Aug. 19, 1947. T. E. CROCKETT 2,425,921

DEVICE FOR HOLDING OBJECTS TO BE COPIED OR PHOTOGRAPHED

Filed Aug. 17, 1945 2 Sheets-Sheet 1

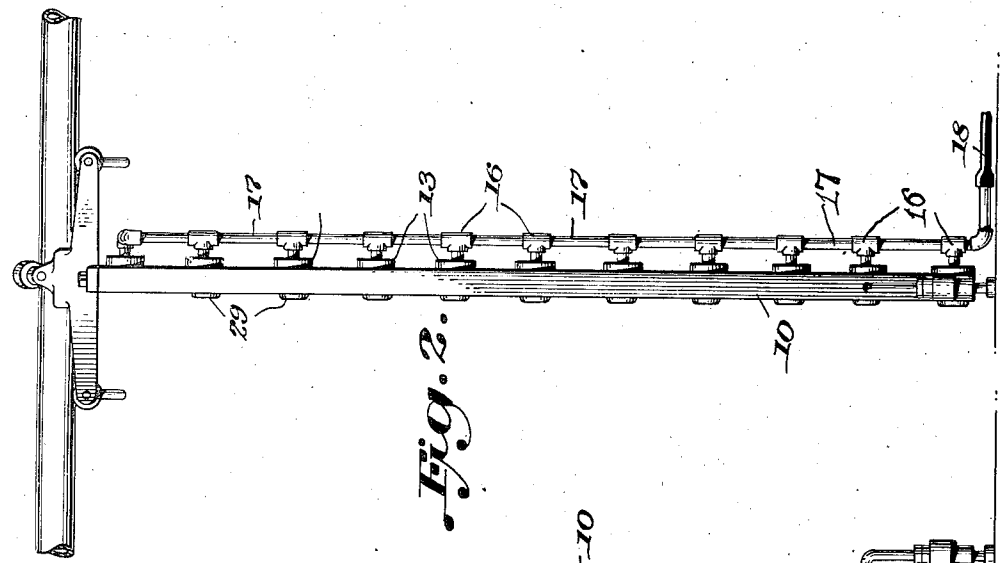


Fig. 2.

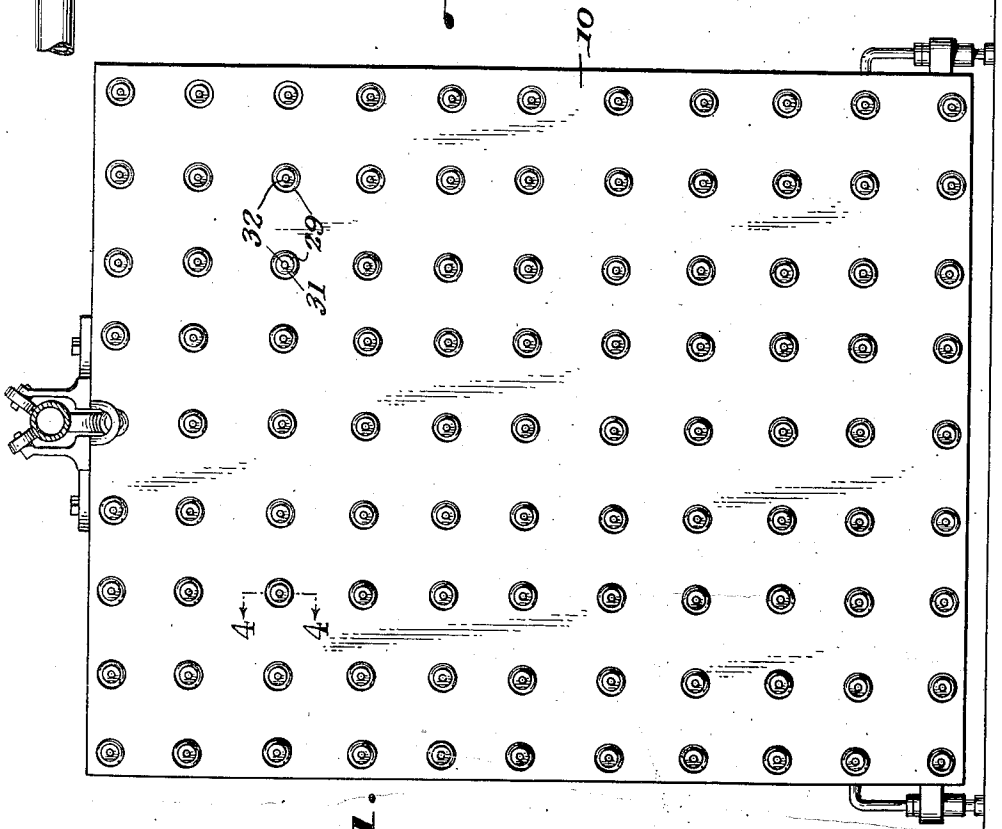


Fig. 1.

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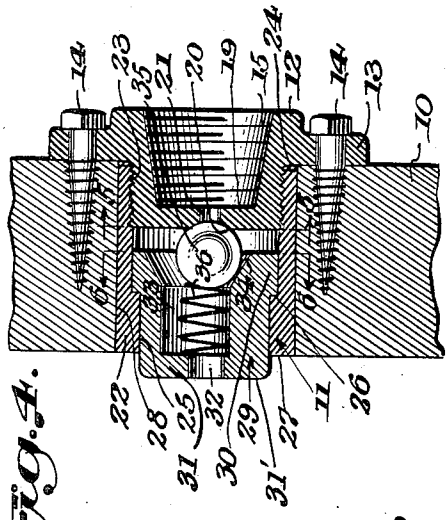


Fig. 4.

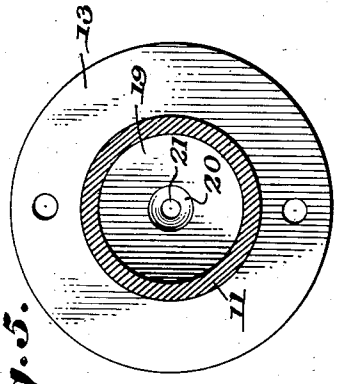


Fig. 5.

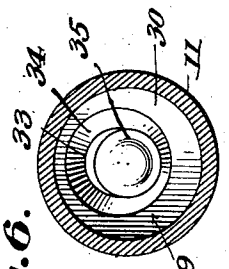


Fig. 6.

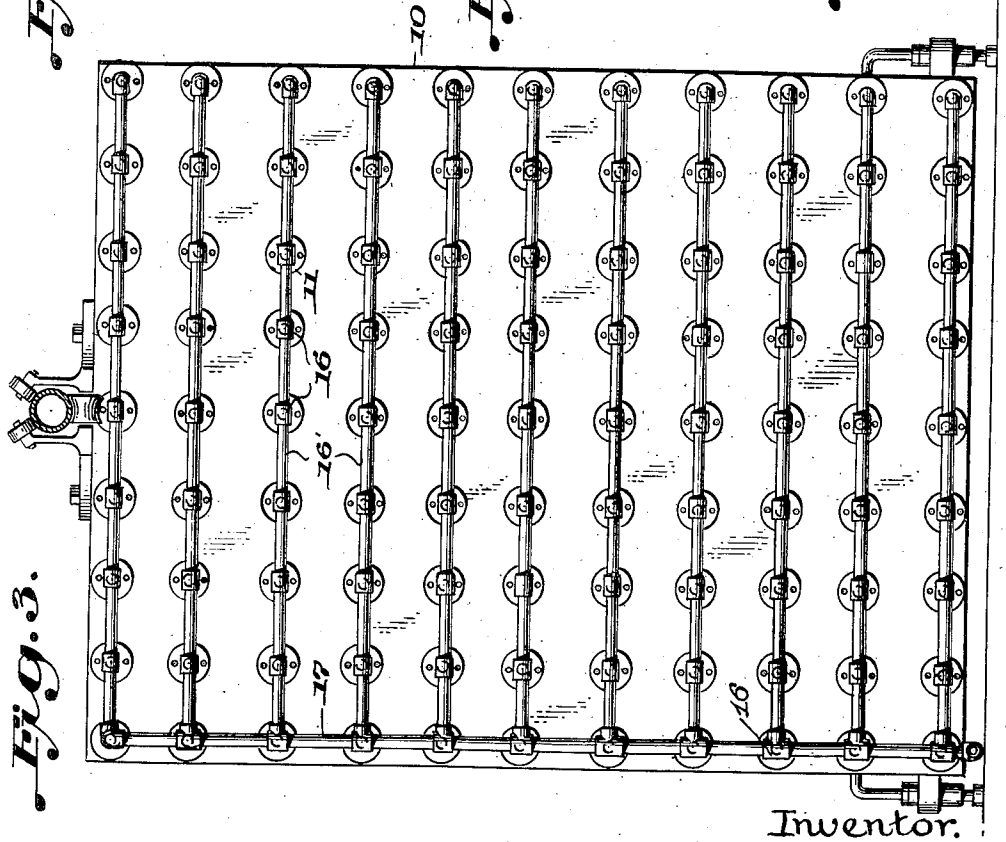


Fig. 3.

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Patented Aug. 19, 1947

2,425,921

UNITED STATES PATENT OFFICE

2,425,921

DEVICE FOR HOLDING OBJECTS TO BE COPIED OR PHOTOGRAPHED

Thomas E. Crockett, Tulsa, Okla.

Application August 17, 1945, Serial No. 611,060

4 Claims. (Cl. 248—363)

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My invention relates to means for supporting and holding objects to be copied or photographed, such as drawings, maps, pictures or the like.

An important object of the invention is to provide means of the above mentioned character which is located behind the object being copied, and which is therefore invisible.

A further object of the invention is to provide means of the above mentioned character which is actuated by pressure applied to the object upon that side of the object remote from the holding means.

A further object of the invention is to provide means of the above mentioned character which will hold the object in position by a suitable degree of vacuum, and which is automatically set into action by pressure applied to the object to be held.

A further object of the invention is to provide suction operated means of the above mentioned character, having its parts restored to the normal position, when the object being held is forceably removed from the holding means.

A further object of the invention is to provide means of the above mentioned character designed for holding objects of varying sizes.

A further object of the invention is to provide means of the above mentioned character which is simple in construction and reliable in operation.

Other objects and advantages of the invention will be apparent during the course of the following description.

In the accompanying drawings forming a part of this application and in which like numerals are employed to designate like parts throughout the same,

Figure 1 is a front elevation of a photo copying panel or board embodying my invention,

Figure 2 is an edge elevation of the same,

Figure 3 is a rear elevation of the same,

Figure 4 is an enlarged transverse section taken on line 4—4 of Figure 1,

Figure 5 is a horizontal section taken on line 5—5 of Figure 4,

Figure 6 is a similar view taken on line 6—6 of Figure 4.

In the drawings, wherein for the purpose of illustration is shown a preferred embodiment of my invention, the numeral 10 designates a copying panel or board. This panel or board is preferably identical with or similar to the panel or board shown in my co-pending application for Photographic copying machine, 566,174. This panel or board may be 8 feet long and 4½ feet wide. However, the invention is not restricted to these dimensions. The panel or board may be supported vertically when in use and may be employed to carry the object to be copied, or the film or sensitized plate. The panel or board is

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arranged in cooperative relation to the lens of the camera, as shown in my application 566,174. The same means may be employed to support and shift the panel or board.

The panel or board is provided with a plurality of suction-operated object holding units 11, which are distributed over the entire area of the panel or board. These units are preferably arranged in vertical and horizontal rows and are peferably spaced about 4 to 5 inches.

Each unit comprises a body portion 12, having a radial flange 13, arranged upon the rear face of the panel or board 10 and secured thereto by screws 14 or the like. This body portion has a screw threaded recess 15, for receiving the screw threaded end of a T-coupling 16. These several T-couplings are arranged in horizontal and vertical groups, and the T-couplings in each horizontal group are connected by pipes 16. The T-couplings in one vertical group are connected by pipes 17, and a flexible hose 18 or the like is connected with one T-coupling in the connected vertical group, and this flexible hose has connection with a source of vacuum. This is a low vacuum and is only sufficient to support or hold the object in place. The body portion 12 has its forward end covered by a head 19. The body portion 12 and the head 19 are cylindrical and the head 19 is provided upon its forward face with a recess or valve seat 20, which is spherically curved. This recess or valve seat is concentric with the head 19. The head also has a concentric opening 21, leading into the recess or valve seat 20. The numeral 22 designates a cylindrical sleeve or casing, having screw threaded engagement with the body portion 12, as shown at 23, and forming a vacuum-tight joint therewith. Packing 24 may be provided, if desired. At its forward end, the casing has a contracted cylindrical concentric opening 25, forming an internal shoulder 26. The sleeve or casing 22 has a flat forward end 27. The casing 22 is arranged within a transverse cylindrical opening 28 formed in the panel or board 10 and the forward end 27 is flush with the forward face of the panel or board.

Mounted to reciprocate within the contracted cylindrical opening 25 is a thumb-plunger 29, having a vacuum-tight sliding fit within the sleeve or casing 22. This thumb-plunger has a rear annular flange 30, providing a shoulder to engage with the shoulder 26, to limit the forward movement of the thumb-plunger. The thumb-plunger is spaced from the head 19, as shown. The thumb-plunger has a forward head 31, provided with a forward flat face 31', and this forward head has a cylindrical opening 32, which is concentric with respect to the cylindrical thumb-plunger. The thumb-plunger is tubular and has a forward cylindrical recess 33,

in communication with the opening **32**, and the recess **33** is eccentric with respect to the cylindrical thumb-plunger. At its rear end, the recess **33** leads into a recess extension **34**, which is circular in cross section, and eccentric with respect to the thumb-plunger and concentric with the recess **33**. The recess **33** and recess extension **34** are eccentric with respect to the recess or valve seat **20**. Recess extension **34** is longitudinally tapered and flares rearwardly. The recess extension **34** receives a ball valve **35** adapted to be seated and unseated upon and from the recess or valve seat **20**. This ball valve engages a compressible coil spring **36**, arranged within the recess **33**.

When the unit is in the releasing condition, the ball valve **35** is seated upon the valve seat **20**, covering the opening **21**, and cutting off the suction from the recess **33**. The spring **36** now retains the ball valve seated and also holds the thumb-plunger **25** in the forward position, the forward end of the thumb-plunger projecting a short distance beyond the forward end **27** of the sleeve or casing **22**, such as for $\frac{1}{16}$". All of the thumb-plungers, therefore, project for about $\frac{1}{16}$" beyond the front face of the panel or board.

The object to be photographed or copied is usually flexible, such as drawings, maps, pictures or the like. This flexible object is arranged adjacent to the front face of the panel or board and will extend over any number of units **11**, depending upon the size of the flexible object. The operator determines the point on the object at which it is desired to secure the object to the panel or board and then presses with the thumb rearwardly against the object and the object depresses the thumb-plunger **25**. When the thumb-plunger moves rearwardly slightly, the ball valve **35** engages with the inclined wall of the eccentric recess extension **34** and the thumb-plunger will therefore shift the ball valve laterally, unseating the same from the seat **20**, and this unseating action need only be slight. The suction or vacuum will then be transmitted through the opening **21** to the opening **32** and will act upon the flexible object, clamping the same against the flat end **31**. Four units **11** at the corners of the object to be held may thus be actuated for holding the flexible object, or any other suitable number. When it is desired to remove the flexible object, it is manually peeled or separated from the end **31** of the thumb plunger and this will break the vacuum and the ball valve **35** will return to its seat and the thumb-plunger to its normal outer position.

It is thus apparent that the holding units are at the rear of the flexible object to be copied or photographed and are not visible and will not be photographed. They are always in position, to be used when desired. They do not injure or perforate the flexible object to be copied, and they will last indefinitely. The degree of suction need only be slight, to hold the flexible object securely in place, but the degree of suction is not sufficiently great so that there would be any tendency to tear the flexible object when it is peeled or separated from the thumb-plunger.

It is to be understood that the form of my invention herewith shown and described is to be taken as a preferred example of the same and that various changes in the size, shape and arrangement of parts may be resorted to without departing from the spirit of my invention or the scope of the subjoined claims.

Having thus described my invention, what I claim is:

1. A device for supporting objects to be copied or photographed, comprising a support, a device mounted upon the support comprising a casing having an opening and a valve seat, a valve to engage and disengage the valve seat, a tubular reciprocatory thumb-plunger within the casing and having an object engaging end which extends forwardly beyond the casing and support and a contracted opening in such end and a recess offset laterally with respect to the valve seat, the valve extending into the offset recess, and spring means engaging the thumb-plunger and valve.

2. A device for supporting objects to be copied or photographed, comprising a support, a device mounted upon the support comprising a casing having an opening and a valve seat, a ball valve to engage and disengage the valve seat, a tubular reciprocatory thumb-plunger within the casing and having a relatively wide object engaging end which extends forwardly beyond the casing and support and a contracted opening in such end and a recess at its rear end which is eccentric with respect to the valve seat, the ball valve extending into the eccentric recess, a spring arranged within the tubular plunger and engaging the ball valve and tubular plunger, and a suction line connected with the casing.

3. A device for supporting objects to be copied or photographed, comprising a panel having a transverse opening, a suction device carried by the panel, said suction device including a casing mounted within the transverse opening of the panel and having its forward end substantially flush with the forward face of the panel, a thumb-plunger mounted to reciprocate within the casing and to extend forwardly beyond the casing, the thumb-plunger being tubular and having a forward relatively wide object engaging end and a contracted opening in such end and having an eccentric shifting part, a valve to control the passage of suction through the casing and arranged to engage the shifting part of the thumb-plunger, spring means serving to seat the valve and thumb-plunger, and a suction line connected with the casing.

4. A device for supporting objects to be copied or photographed, comprising a panel, a plurality of spaced suction devices mounted upon the panel and extending transversely thereof, each section device comprising a movable transverse tubular member having a forward object engaging end arranged adjacent to the forward face of the panel and behind the object to be copied, said end having an opening, the tubular member being shifted by pressure applied to the face of the object remote from the tubular member, and means to supply vacuum to the member when shifted.

THOMAS E. CROCKETT.

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