March 7, 1950 J. STOIBER 2,500,048

CLAMPING DEVICE

Filed Jan. 30, 1947

Fig. 1

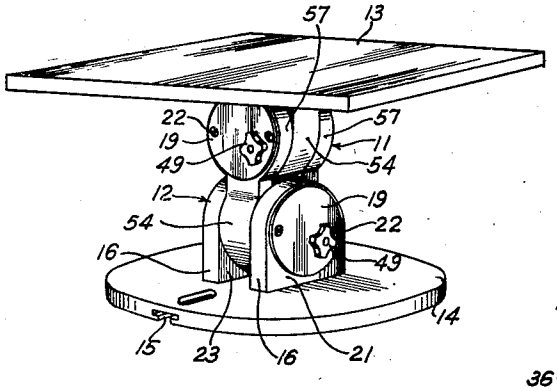


Fig. 4

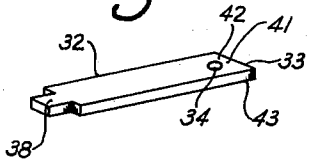


Fig. 5

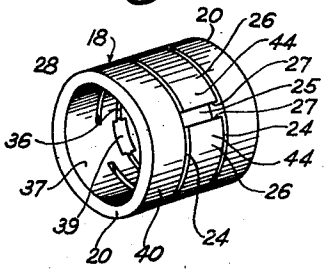


Fig. 2

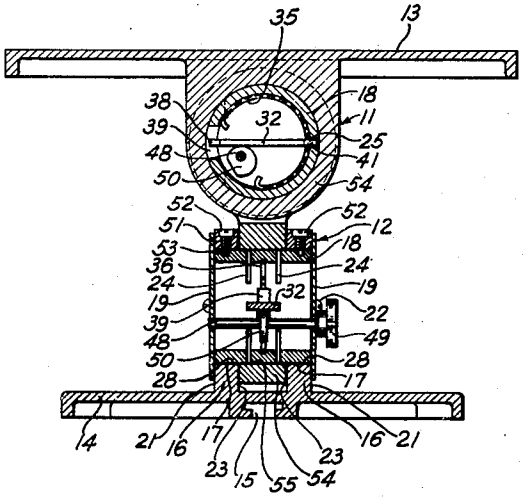
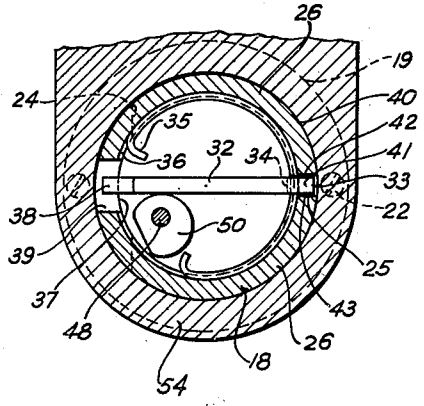


Fig. 3



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Patented Mar. 7, 1950

2,500,048

UNITED STATES PATENT OFFICE

2,500,048

CLAMPING DEVICE

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Application January 30, 1947, Serial No. 725,217

13 Claims. (Cl. 248—177)

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The present invention relates to tiltable members primarily designed for use on tripod heads or similar devices, and more particularly to a new and improved clamping and holding device for said members.

The invention has as its principal object the provision of a clamping or holding device for a tiltable member.

Another object of the invention is the provision of an arrangement by which the tiltable member may be moved to any adjusted position, and may then be securely clamped in said position.

Still another object of the invention is the provision of a clamping device which is simple, with few parts of rugged construction, easy to operate and positive in its results.

To these and other ends, the invention resides in certain improvements and combinations of parts, all as will be hereinafter more fully described, the novel features being pointed out in the claims at the end of the specification.

In the drawings:

Fig. 1 is a perspective view of one form of tripod head formed with a double clamping device constructed in accordance with the present invention;

Fig. 2 is a vertical sectional view through the device illustrated in Fig. 1, showing the arrangement of the clamping parts;

Fig. 3 is a vertical sectional view through one of the clamping devices, but on a larger scale than Fig. 2, showing the arrangement of the parts in the released and non-clamping position;

Fig. 4 is a perspective view of the cantilever bar which is pivoted to cause the clamping element to become operative; and

Fig. 5 is a perspective view of the tubular-bearing member showing the relation of the movable clamping members formed thereon.

Similar reference numerals throughout the various views indicate the same parts.

Fig. 1 of the drawings shows a pair of tiltable members broadly indicated by the numerals 11 and 12, the upper one 11 of which carries a plate 13 to which a camera or similar object may be secured, while the lower one 12 is provided with a base plate 14 to which a tripod may be connected, as is apparent. As the two tilting units and the locking-and-clamping means therefor are identical in construction, only one will be described in detail and the corresponding parts in the other will be designated by the same numerals.

Fig. 2 shows a base 14 provided with a T-slot 15 for connecting the base to a tripod or similar

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device. This base has integrally formed therewith a pair of spaced brackets 16 extending upwardly from the base 14 and forming therewith a unitary support. The brackets 16 are provided with aligned openings 17 adapted to slidably receive a tubular cylindrical bearing 18 which has a length substantially equal to the distance between the outer edges of the brackets, as best shown in Fig. 2, the bearing member 18 forming, in effect, a part of the main support. A pair of plates 19 covers the openings 17 and engages the ends 20 of the bearing 18 to retain the bearing 18 in position. These plates 19 are secured to the outer surface 21 of the brackets 16 by screws 22 or other suitable fastening means.

The portion of the bearing 18 between the inner surfaces 23 of the brackets 16 is formed with a pair of substantially parallel slots 24 which extend most of the way around the member 18, as best shown in Fig. 5, and an axially-extending slot 25 which connects the slots 24 to form a pair of flexible fingers or tongues 26, the ends 27 of which are spaced by reason of the slot 25, as is apparent from an inspection of Fig. 5. The slots 24 are spaced apart axially a distance less than the distance between the inner surfaces 23 of the brackets 16, as shown in the lower part of Fig. 2, to provide a pair of spaced-bearing areas 28, the purpose of which will be later pointed out.

The tubular bearing 18 has positioned therein a transversely extending cantilever bar 32, one end 33 of which extends into the slot 25. In order to retain the end 33 in slot 25, the bar 32 is provided with an aperture 34 through which an annular spring 35 is passed. This spring is positioned in an annular recessed or groove 36 formed on the inner surface 37 of the bearing 18. The left or free end 38 of the bar 32, as viewed in Fig. 3, is reduced in size and extends into a slot 39 formed in 18 and positioned diametrically opposite the slot 25. This slot 39 is substantially the same width as the end 38 and serves to guide the bar 32 to retain the latter in proper position and to prevent sideways tipping of the bar. However, the end 33 substantially fills the slot 25. Normally the fingers 26 conform in shape to the outer surface 40 of the bearing 18. However, if an upward movement is imparted to the left end of the bar 32, see Fig. 3, the right end 33 of the bar pivots substantially about the point 41 so that the surface 42 will engage the upper fingers 26 while the lower surface 43 will engage the lower fingers 26 to spread or force the fingers outwardly or radially of the bearing 18 so that the outer

surfaces of the fingers will project beyond the outer surface 40 of the bearing 18, as is apparent from an inspection of Fig. 3. Thus, by imparting a clockwise movement to the bar 32, the fingers 26 may be moved outwardly for clamping, as will be later pointed out.

To secure such movement of the bar 32, the plates 19 have mounted therebetween a shaft 48 which extends through the bearing 18 adjacent but slightly below the free end of the bar 32, as shown in Fig. 3. One end of this shaft projects beyond one of the plates 19 and has mounted thereon an operating wheel 49 by which a turning movement can be imparted to the shaft 48. Inside the bearing 18 and just below the left end of the bar 32, the shaft 48 has mounted thereon a cam 50 adapted to engage and move the bar 32 upwardly upon rotation of shaft 48, as is apparent from an inspection of Fig. 3. Thus, by turning the wheel 49 the shaft 48 may be rotated to bring the cam 50 into lifting relation with the bar 32 to pivot the latter to spread the fingers 26 radially. In order to prevent movement of the bearing 18 relative to the brackets 16, each of the latter is provided with a tapped hole 51 through which a holding screw 52, the end of which extends into an opening 53 formed in the bearing 18, see Fig. 2. The member 54 to be clamped is annular in shape and has a width substantially equal to the space between the inner surfaces 23 of the brackets 16, as shown in Fig. 3. The member 54 is thus concentric with and has an inner diameter which is slightly greater than the outer diameter of the bearing 18 so that the member 54 may tilt or rock relative to the bearing to position the camera or supporting plate 13. The inner surface 55 of the member 54 is provided with portions which are supported by the bearing areas 28 of the bearing 18, see Fig. 2. When the parts are in the position as shown in Fig. 3, the member 54 may be rocked or moved relative to the bearing 18. However, when the fingers 26 are moved outwardly by the rocking bar 32, as above described, the displaced fingers will engage tightly the inner surface 55 of the member 54 to clamp or hold the member 54 tightly to the bearing 18 to prevent relative movement therebetween. Thus, the turning of the wheel 49 serves to clamp the member 54 against movement. Reverse rotation of the wheel, however, permits the fingers 26 to move out of clamping relation with the surface 55 so that the member 54 may be rocked on the bearing 18. Thus, the latter provides both a bearing and a locking or holding means for the member 54. The latter is formed with upwardly spaced brackets or supporting members 57 which correspond with the brackets 16 and differ from the latter only that they are movable with the member 54. Otherwise, they function in the same manner as the brackets 16.

It is apparent that by moving the proper wheel 49 the upper or lower members 54 may be moved selectively, or by unclamping both wheels, both units may be adjusted, the advantages of which are relatively apparent. Thus, the members 54 may be moved to an adjusted position, and when properly adjusted, the wheels 49 and shafts 48 are rotated to rotate the cams 50 to cause the cams to rock bars 32 to spread the fingers 26 into clamping relation with the surfaces 55 to clamp or hold the members 54 against rotative movement. Such a clamping device is simple, easy to operate and positive in its action. While the above described clamping device has been illustrated and described in connection with a member which is movable or tiltable above a horizontal axis, such a clamping arrangement is also adapted for use in connection with an adjustable member movable about a vertical axis.

While one embodiment of the invention has been disclosed, it is to be understood that the inventive idea may be carried on in a number of ways. This application is, therefore, not to be limited to the precise details disclosed, but is intended to cover all variations and modifications thereof falling within the scope of the appended claims.

I claim:

1. A clamping device for a turning member comprising a support, a cylindrical bearing carried by said support, a turnable member rockably mounted on said bearing for movement relative thereto, resilient clamping means formed from said bearing, and means for moving said clamping means into holding relation with said member to hold the latter against movement relative to said bearing.

2. A clamping device for a turning member comprising a support, a cylindrical bearing fixedly positioned in said support, a turnable member having a cylindrical portion mounted on said bearing for moving relative thereto, resilient clamping means formed from said bearing and movable radially to engage said portion, areas on said bearing adjacent said clamping means for supporting said portion, and means carried by said support for moving said clamping means into clamping relation with said portion to hold said member against movement relative to said bearing.

3. A clamping device for a turning member comprising a support, a bearing carried by said support, a turnable member mounted on said bearing for movement relative thereto, means for positioning said member on said bearing, resilient clamping means formed from said bearing and adapted to be moved radially into clamping relation with said member to hold the latter against movement relative to said bearing, and means on said support for moving said clamping means to clamping position.

4. A clamping device for a turning member comprising a support formed with spaced substantially annular-shaped parts, a tubular bearing carried by said parts, a turnable member positioned between said parts and rockably supported by said bearing, clamping members formed from said bearing and adapted to be moved radially into clamping relation with said turnable member to prevent movement of the latter relative to said bearing, and means on said support for moving said clamping members into clamping position.

5. A clamping device for a turning member comprising a support, a cylindrical bearing mounted in said support, a turnable member rockably mounted on said bearing for movement relative thereto, a pair of flexible radially movable clamping members formed from said bearing, the ends of said clamping members being arranged in spaced relation, a wedging member positioned between said ends, and means for actuating said wedging member to spread said ends to move said clamping members radially and into clamping relation with said turnable member to hold the latter against movement.

6. A clamping device for a turning member comprising a support, a cylindrical bearing mounted in said support, a turnable member rockably mounted on said bearing for movement

relative thereto, a pair of flexible radially movable clamping members formed from said bearing, the ends of said clamping members being arranged in spaced relation, a wedging member positioned between said ends, means for actuating said wedging member to spread said ends to move said clamping members radially and into clamping relation with said turnable member to hold the latter against movement, and means for retaining said wedging members in position between said ends.

7. A clamping device for a turning member comprising a support, a tubular bearing mounted in said support, a turnable member rockably mounted on said bearing for movement relative thereto, a pair of flexible radially movable clamping members formed from said bearing, the ends of said clamping members being arranged in spaced relation, a wedging member positioned between said ends, means including a cam member carried by said support for actuating said wedging member to spread said ends to move said clamping members radially and into clamping relation with said turnable member to hold the latter against movement, and means for yieldably retaining said wedging member in position between said ends.

8. A clamping device for a turning member comprising a support, a tubular bearing mounted in said support, a turnable member rockably mounted on said bearing for movement relative thereto, a pair of curved flexibly clamping members formed on said bearing and normally positioned concentric with said bearing, the ends of said clamping members being arranged in spaced relation, a wedging member having a portion positioned between said ends, and means for actuating said wedging member to cause said portion to spread said ends to move said clamping members out of concentric relation and into clamping relation with said turnable members.

9. A clamping device for a turning member comprising a support, a tubular bearing mounted in said support, a turnable member rockably mounted on said bearing for movement relative thereto, a pair of flexible radially movable clamping members formed from said bearing, the ends of said clamping members being arranged in spaced relation, a cantilever bar having one end positioned between said ends, and means for moving the other end of said bar to pivot said one end to wedge said ends apart to move said clamping members into clamping relation with said turnable member.

10. A clamping device for a turning member comprising, a support, a tubular bearing mounted in said support, a turnable member rockably mounted on said bearing for movement relative thereto, a pair of flexible radially movable clamping members formed from said bearing, the ends of said clamping members being arranged in spaced relation, a cantilever bar having one end positioned between said ends, means for moving the other end of said bar to pivot said one end to wedge said ends apart to move said clamping members into clamping relation with said turnable member, and spring means for retaining said one end of said bar in position between said ends.

11. A clamping device for a turning member comprising, a support, a tubular bearing mounted in said support, a turnable member rockably

mounted on said bearing for movement relative thereto, a pair of flexible radially movable clamping members formed from said bearing, the ends of said clamping members being arranged in spaced relation, a cantilever bar having one end positioned between said ends, means for moving the other end of said bar to pivot said one end to wedge said ends apart to move said clamping members into clamping relation with said turnable member, spring means for retaining said one end of said bar in position between said ends, and means on said bearing for guiding said other end of said bar.

12. A clamping device for a turning member comprising a support, a tubular bearing mounted in said support, a turnable member rockably mounted on said bearing for movement relative thereto, a pair of flexible radially movable clamping members formed from said bearing, the ends of said clamping members being arranged in spaced relation, a cantilever bar having one end positioned between said ends, an annular spring positioned in said bearing and engaging said bar adjacent said one end to retain the latter in position between said ends, said bearing having a slot opposite said ends to receive and guide the other end of said bar, a shaft rotatably mounted on said support, and a cam carried by said shaft and adapted upon rotation of said shaft to engage the other end of said bar to rock the latter about said one end to spread said clamping members to move the latter into clamping relation with said turnable member.

13. A clamping device for a turning member comprising a support, a tubular bearing fixedly positioned in said support, said bearing being formed with a pair of parallel circumferential slots which are connected at one point by an axial slot to form a pair of substantially semi-annular flexible portions connected to said bearing, a cantilever bar positioned within said bearing and having one end thereof extending into said axial slot so as to engage the free ends of said portions, said bearing being formed with a second axial slot diametrically arranged from said first axial slot to receive the other end of said bar to guide the latter, bearing areas on said bearing outside said portions, a turnable member mounted on said bearing to overlie said portions and supported on said areas, an annular spring positioned within said bearing and yieldably engaging said bar near said end to retain the latter in position in said first slot, a shaft carried by said support and extending through said bearing adjacent the other end of said bar, and a cam on said shaft adapted upon rotation of said shaft to engage and move the other end of said bar to pivot the one end of said bar in said first slot to spread said free ends to move said portions outwardly and into clamping relation with the turnable member.

JOSEPH STOIBER.

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