May 8, 1951 W. SANDAGER, JR 2,551,971

INSTRUMENT SUPPORT

Filed Oct. 22, 1946

Fig. 1.

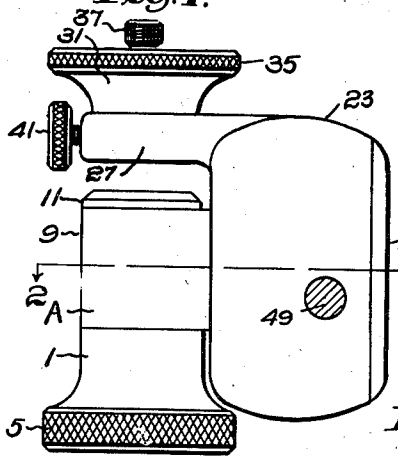


Fig. 2.

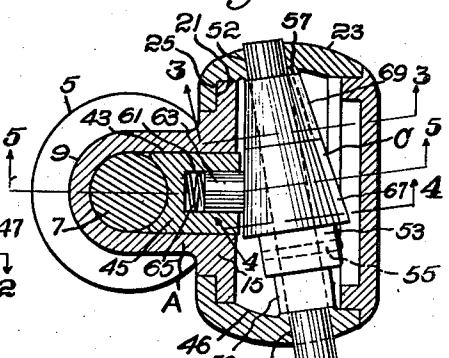


Fig. 3.

Fig. 4.

Fig. 5.

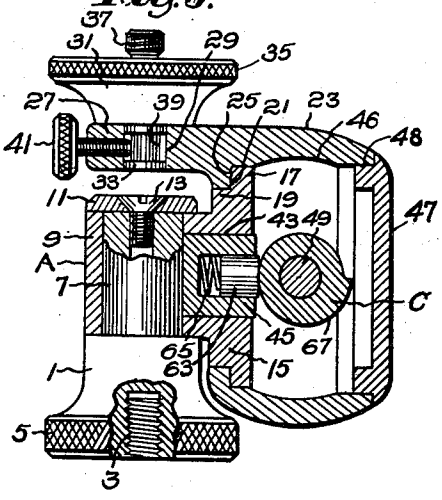
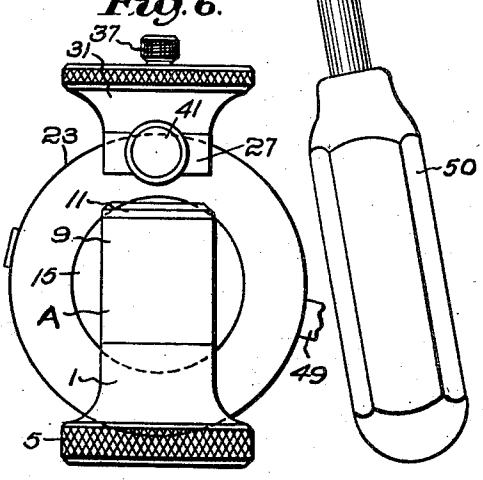


Fig. 6.



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UNITED STATES PATENT OFFICE

2,551,971

INSTRUMENT SUPPORT

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4 Claims. (Cl. 248—183)

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My invention relates to supports for instruments such as cameras, telescopes, microphones, and the like.

The invention has among its objects the provision of an improved support for mounting the instrument for universal movement, together with improved means for locking it into selected adjusted positions. The invention, however, will be best understood from the following description when read in the light of the accompanying drawings of a specific embodiment of the invention, the scope of which latter will be more particularly pointed out in the appended claims.

In the drawings:

Fig. 1 is an elevation of an instrument support according to the invention;

Fig. 2 is a section on the line 2—2 of Fig. 1;

Figs. 3 and 4 are, respectively, sections on the lines 3—3 and 4—4 of Fig. 2, with parts omitted;

Fig. 5 is a section on the line 5—5 of Fig. 2, with parts in elevation and parts broken away; and

Fig. 6 is an elevation of the instrument support as viewed from the left in Fig. 1.

Referring to the drawings, the instrument support illustrated comprises a base member 1 formed with a screw-threaded recess 3 opening on its under side, this recess being adapted to receive an upwardly projecting screw-threaded stud carried by an under structure such as a table, tripod or the like for securing the support thereto. As shown, the lower end of the base member is formed with a peripherally knurled head 5 to facilitate screwing the base member on the stud and clamping it against the upper surface of the under structure.

Integral with the base member 1 is shown an upwardly projecting post 7. On this post is rotatably mounted for horizontal swinging the ear portion 9 of an intermediate part A. As shown, for retaining the intermediate part on the post is a washer 11 secured to the post by a screw 13.

As shown, the intermediate part A is provided with a flange 15 integral with the ear 9. This flange is shown as formed with a large diameter portion 17 and a reduced diameter portion 19, the peripheral cylindrical surfaces of these portions at their adjacent ends being connected by an annular surface portion 21 parallel to the axis of the post 7. Rotatably mounted for vertical swinging on the peripheral surfaces of the flange portions 17 and 19 is a member 23, the latter having an annular surface 25 facing and contacting with the annular surface portion 21 of the intermediate part.

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The member 23 is shown as formed with an arm 27 having a cylindrical through opening 29, the axis of this opening preferably being in the same plane as the axis of the post 7. Supported on the arm is a head 31 having at its under side a stud 33 rotatably received in the opening 29, so that by use of the peripherally knurled flange 35 of the head the upwardly projecting screw-threaded stud 37 of the head may be screwed into a corresponding screw-threaded recess on the under side of the instrument to be supported by and secured to the head. As shown, the stud 33 is provided with a circumferential lateral groove 39 which receives the inner end of a set screw 41 screw-threadedly carried by the arm 27. The head may be non-rotatably clamped to the arm by use of this set screw. By slightly loosening the set screw rotation of the head relative to the arm will be permitted for permitting the instrument to be attached to the head without permitting the head to be withdrawn from the arm. However, upon backing off the screw sufficiently to withdraw it from the groove 39 the head may be removed from the arm to permit the head, when desired, to be attached to the instrument with the head detached from the arm.

As shown, the intermediate part A is provided with an opening 43 extending from the outer face of the flange 15 to the bore of the ear 9 which receives the post 7. In this recess is slidably mounted a plug-like dog 45 the inner end of which, as clearly illustrated in Fig. 2, is shaped to conform to the surface of the post. The portion of the member 23 which projects to the right beyond the flange 15, as viewed in Fig. 5, is formed with a cavity 46 closed by a removable cover 47 having a friction fit in the opening 48 of the cavity. Through the cavity extends one end portion of an elongated rod 49 provided at its opposite end with a handle 50, the rod being rotatably journalled in the opposite walls of the cavity 46 as indicated at 51 and 52 (Fig. 2). Carried by the rod interiorly of the cavity 46 is a cam C having at one end thereof a sleeve portion 53 fixedly secured to the rod by a pin 55 so that the cam must rotate with the rod. At one end the cam bears against the interior surface of the wall of the cavity as indicated at 57, a spacing sleeve 59 being loosely positioned on the rod 49 between the opposite end of the cam and the interior wall of the cavity, which construction holds the cam and rod against longitudinal movement. The rod is set at an angle to the post 7 so that it and its handle portion will clear the under support when the rod is

manipulated by means of its handle to point the instrument in different directions. The cam is therefore conically shaped to present its cam surfaces properly to the flange 15 and dog 45. As shown, the dog 45 is recessed, as indicated at 61, for slidably receiving a plug 63, a spring 65 at the bottom of the recess urging the plug outwardly of the recess to hold it yieldingly in contact with the cam and urging the dog in the opposite direction to hold it yieldingly in contact with the post 7. The spring because of the contact of the plug 63 with the cam also urges the member 23 carrying the cam to the right, as viewed in Fig. 2, so as to hold the annular surfaces 21 and 25 in contact. In these ways the spring prevents lost motion between the parts.

The cam C above referred to is shown as provided with a raised portion 67 which when the rod 49 is rotated clockwise, as viewed in Fig. 4, will depress the plug 63 and engage the dog 45 and force the latter into locking engagement with the post 7, whereby to lock the intermediate part A against horizontal swinging relative to the post. At the same time the reaction between the post and the member 23 which carries the cam will force that member to the right, as viewed in Fig. 2, to force the clutch surfaces presented by the annular surfaces 21 and 25 into locking engagement, so as to lock the member 23 against vertical swinging relative to the intermediate part. If desired, the spring 65 selected may be stiff enough to necessitate the cam portion 67 operating only on the plug 63, that is to say, without directly operating the dog 45, to secure satisfactory locking engagement of the dog with the post 7. The spring in such case will act to limit the locking force applied by the handle 50 and thus insure against possible jamming of the parts.

The cam C has a second raised portion 69 which when the rod 49 is rotated counterclockwise, as viewed in Fig. 3, will directly engage with the adjacent surface of the flange 15 of the intermediate part A without the raised portion 67 of the cam acting upon the plug 63 or dog 45. The reaction force on the member 23 in such case will force that member to the right, as viewed in Fig. 2, and thus force the clutch surfaces 21 and 25 into interlocking engagement so as to lock the member 23 against vertical swinging without locking the intermediate part on which it is mounted against horizontal swinging.

It will be understood, that with the cam C in neutral position, the instrument supported on the under structure by the device described may be universally adjusted into a desired position by manipulation of the handle 50, whereupon, by rotation of the handle in one direction, the instrument may be locked against all movement from its adjusted position, or, by rotation of the handle in the opposite direction, the instrument may be locked only against vertical swinging from its adjusted position thus enabling it still to be swung horizontally by manipulation of the handle. Friction between the cam and the parts on which it operates will hold the parts locked until the handle is manually rotated to release them.

Preferably the parts of the instrument support above described, except the spring 65, are made of light weight material such as aluminum. It will be understood, however, that other metals and materials may be employed.

It will be understood that within the scope of the appended claims wide deviations may be made from the form of the invention described without departing from the spirit of the invention.

I claim:

1. An instrument support having, in combination, a base member, a member for attachment to the instrument, an intermediate part on which said members are mounted for swinging about axes at an angle to each other, separate means for releasably locking said intermediate part to said members, respectively, cam means carried by one of said members, a handle for moving said cam means in opposite directions from a neutral position in which neither locking means is actuated, said cam means when so moved in one direction operating both of said locking means into locking condition and when moved in the opposite direction operating one only of said locking means into locking condition.

2. An instrument support having, in combination, a base member; a member for attachment to the instrument; an intermediate part on which said members are mounted for swinging about axes at an angle to each other, one of said members and said intermediate part presenting cooperating surfaces for resisting movement of that member relative to said intermediate part in a direction which is away from the axis of swinging of the other of said members; means for detachably locking said intermediate part to the said other of said members comprising a second part movable toward said axis; a manually operated actuator rotatably carried by that member which presents one of said cooperating surfaces, said actuator having a portion adapted when said actuator is rotated in one direction to operate on said second part only, for locking said intermediate part to the other of said members and simultaneously urging the member carrying said actuator away from said axis for forcing said cooperating surfaces into frictional locking engagement, said actuator also having a portion adapted when said actuator is rotated in the opposite direction to operate on said intermediate part only, for forcing said cooperating surfaces into frictional locking engagement.

3. An instrument support having, in combination, a base member, a member for attachment to the instrument, an intermediate part on which said members are mounted for swinging about axes at an angle to each other, means for releasably locking one of said members to said intermediate part against relative swinging comprising a locking dog adapted to engage a surface of revolution on said member coaxial with its axis of relative swinging, means for releasably locking the other of said members to said intermediate part comprising cooperating facing clutch surfaces coaxial with the axis of relative swinging of said member and part, manually operated means carried by the last mentioned member comprising a rotatable cam for forcing said dog into locking engagement with said surface of revolution and for creating a reaction force on said member tending to urge it in the direction of its axis of relative swinging for forcing said clutch surfaces operatively into locking engagement, said cam having a position in which each locking means is released, said cam having a portion adapted, when the cam is rotated in the direction opposite to that in which it actuates the dog, directly to engage the intermediate part for forcing the clutch surfaces operatively into locking engagement without actuating the dog into locking engagement.

4. An instrument support having, in combination, a base member provided with a post, an intermediate part swingingly mounted on said post, a second member for attachment to the instrument mounted on said intermediate part for swinging about an axis at an angle to the axis of said post, means forming a pair of cooperating clutch surfaces carried by said intermediate part and second member, respectively, a locking dog carried by said intermediate part, means comprising a manually operated rotatable cam for releasably forcing said dog into locking engagement with said post for locking said intermediate part to said base member, said cam being carried by said second member whereby the reaction between said member and post when the dog is forced by said cam into locking engagement with the post will also cause locking engagement of said clutch surfaces to lock said intermediate part also to said second member,

said cam having a neutral position in which neither locking means is actuated, said cam having a portion adapted, when the cam is rotated from said neutral position in the direction opposite to that in which it actuates the dog, directly to engage the intermediate part for causing locking engagement of the clutch surfaces.

WILLIAM SANDAGER, JR.

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