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F. DOUTHITT

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VACUUM COPYHOLDER

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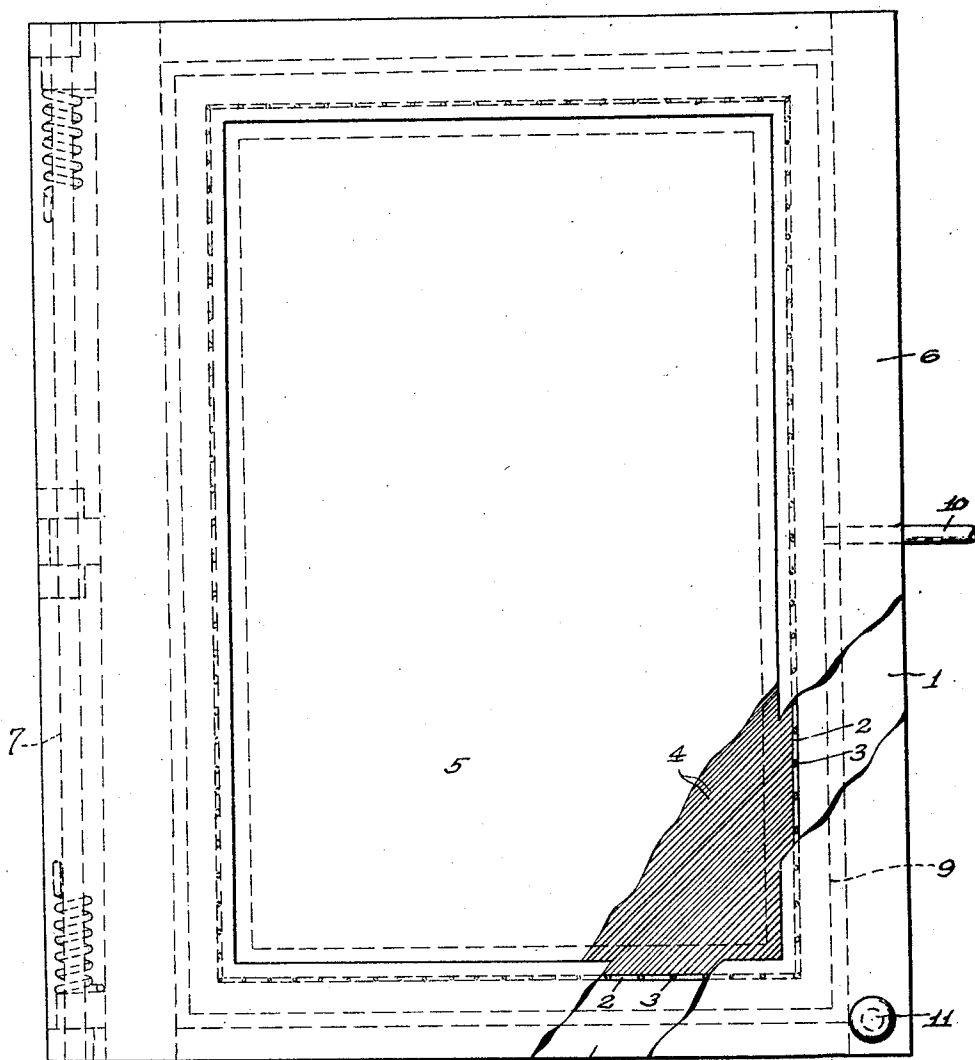


Fig. 1.

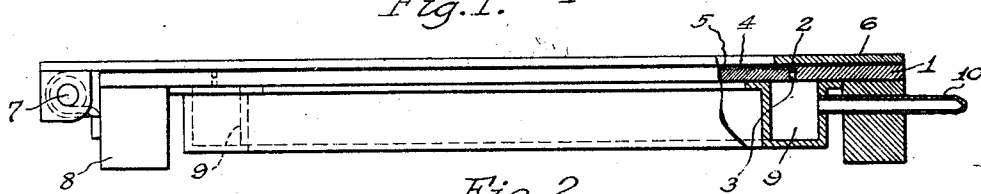


Fig. 2.

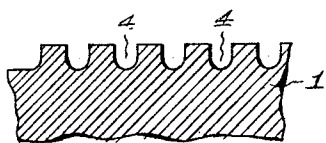


Fig. 3.

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## UNITED STATES PATENT OFFICE.

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VACUUM COPYHOLDER.

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This invention relates to holding means for flat material and articles and my invention aims to utilize vacuum or a reduction in atmospheric pressure for evenly and positively holding flat material or articles on a surface, so that there will be no danger of accidental displacement, no gap between the material and the surface on which it is held, and no wrinkled or buckled portion of the material which might cause impressions in various kinds of work. As an instance of holding flat material in various arts, there is that of holding celluloid films in a perfect plane in a camera while making a photograph; holding celluloid tints, of the "Ben Day" process, while transferring ink to metal plates, holding celluloid upon which half tone or grained tints have been printed in perfect contact with drawings while art work is performed or while photographing to avoid shadows, and for eliminating the curve of any photographic negative to insure a perfect plane while photographing. Other uses are that of holding copies without a cover glass; holding paper on a drawing board without thumb tacks, and holding copper or other metallic plates on a router bed while being routed.

My invention further aims to use a finely lined supporting surface for flat material which will permit of a section being produced throughout practically the entire surface of the support, and in consequence of such support the flat piece of material will be held snugly on the support without any wrinkles or buckled portions, and without the use of any mechanical means, as contacts, clamps or the like.

My invention further aims to provide a support with a marginal vacuum chamber communicating with the surface of the support by channels and apertures so that when the channels and apertures are closed by material being placed on the support air may be withdrawn from the chamber to produce a suction which will hold the material on the support.

My invention will be hereinafter specifically described and then claimed, and reference will now be had to the drawing wherein

Figure 1 is a plan of a holding device partly broken away and partly in plan;

Fig. 2 is an end view of the device partly broken away and partly in section, and

Fig. 3 is an enlarged detail sectional view of a portion of a support.

In the drawing, the reference numeral 1 denotes a flat support and on the upper face of said support is a holding area having for its boundary channels or grooves 2 communicating with a plurality of apertures 3 extending from the upper face of the support to the lower face thereof. The holding area of the support 1 is lined or grooved to provide very fine channels 4 having the ends thereof communicating with the channels 2. The channels have been greatly exaggerated in Fig. 3, and in actual practice are just as small and close together as it is possible to make the same, whereby the approximately entire holding area may have air withdrawn therefrom after being covered by a sheet 5 of paper or other material. The sheet of paper is of greater area than the holding area so that its edges will overlap or extend beyond the channel 2, and to facilitate temporarily holding a sheet of paper 5 in place, I may provide the support 1 with a frame 6. The frame 6 may be hingedly supported as at 7, from one of two feet or cleats 8 attached to the lower face of the support 1, and said frame may be spring closed so that it will not accidentally open while the device is being handled.

The feet or cleats 8 may extend along the end edges of the support and are mainly employed to hold the support 1 elevated relative to a table top in order to provide clearance for a channel vacuum chamber 9 attached to the lower face of the support 1 and communicating with the apertures 3. The vacuum chamber 9 is sealed relative to the lower face of the support 1 and said chamber has a connection 10 whereby a pump may be used for exhausting air from the vacuum chamber.

In some instances the vacuum chamber 9 may serve as supporting means for the support 1, then again, the legs or cleats 8 may be dispensed with when the support 1 is built into a table top, camera, machine or other structure.

The frame 6 may be of greater area than the support 1 to facilitate opening said frame or it may be provided with a knob 11 for such purposes. In some instance the

frame may be entirely discarded but it is preferable to use the same where films, large sheets of paper, celluloid or tracing linens which contain a roll or curl are to be temporarily held.

When my vacuum holding means is used in connection with some machines, for instance a printing press, it may be necessary to remove the sheet of paper or other material by air pressure forced into the chamber 9, apertures 3, and channels 2 and 4 to overcome any static elasticity that may tend to hold the sheet of paper or material on the support. Such expelling of the sheet of paper may be necessary in a printing press where sheets are to be expeditiously handled in which case the connection 10 may be provided with a two-way valve controlling the supply of air to the vacuum chamber for expelling purposes and the withdrawal of air from the vacuum chamber for holding purposes.

I attach considerable importance to the channeled support 1 which has its channels very closely assembled and extending from one of the channels 2 to another preferably with the channels 4 diagonally disposed as indicated in Fig. 1. With such fine channels it will be possible to withdraw air from practically the entire lower face of the sheet of paper and there will be no opportunity for the paper to buckle or lie uneven on the surface of the support. This is ad-

vantageous in the handling of films or celluloid and any solid material or article can be more firmly held than by using thumb tacks, clamps or like devices.

One embodiment of my invention has been illustrated, but it is to be understood that the structural elements are susceptible to such variations and modifications as fall within the scope of the appended claims.

What I claim is:—

1. Holding means for material comprising a support having a vacuum chamber from which air may be withdrawn, said support having a large supporting area bounded by channels and apertures communicating with said vacuum chamber, said support having a surface formed of fine closely assembled parallel grooves with the ends of said grooves communicating with the boundary channels and apertures, said support surface adapted to be covered by the material to be held on said support.

2. A sheet holding device comprising a support having a finely grooved supporting area, channels connecting the fine grooves of said support, and a connection in communication with the channels of said support so that air may be withdrawn from the grooves of said support when said grooves are covered by a sheet.

In testimony whereof I affix my signature.

FLETCHER DOUTHITT.