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[73] Assignee **Mohawk Precision Corporation**

[56] References Cited			
UNITED STATES PATENTS			
1,417,009	5/1922	Woodward.....	24/244 X
2,625,277	1/1953	Rauscher.....	211/89
3,168,954	2/1965	Von Herrmann.....	211/50
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1,012,541	12/1965	Great Britain.....	211/89
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[54] **HANGER FOR FLEXIBLE SHEET MATERIAL**
4 Claims, 2 Drawing Figs.

[52] U.S. Cl..... 211/50,
24/244, 211/89
[51] Int. Cl..... A47f 1/08
[50] Field of Search..... 211/50, 16,
89; 24/244

ABSTRACT: A hanger for temporarily holding sheet material by wedging action of rollers between convergent walls, including a special lip on the end of the front wall to prevent improper insertion and to assist release of improperly inserted sheets.

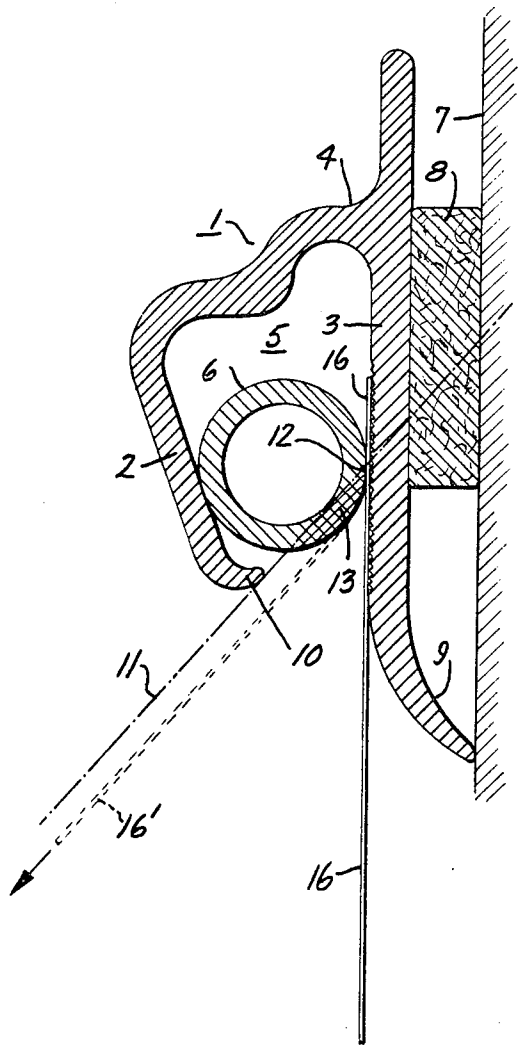


Fig. 1.

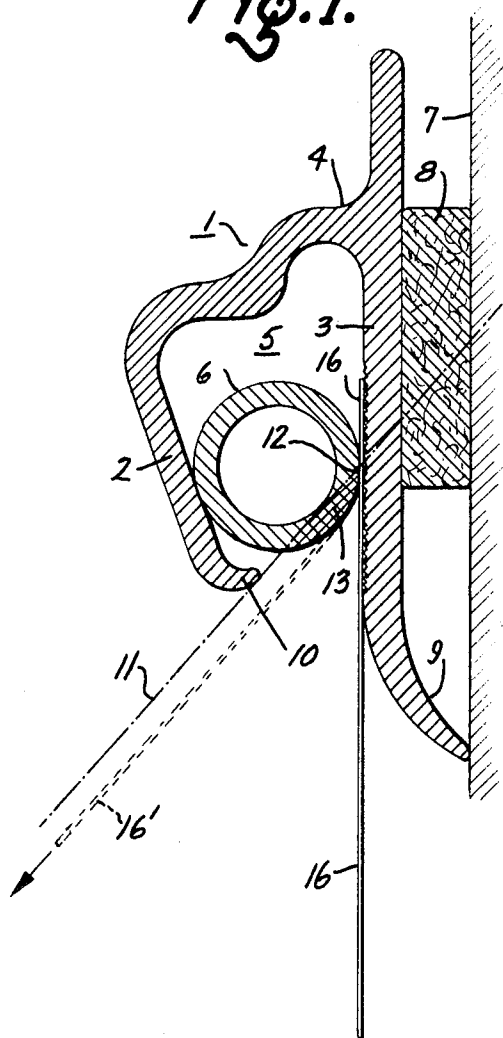
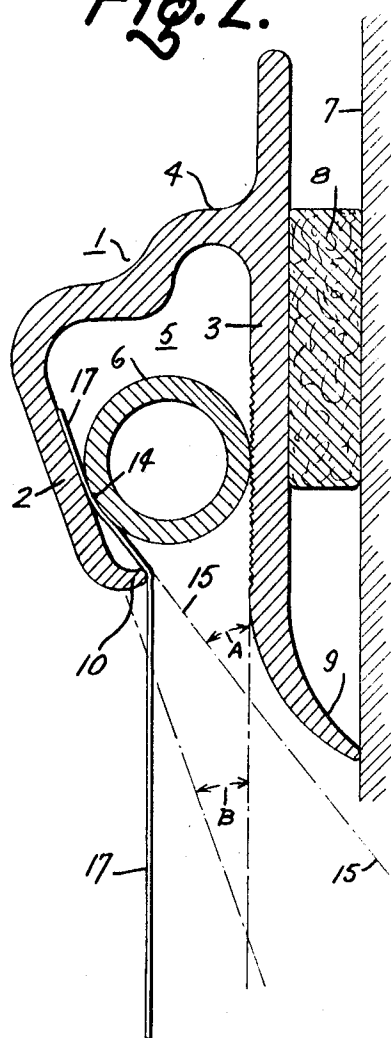


Fig. 2.



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HANGER FOR FLEXIBLE SHEET MATERIAL

BACKGROUND OF THE INVENTION

This invention relates generally to a hanger for temporarily holding flexible sheet material, such as charts, drawings, notices, photographs and so forth, wherein means are provided for releasing the sheets by pulling them outward from the hanger. More particularly, this invention is an improvement upon my U.S. Pat. No. 3,168,954, issued Feb. 9, 1965 and directed to such a hanger.

In the aforesaid patent, the hanger is provided with downwardly convergent front and rear walls defining an elongated recess. A number of unconnected wedging members are loosely disposed in the recess, which serve to grip and hold sheet material inserted between the backwall backwall and the wedging members. The front wall is so constructed as to terminate at a point such that a portion of the wedging member extends beyond a line passing between the front wall termination and the backwall wedging point. By this means, a releasing action is obtained by pulling the sheet material away from the hanger at an angle, so that an upward releasing component of force is exerted on the wedging member.

Although the hanger constructed in accordance with the aforesaid patent has enjoyed significant commercial success, careless usage has sometimes resulted in improper insertion of the sheets so that they pass upward between the front wall and the wedging member. Although gripping of the sheet by the wedging member takes place as before, proper releasing action is not obtained, since the rear wall of the hanger and the wall to which the hanger is usually attached prevent pulling at the proper direction.

OBJECTS OF INVENTION

Accordingly, one object of the present invention is to provide an improved releasing hanger for flexible sheet material, wherein improper insertion of the sheet material is very difficult.

Another object of the invention is to provide an improved hanger of the type described, wherein improperly inserted sheets will not be gripped at all, but will be automatically released when wedging is attempted.

SUMMARY OF INVENTION

Briefly stated, the invention is practiced by providing a hanger of the type having downwardly convergent front and rear walls defining a recess holding a plurality of wedging members, wherein the improvement comprises a front wall terminating in a lip which protrudes toward the backwall a sufficient amount to block improper insertion of a sheet and to provide a flexure point for an improperly inserted sheet which changes the effective wedging angle so that a downward pull automatically releases the sheet. Thus the very principle used for releasing the flexible material during normal operation of the device is used to prevent improper holding action when the flexible material is erroneously inserted in front of the roller. The lip is also located so as to still permit release of a properly inserted sheet.

DESCRIPTION OF DRAWING

These and other objects will become apparent in the concluding portion of the specification, taken in connection with the accompanying drawings in which:

FIG. 1 is an enlarged cross section of the improved hanger illustrating one mode of operation, and,

FIG. 2 is a similar cross section illustrating the hanger in another mode of operation.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to FIG. 1 of the drawing, the hanger comprises an elongated member 1 of any desired length which is

preferably an extrusion. Hanger member 1 includes a front wall 2 and a rear wall 3 converging downwardly toward one another and connected by a top wall 4. The angle of convergence between walls 2, 3 is selected with regard to the material used in the hanger and is on the order of 20°, preferably between 19° and 22°. Walls 2, 3 define an elongated recess 5 therebetween, which are disposed a number of wedging members 6. These may conveniently be short rollers cut from lengths of hollow steel tubing.

Hanger 1 is attached to a supporting wall 7 by means of a fibrous pad 8 coated with a suitable pressure-sensitive adhesive on both sides. In order to prevent insertion of the sheet in the standoff distance between hanger backwall 3 and supporting wall 7 (due to the thickness of the pad 8) the backwall 3 is formed so as to have an inwardly curving portion 9 which contacts the supporting wall.

In accordance with the invention, the front wall 2 is formed so as to include a small lip 10 which extends for a short distance from the front wall 2 in the direction of rear wall 3, so as to partially bridge the gap between the walls. The point at which the lip commences as well as the length of the lip extension toward the backwall are both very important to the correct operation of the improved hanger.

First, with reference to FIG. 1 of the drawing, it will be noted that the lip is located and of such a length relative to the backwall 3 and the wedging member 6 that a line 11 drawn tangent to lip 10 and passing through a point 12 where the wedging member 6 is tangent to the rear wall passes through the wedging member, leaving a portion 13 protruding beyond the line 11. The angle made by line 11 with the front wall (here around 60°) should be sufficiently great to provide an upward component which will overcome the wedging against the rear wall. It can be shown geometrically that this angle is equal to the sum of the angle of convergence and the angle which line 11 makes with the rear wall.

Secondly, with reference to FIG. 2 of the drawing, the wedge member 6 is seen to have its closest point of approach to front wall 2 at a point 14. A line 15 drawn from point 14 and tangent to lip 10 forms an angle A with the rear wall. It will be noted that both the length of the lip and the distance from point 14 at which the lip commences will affect the value of angle A.

As noted previously, the angle of convergence of front and rear walls (shown as angle B in FIG. 2) is on the order of 20° to give proper wedging action without either jamming or unwanted slippage. In accordance with the invention, the end of lip 10 is located with respect to point 14, so that angle A will be substantially greater than 20°, preferably about twice that amount (here around 40°). From the aforementioned geometric considerations with respect to line 11 of FIG. 1, the angle made by line 11 with the rear wall is also about 40° or roughly the same as angle A.

The operation of the invention is as follows. A sheet of paper 16, when inserted properly into the hanger appears as shown in FIG. 1. It is held at point 12 between the roller 6 and the rear wall. To release, it is pulled downward and outward as shown at 16'. The upward component of force on protruding portion 13 releases the sheet.

It will be noted that the lip 10 guides the sheet 16 toward the proper point of insertion and furthermore blocks the space between the front wall and the roller, reducing the possibility of careless insertion there. Should improper insertion occur, however, the situation is depicted in FIG. 2, where sheet 17 has managed to become wedged between the front wall and the wedging member. When one attempts to pull the sheet 17 downward slightly in order to fix it in position, the rounded corner of lip 10 acts as a flexure point for the sheet. The hanger functions then as though the sheet 17 were being pulled along the line 15 at angle A with the backwall, rather than at angle B (which would be the case if the lip 10 were not present). Angle A is much greater than the wedging angle B (and much greater than the actual angle of friction) and the wedging member simply releases the sheet. The foregoing ac-

tion may take place without the operator actually knowing that he has inserted the sheet improperly, because the opening between front and rear wall is very small and is obscured from view in the actual device due to its downward orientation. The operator simply tries again until he inserts the sheet properly, and gripping occurs.

The foregoing invention has provided a significant improvement in operation over the hanger described in my aforementioned patent, with no significant increase in cost.

While what is described in the specification is considered to be the preferred embodiment of the invention, it is intended to cover in the appended claims all such modifications as fall within the true spirit and scope of the invention.

What I claim as new and desired to secure by Letters Patent of the United States is:

1. In a hanger of the type having longitudinally extending downwardly convergent front and rear planar walls defining an elongated recess therebetween open at the bottom for the insertion of flexible sheet material and having a plurality of wedging rollers disposed in said recess and tangent to the front and rear walls at first and second points respectively, the improvement comprising:

a terminating longitudinal lip portion disposed on the lower end of the front wall and extending toward said rear wall, said lip being so shaped and disposed that lines drawn tangent to the lip through said first and second points form first and second angles respectively with the rear wall which are substantially greater than the angle of convergence between front and rear walls.

2. The improvement according to claim 1 wherein said first and second angles are both on the order of twice said angle of

convergence.

3. The improvement according to claim 1 wherein said angle of convergence is on the order of 20° and wherein said first and second angles are on the order of 40° .

4. A hanger for flexible sheet material comprising:

an elongated extrusion defining a vertical rear wall, a front wall converging downwardly toward the rear wall, a top wall integral with and connecting the front and rear wall, said walls defining an elongated recess having an open mouth at the bottom between said front and rear walls,

a plurality of rollers disposed loosely end-to-end in said recess for gripping sheet material, said rollers being tangent to front and rear walls at first and second points respectively,

said front and rear walls forming an angle of convergence on the order of 20° ,

said front wall defining a terminating lip portion therealong extending toward the rear wall and being spaced from the bottom of said rollers, said lip portion being oriented so that a line drawn tangent to the end of said lip portion through said first point forms a first angle with the rear wall on the order of 40° and a line drawn tangent to the end of said lip portion through said second point intersects the lower portion of said rollers,

whereby sheet material pulled outward against the lip portion will release if in wedging engagement with the rear wall while sheet material in wedging engagement with the front wall and pulled downward will flex over the lip portion and be drawn at said first angle to release.

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