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VACUUM HOLDER

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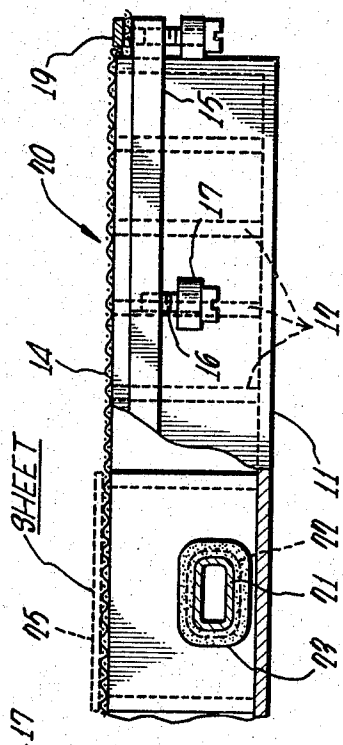
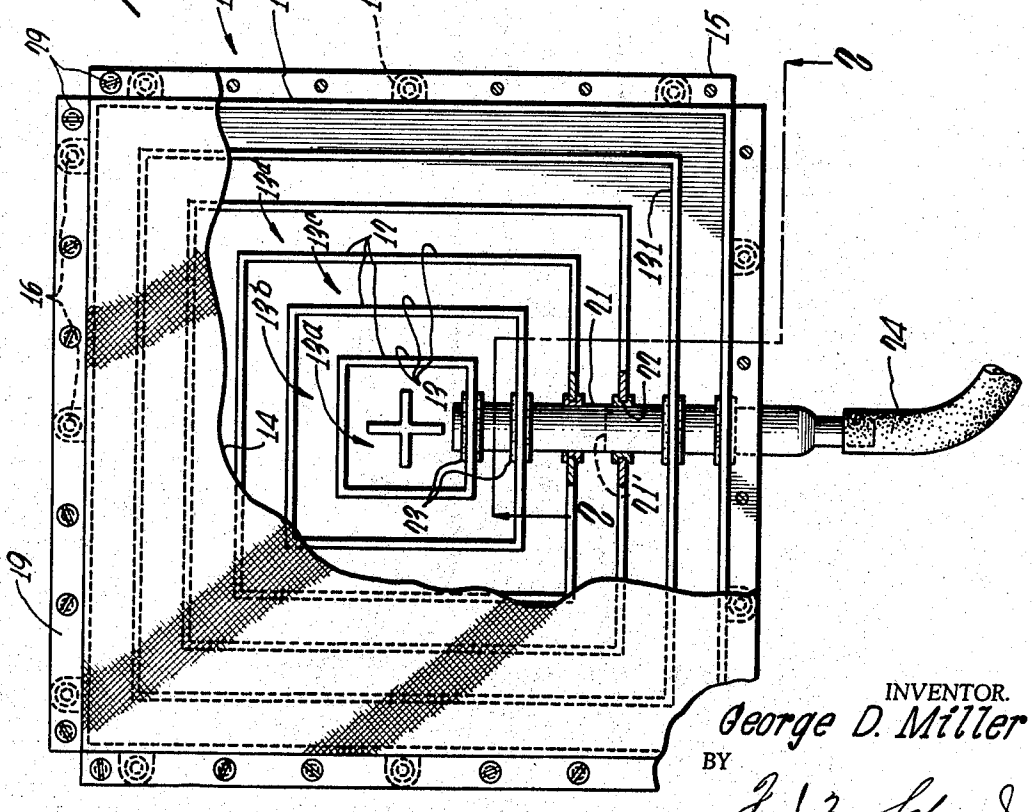


FIG. 2

SHEET

FIG. 1



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VACUUM HOLDER

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This invention relates in general to sheet or film holding devices and more particularly to improvements in a holding device which utilizes a vacuum source as the means for holding a sheet or the like in a flat plane for photographic or other purposes.

A principal object of the present invention is to provide a vacuum type sheet or film holding device which is extremely simple and economical to manufacture and which will accommodate sheets or films of different sizes.

Another object is to provide a vacuum type sheet holder capable of holding a sheet or the like in a perfectly flat plane.

Another object is to reduce the amount of vacuum required to hold sheets or the like in a flat plane.

Another object is to provide a vacuum type sheet holder which is readily and easily adjustable to accommodate sheets of different sizes.

A further object is to provide a vacuum type sheet holder which is quickly operable to hold a sheet in place.

The present invention accomplishes the above objects by mounting a foraminous member, preferably a woven mesh screen member, over a series of nested wall sections upstanding from a base and slideably positioning a vacuum tube in aligned openings in the wall sections to apply vacuum to one or more vacuum compartments formed by such wall sections so as to limit the application of vacuum to those compartments over which a sheet is mounted.

The manner in which the above and other objects of the invention are accomplished will be readily understood on reference to the following specification when read in conjunction with the accompanying drawing, wherein:

FIG. 1 is a plan view of the improved film holding device with parts broken away to illustrate its construction.

FIG. 2 is an enlarged fragmental side elevation view, partly in section, and taken substantially along the line 2—2 of FIG. 1.

In reference to the drawing, the sheet holding device, indicated generally by the numeral **10**, comprises a base member **11** which is rectangular in shape and is preferably formed of an aluminum casting. Formed integrally with the base member **11** are a plurality of nested upstanding wall sections **12** which together define nested compartments **13**. The upper edges of the wall sections are machined to present a perfectly level surface to receive a woven mesh screen type sheet support member **14**. Such construction presents a rigid body which resists warping during assembly of the device or during handling.

The support member **14**, which is similar to window screen material, is prestretched over a suitable frame (not shown) and is then stretched over the upper edges of the wall sections **12** and is firmly attached about the perimeter of the base **11** to the upper surfaces of adjustable tension frame members **15**. For this purpose, each edge of the member **14** is clamped between a respective frame member **15** and a clamp strip **19** by screws **29**. This results in a precisely flat sheet supporting surface.

Screw threaded into each frame member **15** are a plurality of adjusting bolts **16**. These bolts pass through projecting bosses **17** all of which are integrally formed on the perimeter of the frame **11** below the frame members **15**. When adjustment of the member **14** is deemed necessary to maintain the same in a taut or drum-like condition, the bolts **16** are advanced to draw frame members **15** downwardly thereby applying an even tensioning force to the member **14** to present a flat sheet supporting surface.

The material of member **14** is preferably of such mesh and wire size as to properly support a sheet or film in a flat plane against atmospheric pressure upon partial evacuation of air from therebelow.

Because of the relatively large overall open area presented by a woven or mesh type screen material, in comparison with that presented by a sheet in which holes are drilled or otherwise formed, a relatively lower vacuum force need be applied to adequately hold the sheet material in place. Also, such mesh type screen material is far less expensive than sheets in which holes are formed. Further, since such screen material presents a series of round wires forming the openings and since the open area is greater than the closed area, there is little tendency for such openings to clog with accumulated dust or dirt partcles. On the other hand, in prior art supports formed of sheet material in which small holes are drilled, dust particles tend to collect in the holes over a period of time thus reducing the size of such openings and the effectiveness of the vacuum applied therethrough.

A tube **21** of generally rectangular cross section is slideably mounted in a series of aligned openings **22** in the various wall sections **12**. These openings **22** are lined with sealing grommets **23** of felt or the like which serve as bearing surfaces for the tube **21** and also serve to suitably seal the various compartments **13** from one another. Secured to the outer end of the tube **21** is a rubber hose **24** which is attached to a suitable source of vacuum (not shown).

During operation, when it is desired to support a sheet or film **25** (dotted lines, FIG. 2) having an area roughly equal to the smaller compartment **13***a*, the tube **21** is slid inward to its position illustrated in FIG. 1. Thus, when vacuum is applied it will be restricted to compartment **13***a* and this will serve to hold the film or sheet **25** perfectly flat against the screen **14**. If a larger film or sheet is to be supported such as one approximating the size of the wall section **131**, the tube is slid outward until it resumes its dotted line position **21**, FIG. 1, wherein it terminates adjacent the opening formed in such wall section **131**, thus applying vacuum to the four compartments **13***a* through **13***d* to hold the film thereabove flat against the support member **14** as mentioned above.

Because of the relatively small amount of vacuum necessary to properly hold a sheet in position, adequate holding will be effected in the corners and throughout the area of such sheet.

Also, it will be noted that the tube **21** may be readily and quickly adjusted lengthwise to apply vacuum to the desired number of compartments depending upon the size of the sheet to be supported.

Although the invention has been described in detail and certain specific terms and languages have been used, it is to be understood that the present disclosure is illustrative rather than restrictive and that changes and modifications may be made without departing from the spirit or scope of the invention as set forth in the claims appended hereto.

Having thus described the invention, what is desired to be secured by United States Letters Patent is:

1. A vacuum holder for sheets or the like,
comprising a base having nested wall sections upstanding therefrom to form a plurality of vacuum compartments,
a foraminous support member extending over said wall sections,

said wall sections having aligned openings therein, and a tube adapted to be connected to a source of vacuum,
said tube being slideable endwise through said openings whereby to apply vacuum to one or more of said compartments.

2. A vacuum holder for sheets or the like,
comprising a base having nested wall sections upstanding therefrom to form a plurality of vacuum compartments,
a foraminous support member extending over said wall sections,
said wall sections having aligned openings therein,
a tube adapted to be connected to a source of vacuum,
said tube being slideable endwise through said openings whereby to apply vacuum to one or more of said compartments, and
sealing means surrounding said openings to form sliding seals between said wall sections and said tube.

3. A vacuum holder for sheets or the like,
comprising a base having nested wall sections upstanding therefrom to form a plurality of vacuum compartments,
a flexible support member of woven mesh material extending over said wall sections,
a frame tensioning member slideable over an outer one of said wall sections,
means attaching said support member to said tensioning member,
means for adjusting said tensioning member along said outer wall section whereby to stretch said support member over said wall sections,
and means for selectively applying vacuum to one or more of said compartments.

4. A vacuum holder for sheets or the like,
comprising a base having nested wall sections upstanding therefrom to form a plurality of vacuum compartments,
a flexible foraminous support member extending over said wall sections,
tensioning means slideable over an outer one of said wall sections,
means attaching said support member to said tensioning means about the periphery of said outer wall section,
means for moving said tensioning means along said outer wall section and toward said base whereby to maintain said support member taut in all directions in the plane of that portion thereof extending over said nested wall sections,

and means for selectively applying vacuum to one or more of said compartments.

5. A vacuum holder for sheets or the like,
comprising a base having nested wall sections upstanding therefrom to form a plurality of vacuum compartments,
a flexible foraminous support member extending over said wall sections,
said wall sections having aligned openings therein,
a vacuum tube adapted to be connected to a source of vacuum,
said tube being slideable endwise through said openings whereby to apply vacuum to one or more of said compartments,
frame means encompassing the outer one of said wall sections and slideable therealong,
means attaching said support member to said frame means around the periphery of said outer wall section, and
means for moving said frame means toward said base whereby to maintain said support member taut in all directions in the plane of that portion thereof which extends over said wall sections.

6. A vacuuum holder for sheets or the like,
comprising a flat base having a plurality of nested wall sections upstanding therefrom to form a plurality of nested vacuum compartments,
a flexible woven mesh screen member extending over said wall sections,
said wall sections having aligned openings therein,
a tube adapted to be connected to a source of vacuum,
said tube being slideable endwise through said openings whereby to apply vacuum to one or more of said compartments,
tensioning members independently movable along the outer one of said wall sections,
means attaching said screen member to said tensioning members, and
means for moving said tensioning members toward said base whereby to maintain said screen member taut in all directions in the plane of that portion thereof which extends over said wall sections.

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