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MATERIAL HANDLING DEVICE

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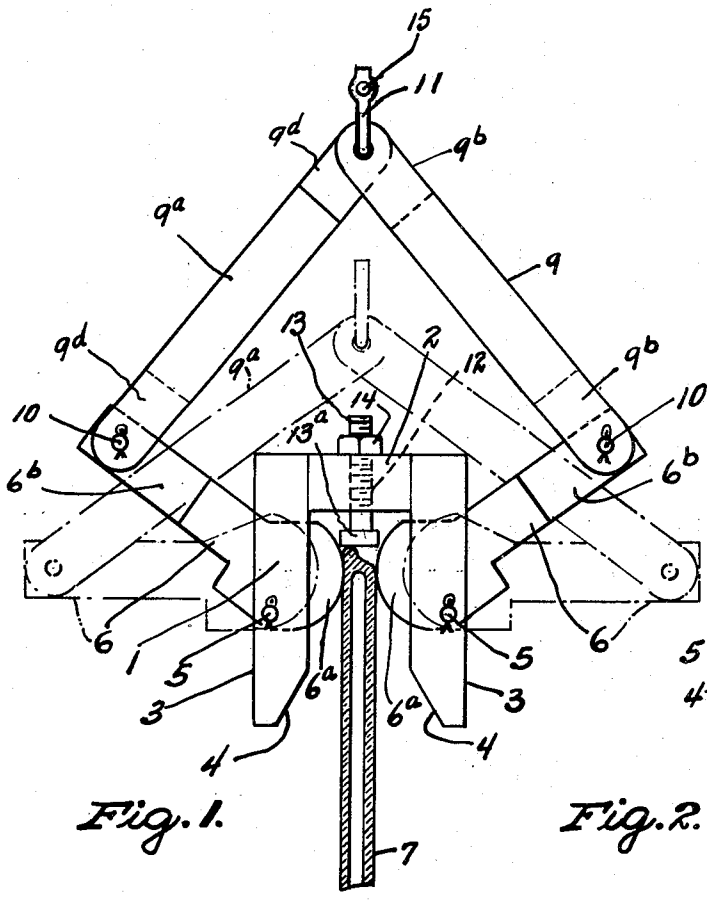



Fig. 1.

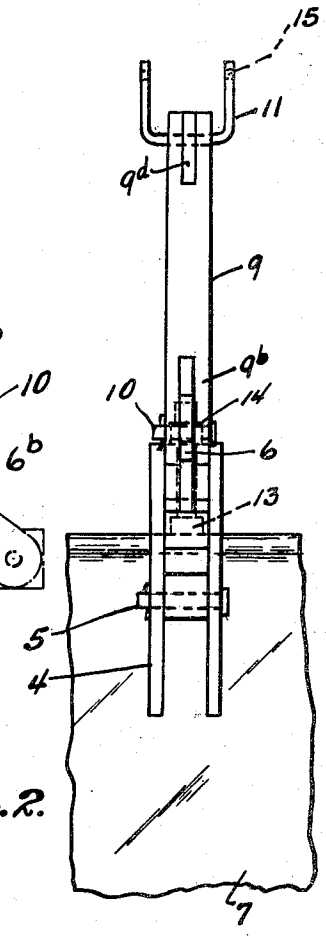



Fig. 2.

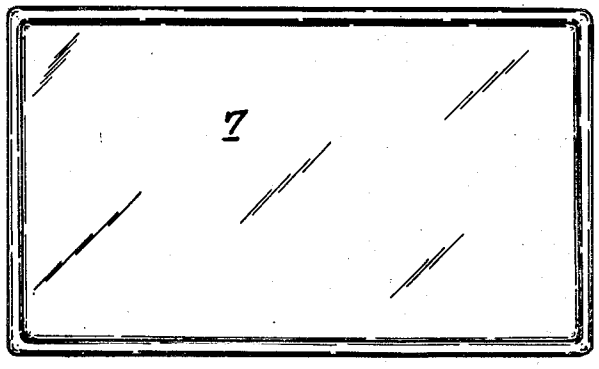



Fig. 3.

INVENTOR.

BY HARRY O. PHALIN

Glen E. Bee.

ATTORNEY.

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## MATERIAL HANDLING DEVICE

Harry O. Phalin, Port Allegany, Pa., assignor, by mesne assignments, to Pittsburgh Plate Glass Company, Pittsburgh, Pa., a corporation of Pennsylvania

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2 Claims. (Cl. 294—114)

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This invention pertains in general to material handling devices and more particularly to devices of the character in which opposing jaws of the device clamp the material therein with a pressure proportional to the weight of the material being handled.

One object of the invention is to provide a material handling device of the character described which is automatically adjustable, within a selected range, to various thicknesses of material.

Another object of the invention is to provide a material handling device of the character described with adjustable means for automatic selective engagement of the device with the material being handled at substantially the same area inwardly of the edge of the material.

A further object of the invention is to provide a material handling device of the character described which is automatically actuated by gravity to control the degree of frictional engagement between the device and the material handled, by reason of the weight of the material.

In the drawings forming a part of this description, Fig. 1 shows, in elevation, one form of the invention as provided for hanging glass objects from a travelling carrier while passing through an annealing lehr; Fig. 2 shows, in end elevation, the device of Fig. 1; Fig. 3 shows, in plan, one form of a glass object to be suspended between the jaws of the material handling device.

Referring now in detail to the drawings, reference character 1 indicates in general the fixed head of the device and comprises a spacer member 2 having pairs of spaced arms 3 secured thereto and depending therefrom, adjacent opposite ends of the member 2. Adjacent the free ends of the extremities of the members 3, the opposing faces of the members are beveled as at 4, to facilitate engagement between the head 1 and the material being suspended. Pivotally mounted between each pair of the members 3, intermediate the ends thereof and by means of suitable pins 5, are rotatable material-engaging arms 6. The opposing faces of the arms 6 have cam-shaped portions 6*a* suitably shaped to cause the faces 6*a* to approach each other as the arms 6 are rotated upwardly and to retract from each other as the arms 6 are rotated in a reverse direction. The opposite ends of each of the members 6 are reduced in thickness, as at 6*b*, to be received within suitable activating arms 9 and 9*a*. Each of the arms 9 has suitable slots 9*b* therein for this purpose. The engaged ends of the arms 9 and 9 have suitable registering apertures therein for reception of pins 10 pivotally connecting these members together. The arms 9 and 9*a* are pivotally connected at their opposite ends by means of the member 11, and for this purpose arm 9 has a slot 9*b* adjacent the pin 11 and the arm 9*a* is suitably reduced at 9*d* to be received within slot 9*b*.

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The member 11 may serve both as a pin connection between the members 9 and 9*a* and also as a means for suspending the handling device from any suitable mechanism. As illustrated in Figs. 1 and 2 of the drawings, member 11 is substantially U-shape in contour. Adjacent the free ends of the arms of member 11, each arm may be provided with an aperture 15 registering with the similar aperture 15 of the adjacent arm to receive a suitable pin or link to suspend the handling device from the aforesaid suitable mechanism.

The arms 6 and 9 on opposite sides of the head 1 may be suitably proportioned to permit the arms 9 to engage the head 1 when the arms 6 assume substantially horizontal position. By this arrangement the spacing between the cam faces 6*a* is fixed to a maximum, and the material-engaging portions of the cam faces are positioned to provide equal movement of both arms 6 in engaging the material being handled. A further adjusting device is mounted in the head 1, comprising a threaded aperture 12 in member 2 intermediate the pairs of arms 3, and a screw member comprising a threaded shank 13 mounted in the aperture 12 and provided with a head 13*a* disposed between the pairs of arms 3. A suitable nut 14, mounted on the shank 13 exteriorally of the head 1, locks the head 13*a* of the screw in any selected distance from the underside of the member 2 of the head. In this manner, the head 13*a* mounted above the effective travel of the cam faces 6*a*, limits the amount or distance which the material can be inserted into the space between the arms 3 of the head and the cam faces of the members 6.

The advantages of the foregoing adjustment features are of great importance when the device is used to handle materials which might be damaged if too great a pressure is exerted by the cam shaped faces 6*a* of the arms 6, in engaging the material at points not suitably reinforced.

One specific use of the invention, as illustrated in the drawings, is the handling of double glazing units between the apparatus forming the unit

and through the annealing lehr. As illustrated in the drawing, the double glazed unit 7 comprises spaced sheets of glass joined together at their marginal areas. This joining is done by heating the peripheral edges of the sheets to softening condition so that the localized heated areas flow together to form a homogeneous weld in a suitable mechanism. The unit 7 is then removed from the mechanism and engaged by the handling device for conveyance through the annealing lehr. The screw 13 is suitably manipulated so that when the unit 7 disposed between the arms 3 abuts the head 13*a* of the screw 13, the cam faces 6*a* of the members 6 engage the unit adjacent the thickened welded shoulder. Furthermore, since the members 6 are identical and start to pivot from substantially the same position relative to their pivot point, these arms 6 through their faces 6*a* exert equal pressure on opposite sides of the unit 7, and always a pressure proportionate to the weight of the unit.

In the embodiment of the invention illustrated in the drawings, the weight of the head member 1 may be such as to normally fall below the position illustrated by full lines in Fig. 1 of the drawings whenever the head 1 is not engaged with material to be suspended, such as 7. To engage material between the cam faces 6*a*, the head member may be positioned over the material and dropped down to engage the material, or the head may be manually raised to rotate arms 6 so as to open the cam faces and the material then inserted and the head moved down to cause cam faces 6*a* to engage the material. The weight of the material being handled, such as 7, will pull head 1 downwardly, clamping the material firmly between cam faces 6*a* of the arms 6.

When it is desired to remove the unit 7 from the head 1 of the handling device, it is only necessary to support the unit 7 and to slightly raise the head 1 relative to the unit 7 to release the jaws 6*a* from engagement with the unit 7. This supporting of the unit 7 and raising of the head 1 may be accomplished manually or by any of the well-known suitable mechanical mechanisms for performing this function.

Obviously, by reason of its construction, the material-handling device herein illustrated will work equally as well upon any thickness of material which can be inserted between the arms 3 and the opposing cam faces 6*a* when the device is in the relative position indicated by dot and dash lines of Fig. 1. The head 1 can be made of any desired size and, upon suitably proportioning the various members of the handling device, materials of any weight and shape can be handled in the manner as hereinbefore described.

The specific embodiment of the invention as disclosed in the drawings is for purposes of illustration only and many modifications obvious to those skilled in the art may be made in the handling device without departing from the spirit of the invention as described and as set forth in the appended claims.

I claim:

1. In a material handling device, in combination, an open ended head portion comprising a top member and depending side members, a material engaging member pivotally mounted intermediate its ends upon each depending head portion side member, each material engaging member having a cam shaped end portion for engagement with the material and an extension projecting outwardly from the pivotal mounting, an operating member pivotally connected with each extension, a pivotal connection for each operating member above said head portion, and an adjustable stop member mounted upon the head portion top member to gage the points of contact between the material to be handled and the cam faces of the material engaging members.

2. In a material handling device, in combination, an open ended head portion comprising a top member and depending side members, a material engaging member pivotally mounted intermediate its ends upon each depending head portion side member, each material engaging member having a cam shaped end portion for engagement with the material and an extension projecting outwardly from the pivotal mounting, and an operating member pivotally connected with each extension and pivotally connected above the head portion to engage the head portion top member when moving the material engaging members to release position so as to limit the opening movement of the material engaging members.

HARRY O. PHALIN.

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