials or supports, for instance of PVC or polystyrene, which may also be electrostatically charged, as needed, by means of charging cloths made e.g. from wool or nylon fibres. A dissipation or discharge of the electrostatic charge may be prevented by providing below the plastic film or sheet **17** the metal foil, plate or panel **18** which is preferably grounded.

Reproduction walls and similar devices, which are equipped with the holding arrangement and with the electrostatic plastic cover of the present invention, permit a rapid exchange of originals, and especially as they only have to be slipped under the holding rails if they should tend to roll or if they should be too heavy to adhere by electrostatic charge.

A drawing sheet, framed by the holding rails of the present invention, is absolutely safe against tearing or damage to its edges since neither the drawing machine nor the drawing implements can slip under the sheet.

While I have shown and described several embodiments in accordance with the present invention, it is understood the same is not limited thereto but is susceptible of numerous changes and modifications as known to a person skilled in the art and I therefore do not wish to be limited to the details shown and described herein but intend to cover all such changes and modifications as are encompassed by the scope of the appended claims.

I claim:

1. A fastening device for fastening paper and foil sheets to relatively smooth surfaces, comprising relatively narrow thin elastic rail means provided with self-adhesive edges along the outer sides thereof, said rail means being mounted on said surfaces by said self-adhesive edges so as to clamp the sheet to be fastened at least on one side thereof.

2. A fastening device for fastening paper and foil sheets to relatively smooth surfaces, comprising a plurality of relatively narrow thin elastic rail means provided with self-adhesive edges along the outer sides thereof, said rail means being mounted on said surface by said self-adhesive edges so as to clamp the sheet to be fastened at least on two sides thereof.

3. A fastening device for fastening paper and foil sheets to relatively smooth surfaces, comprising relatively narrow thin elastic rail means provided with self-adhesive edges along the outer sides thereof, said rail means being mounted on said surfaces by said self-adhesive edges so as to clamp the sheet to be fastened at least on one side thereof,

said rail means essentially consisting of plastic material selected from the group consisting of polyvinyl chloride and polystyrene.

4. A fastening device for fastening paper and foil sheets to relatively smooth surfaces, comprising relatively narrow thin elastic rail means provided with self-adhesive edges along the outer sides thereof, said rail means being mounted on said surfaces by said self-adhesive edges so

as to clamp the sheet to be fastened at least on one side thereof,

said rail means having thickness of about 0.25 to 0.5 mm.

5. A fastening device for fastening paper and foil sheets to relatively smooth surfaces, comprising relatively narrow thin elastic rail means provided with self-adhesive edges along the outer sides thereof, said rail means being mounted on said surfaces by said self-adhesive edges so as to clamp the sheet to be fastened at least on one side thereof,

said rail means being bevelled at the adhesive-free outer edges.

6. A fastening device for fastening paper and foil sheets to relatively smooth surfaces, comprising a plurality of relatively narrow thin elastic rail means provided with self-adhesive edges along the outer sides thereof, said rail means being mounted on said surfaces by said self-adhesive edges so as to clamp the sheet to be fastened at least on two sides thereof,

said rail means essentially consisting of plastic material capable of being electrostatically charged.

7. A fastening device according to claim **6** wherein said rail means has a thickness of about 0.25 to 0.50 mm.

8. A fastening device according to claim **7** wherein said rail means are bevelled along the adhesive-free edges.

9. An arrangement for fastening paper and foil sheets to relatively smooth surfaces, comprising:

support means for supporting the sheets including a plastic base and essentially consisting of a plastic material capable of being electrostatically charged,

and fastening means including a plurality of relatively narrow thin elastic rails of a plastic material adapted to be electrostatically charged and provided with self-adhesive edges along the outer sides thereof, said rail means being mounted on said base by said self-adhesive edges so as to clamp the sheet to be fastened,

said rail means having thickness of about 0.25 to 0.5 mm.

10. An arrangement for fastening paper and foil sheets to relatively smooth surfaces, comprising:

support means for supporting the sheets including a metallic plate and a plastic base disposed on said plate and essentially consisting of a plastic material capable of being electrostatically charged,

and fastening means including a plurality of relatively narrow thin elastic rails of a plastic material adapted to be electrostatically charged and provided with self-adhesive edges along the outer sides thereof, said rail means being mounted on said base by said self-adhesive edges so as to clamp the sheet to be fastened,

said rail means having thickness of about 0.25 to 0.5 mm.

and means for preventing discharge of the electrostatic charges on said base and rails including a ground connection with said metallic plate.

11. A fastening device for fastening paper and foil sheets to smooth surfaces, comprising means including a plurality of relatively narrow thin elastic holding rail means of plastic material provided with self-adhesive edges along the outer sides thereof adapted to engage with said surfaces for holding said sheets on said surfaces by at least two of the three forces consisting of the mechanical fastening effect of said holding rail means, the electrostatic attraction of said plastic holding rail means upon being electrostatically charged by friction and the adhesive force of said self-adhesive edges.

No references cited.

RICHARD H. EANES, JR., *Primary Examiner.*