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RACK AND CLAMP FOR ENLARGERS

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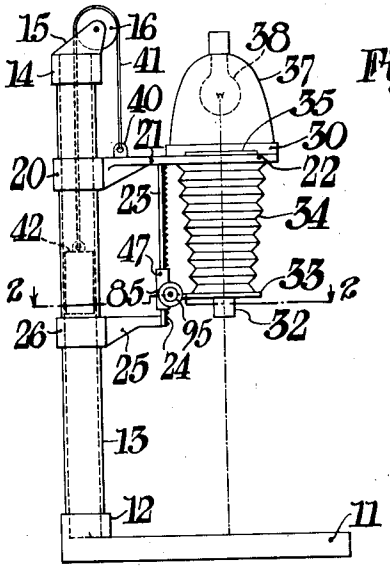


Fig. 1.

Fig. 3.

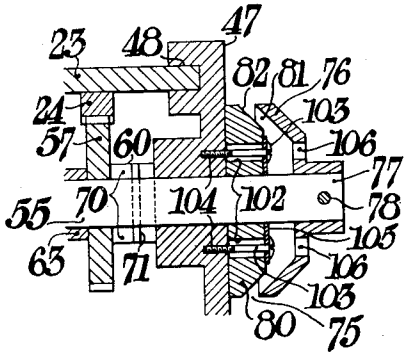
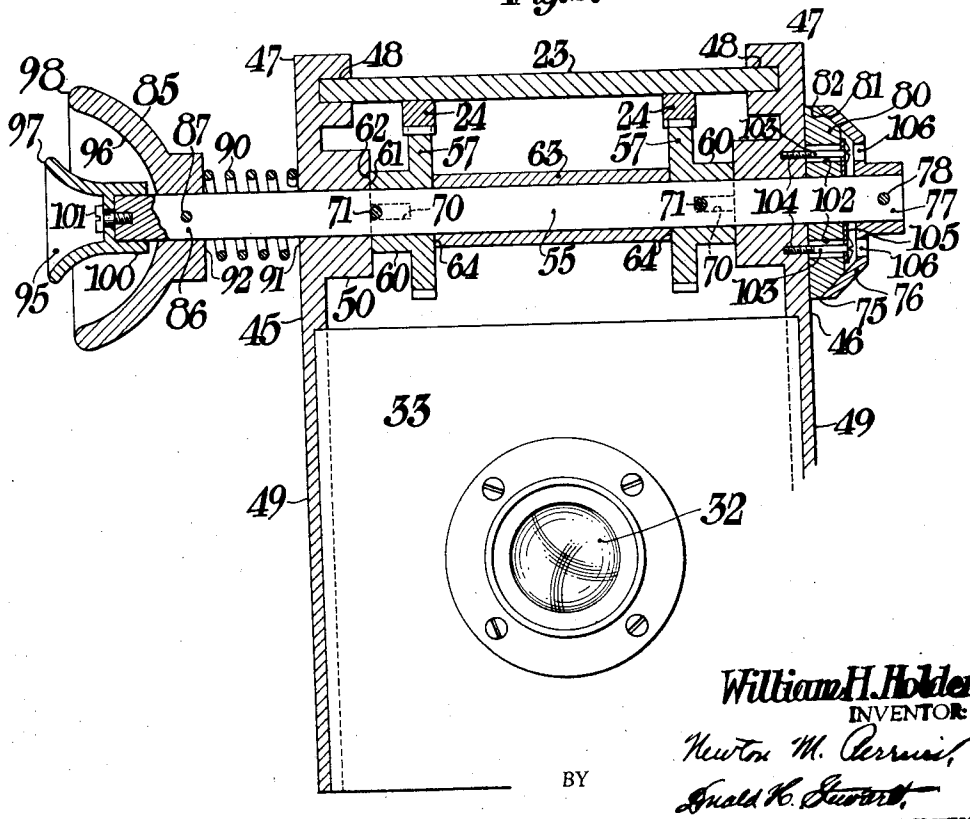


Fig. 2.



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RACK AND CLAMP FOR ENLARGERS

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9 Claims. (Cl. 88—24)

The present invention relates to photography and more particularly to photographic enlarging cameras, which have a focusing lens movable relative to a negative holding frame and to a sensitized-paper easel to enable a wide range of enlargements or reductions to be made. One object of the invention is to provide an improved rack and clamp for enlarging cameras. Another object is to provide a rack and clamp which will enable the lens to be easily and quickly adjusted and, when adjusted, to be securely held against accidental movement until it is again repositioned. Another object is to provide a rack and clamp of the type described which is simple in construction, relatively inexpensive to manufacture, and effective in use. Still another object is to provide a rack and clamp of the class described which is automatically adjusted for wear of the retaining parts and thus assures that the lens will be held in proper adjusted position irrespective of the wear of the device. A further object is to provide a mechanism for adjusting the apparatus by means of two coaxially arranged knobs mounted on a single shaft, one knob rotatably mounted to afford rapid adjustment of the shaft, and the other knob affixed to the shaft for fine adjustments thereof.

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

In the drawing:

Fig. 1 is a side elevation of an enlarging camera in diagrammatic form, including an adjustment mechanism constructed in accordance with a preferred embodiment of my invention;

Fig. 2 is a sectional horizontal view taken substantially on the line 2—2 of Fig. 1, showing the adjustment mechanism with the clutch in engaged position to securely retain the lens in adjusted position; and

Fig. 3 is a horizontal sectional view of a portion of the mechanism shown in Fig. 2 and shows the clutch in the disengaged position to permit free movement of the lens.

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

Referring now to the drawing, 11 indicates a supporting base or easel on which the sensitized paper is positioned to receive a projected image. This easel or base is formed, at one end thereof, with an upwardly extending hub 12 adapted to receive a vertically extending hollow supporting post 13, the upper end of which is provided with a caplike number 14 having outwardly and upwardly extending arms 15 on which is rotatably mounted a pulley 16, the purpose of which construction will be hereinafter more fully described.

Slidably mounted on the post 13, is a bracket 20 formed with spaced laterally extending arms 21 adapted to engage the camera frame 22 to support the latter, in the usual and well known manner. Secured to the bracket 20 and depending therefrom is a plate 23 having tracks, preferably in the form of racks, 24 arranged on the front face thereof. The lower end of the plate 23 is fastened, in any suitable manner, to the arms 25 of a lower bracket 26 also slidably mounted on the post 13. The brackets 20 and 26 thus provide a two-bearing support for the camera, and are arranged to slide vertically on the post 13 to properly position the camera relative to the paper easel 11.

The enlarging camera is of the usual construction and comprises, in general, a negative holding frame 30, and a lens 32 mounted on a suitable lens board 33 and connected to the holding frame 30 by means of a depending bellows 34 which enables the lens to be moved relative to the holding frame for the purpose of focusing, as is well known to those familiar with the art. The frame 30 is arranged to receive a negative holder 35 on which is placed a negative (not shown), the image of which is projected, by means of a suitable light, through the lens 32 and onto the sensitized paper position on the easel 11. A reflector 37 is detachably mounted on the holding frame 30 and carries a light source, preferably in the form of an electric lamp 38, which is connected to a suitable source of electric current (not shown).

In order to make different sizes of enlargement and reductions, it is often necessary to adjust the entire camera relative to the easel 11, as is well known. To this end, the bracket 20 is formed with a projecting ear 40 to which is secured a cable 41 arranged to run over the pulley 16 and through an opening in the cap 14 and into the interior of the post 13. A suitable counterweight 42 is fastened to the free end of the cable 41 within the post 13. When the camera is to be adjusted relative to the easel 11, the brackets 20 and 26, with their connecting plate 23, are slid longitudinally along the post 13 until the desired position is reached. The cable 41 running over the pulley 16, raises or lowers the counterweight 42 within the post 13. After the camera has been properly positioned relative to the easel 11, the counterweight will then maintain this adjustment.

In addition to moving the entire camera relative to the easel 11, it is also essential to properly focus the lens 32 relative to the negative holder 35. To accomplish this result, the present invention provides an improved rack and clamp which will positively yet resiliently retain the lens in adjusted position, but which may be readily released to permit the easy and rapid adjustments of the lens to a new position.

The preferred embodiment of the rack and clamp is clearly illustrated in section in Fig. 2, and comprises two-spaced members generally indicated by the numerals 45 and 46. Each of these members has one end thereof formed to provide a vertically extending portion 47, of any suitable shape, having a slot 48 arranged to slidably engage a vertical edge of the plate 23; a horizontal extending lens supporting arm 49 to which the lens board 33 is secured in any suitable manner; and an inwardly extending boss 50 intermediate the ends, all of which is clearly illustrated in Fig. 2. The bosses or hubs 50 provide spaced bearings for a shaft 55 on which are slidably and rotatably mounted wheels, preferably in the form of pinions 57, which engage or mesh with the rack 24, so that when the shaft 55 is rotated the pinions will roll along the rack to move the lens board.

Each of the pinions 57 is provided with an axially extending reduced shoulder 60, a face 61 of which engages a cooperating and adjacent face 62 of the hub or bearing 50 to limit the movement of the pinion 57 in one direction. The pinions are held in spaced relation by means of a spacing tube 63 which fits loosely on the shaft 55 and engages the opposite or inner faces 64 of the pinions. The spacing tube 63 thus cooperates with the shaft bearings 50 to maintain the pinions 57 in alignment with the rack 24, as clearly illustrated in Fig. 2.

The pinions 57 are preferably splined on the shaft 55 so that they will be rotated when the shaft rotates, but will permit axial movement of the shaft relative thereto. To secure this result, each of the pinions 57 is preferably formed with an open end slot 70 arranged to receive an upwardly extending pin 71 secured to and rotatable with the shaft 55. When the lens 32 is to be shifted to a new position relative to the holding frame 30, the shaft 55 is moved to the right, as viewed in Fig. 2, to disengage a clutch, indicated generally by the number 75 and hereinafter more fully described. When the shaft is thus slid axially, the pins 71 move longitudinally in the slots 70. Upon rotation of the shaft 55, however, the pins 71 engage the sides of the slots 70 and rotate the pinions as a unit with the shaft, to properly adjust the lens. When the lens is thus adjusted, the shaft is then slid axially to the left, as viewed in Fig. 2, to re-engage the clutch 75 to frictionally retain the lens in adjusted position.

The clutch 75 comprises, in the present embodiment, a disk like member 76 secured to an extension 77 of the shaft 55 by means of a pin 78, and a friction portion preferably in the form of a cork ring 80 mounted on the arm 49 of the member 46, as shown in Figs. 2 and 3. The disk 76, in the present embodiment, is formed with a conical friction face or surface 81 arranged to engage a similarly shaped face 82 on the ring 80 to frictionally hold the shaft 55 against rotation, or to move out of engagement with the face 82, as shown in Fig. 3, to permit the free rotation of the shaft 55 to position the lens. Fine adjustments of the lens may be secured by slightly rotating the shaft 55, with the clutch in engagement as shown in Fig. 2, so as to slide the face 81 of the disk 76 on the face 82 of the friction ring 80.

It is desirable to properly position the face 81 of the disk 76 relative to the face 82 of the ring 80. To this end, the ring 80 is provided with two or more holes 102 in which the retaining screws 103 loosely fit. These screws extend through the ring 80 and into registering threaded holes 104 in the arm 49. A suitable washer 105, preferably metallic, is placed under the heads of the screws 103 to provide a suitable bearing therefor. The holes 102 are preferably made slightly larger than the screws 103 so that the ring 80 may be adjusted slightly to properly align the engaging faces 81 and 82 of the clutch members. After the ring has been thus adjusted, the screws 103 may be screwed down by a suitable screwdriver which may be brought into engagement with the screws through the apertures 106 in the ring 76, which apertures are in registry with the screws 103 and the holes 102, as is clearly illustrated in Figs. 2 and 3.

The shaft 55 may be rotated or moved axially in the manner above described by any suitable means, but preferably by a dish-shaped hand knob 85 secured to an extension 86 of the shaft 55 by means of a pin 87, so that the knob 85 will rotate with the shaft. When the shaft 55 is to be rotated a substantial amount, the knob 85 is pressed in, or to the right as viewed in Fig. 2, to disengage the clutch; but when only a slight adjustment is desired, the knob 85 is rotated to rotate the shaft and slide the engaging surfaces of the clutch as pointed out above. A spiral spring 90 surrounds the extenison 86 of the shaft 55, and has one end thereof in engagement with the face 91 of the member 45 and the other end in engagement with a shoulder 92 of the knob 85. This spring 90 thus tends to force the knob 85, shaft 55 and disk 76 to the left, as viewed in Fig. 2, to bring the clutch surfaces into engagement. The spring thus cooperates with the friction clutch to provide means for frictionally retaining the lens in adjusted position. It is apparent that as the faces 81 and 82 of the clutch tend to wear, the spring 90 will move the shaft 55 and the disk 76 to the left, as viewed in Fig. 2, and thus automatically compensate for the wear in the clutch parts.

The present invention also preferably provides an auxiliary dish-shaped palm knob 95 which cooperates with the hand knob 85 to shift the shaft 55 to disengage the clutch. This palm knob 95 is, by preference, slightly smaller than the hand knob 85 and is concentrically positioned in the dished or hollow portion 96 thereof, and has a rim portion 97 which projects slightly beyond the concentric rim 98 of the hand knob 85. The palm knob 95 is formed with an inwardly extending tubular sleeve 100 arranged to rotate freely on the shaft 55, so that when the shaft rotates the palm knob will remain stationary against the palm of the hand. The palm knob 95 is rotatably secured to the shaft 55 by the head 101 of a stud which extends through the center of the palm knob and engages a threaded opening in the end of the shaft, as clearly illustrated in Fig. 2. This construction enables the palm knob to cooperate with the hand knob in moving the shaft axially; but when the shaft is rotated, the palm knob remains stationary against the

palm of the hand, the advantages of which constructions are obvious.

The operation of the device is as follows. When a slight adjustment of the lens is desired, the hand knob **85** is rotated in the proper direction, thus rotating the shaft **55** which carries with it the clutch disk **76**. When the disk **76** is thus rotated, the friction face **81** thereof slides over the registering face **82** of the friction ring **80** until the proper adjustment is secured, after which the clutch members are resiliently held in frictional engagement by means of the spring **90** to retain the lens in adjusted position. When, however, a large movement of the lens is desired, the palm knob **95** is pressed inwardly and cooperates with the hand knob **85** to move the shaft **55** axially to disengage the clutch members **76** and **80**. When the clutch members are thus disengaged, the lens may be easily and quickly adjusted by moving or rolling the pinions **57** along the rack **24**. For example, if the adjustment is to be downward, it is only necessary to press the palm knob **95** with the palm of the hand, and when the clutch is disengaged, the lens will rapidly move downward under its own weight, the palm knob remaining stationary against the palm of the hand. For the sake of lightness, the hand and palm knobs may be made of wood, bakelite or any other suitable light material. If desired, the clutch may be suitably enclosed.

While this rack and clamp has been shown in connection with enlarging cameras, this is by way of illustration only, as it is contemplated that this mechanism is adapted to a wide variety of uses. The applicant, therefore, intends to cover all modifications which come within the spirit of the invention and the scope of the appended claims.

What I claim is:

1. In a photographic enlarging camera, the combination with a supporting member having a track, of a member movable relative to said track, a shaft mounted for rotation on said member, a wheel secured to said shaft and arranged to engage said track to move said member relative thereto, a friction portion associated with said member, means including a disk mounted on said shaft and having a part thereof arranged to engage said portion to retain said movable member in adjusted position, means secured to said shaft and rotatable therewith to rotate said disk on said portion for slight adjustments of said movable member, and means rotatably mounted on said shaft and arranged to move said shaft axially to disengage said disk from said portion to permit large adjustments of said movable member.

2. In a photographic enlarging camera, the combination with a supporting member having a track, of a member movable relative to said track, a shaft mounted for rotation on said member, a wheel secured to said shaft and arranged to engage said track to move said member relative thereto, a friction clutch cooperating with said movable member to frictionally retain the latter in adjusted position, a focusing hand knob secured to said shaft and rotatable therewith to rotate said clutch against the frictional resistance thereof for slight adjustments of said movable member, a focusing palm knob rotatably mounted on said shaft adjacent said hand knob and arranged to move said shaft to disengage said clutch to permit said wheel to move rapidly along said track for large adjustments of said movable member, and resilient means associated with one of said knobs and tending to move the latter axially to engage said clutch.

3. In a photographic enlarging camera, the combination with a supporting member having a track, of a member movable relative to said track, a wheel mounted on and rotatable with said shaft and arranged to engage said track to adjust said movable member, retaining means cooperating with said movable member to retain said wheel in alignment with said track so as to move therealong, friction clutch means associated with said shaft to hold the latter against rotation to maintain the movable member in adjusted position, said shaft being movable axially to permit disengagement of said clutch means, focusing means mounted on said shaft and arranged to both rotate said shaft against the friction of said clutch to provide slight adjustments to said movable member and to move said shaft axially to disengage said clutch to afford large and rapid adjustments of said movable member.

4. In a photographic enlarging camera, the combination with a supporting frame having spaced tracks thereon, of a movable member slidably mounted on said support and arranged to carry a lens board movable bodily therewith, a shaft mounted for rotation on said movable member, spaced wheels on said shaft arranged to engage said track to move said member relative thereto, each of said wheels having an axially extending slot formed therein, a pin on said shaft arranged to extend into said slot, said pin being movable in said slot when said shaft is moved axially but engaging an edge of said slot when said shaft is rotated to rotate said wheel, retaining means cooperating with said movable member to retain said wheels in alignment with said tracks, friction clutch means mounted on said shaft adjacent one end thereof and having a part thereof arranged to frictionally engage a cooperating friction portion secured to said movable member to frictionally hold the latter in adjusted position, a hand knob secured to the shaft adjacent the other end thereof and arranged to turn said clutch means against the frictional resistance of said portion to afford slight adjustments of said lens board, said hand knob being spaced from said movable member, a palm knob rotatably mounted on said shaft adjacent said hand knob and arranged to move said shaft axially, said palm knob being adapted to cooperate with said hand knob to disengage said clutch means to permit said wheels to move along said track to adjust said lens board, and a resilient member having a part thereof engaging said hand knob and tending to move said shaft axially to bring said clutch means into engagement with said portion.

5. In a photographic enlarging camera, the combination with a supporting frame having spaced tracks thereon, of a movable member slidably mounted on said support and arranged to carry a lens board movable bodily therewith, a shaft mounted for rotation on said movable member, spaced wheels on said shaft arranged to engage said track to move said member relative thereto, each of said wheels having an axially extending slot formed therein, a pin on said shaft arranged to extend into said slot, said pin being movable longitudinally in said slot when said shaft is moved axially but engaging an edge of said slot when said shaft is rotated to rotate said wheel, retaining means cooperating with said movable member to retain said wheels in alignment with said tracks, a friction portion on said movable member adjacent one end of said shaft,

a clutch disk secured to said shaft adjacent said one end and having a face thereof arranged to engage a complementary face of said portion to frictionally retain the movable member in adjusted position, a hand knob secured to the shaft adjacent the other end thereof and arranged to both turn said disk on said portion to provide slight adjustments of said lens board or to move said shaft axially to disengage said disk from said portion to permit said movable member to be moved freely along said track, a palm knob rotatably mounted on said shaft adjacent said hand knob and arranged to move said shaft axially to disengage said disk from said portion, and resilient means engaging said hand knob and tending to move said shaft axially to bring said disk into engagement with said portion to frictionally secure the lens board in adjusted position.

6. In a photographic enlarging camera, the combination with a supporting member having a track, of a member movable relative to said track, a shaft rotatably and slidably mounted on said member, a wheel secured to said shaft and arranged to engage said track to move said member relative thereto, a friction clutch associated with said shaft, said shaft being slidable to disengage said clutch to permit large and rapid adjustment of said movable member and slidable in the opposite direction to engage said clutch to maintain said movable member in adjusted position, means including a member loosely mounted on said shaft for sliding the latter, and means for turning said engaged clutch slightly to permit small adjustments of said movable member.

7. In a photographic enlarging camera, the combination with a supporting member having a track, of a member movable relative to said track, a shaft rotatably and slidably mounted on said member, a wheel slidable mounted on but rotatably secured to said shaft and arranged to continuously engage said track to move said member relative thereto, a clutch associated with said shaft, said shaft being slidable in one direction to disengage said clutch to permit large and rapid adjustments of said movable member and slidable in another direction to engage said clutch to maintain said movable member in adjusted position, and means for both rotating said shaft to turn said engaged clutch slightly to permit small adjustments of said movable member and to slide said shaft axially to disengage said clutch to permit large adjustments of said movable member.

8. In a photographic enlarging camera, the combination with a supporting member having a track, of a member movable relative to said track, a shaft rotatably and slidably mounted on said member, a friction portion associated with said member, a disk on said shaft positioned to engage said portion to frictionally retain said movable member in adjusted position, focusing means secured to said shaft to rotate said disk on said portion for slight adjustments of said movable member, and means independent of but cooperating with said focusing means for moving said shaft axially to disengage said disk from said portion to permit large and rapid adjustments of said movable member.

9. In a photographic enlarging camera, the combination with a supporting member having a track, of a member movable relative to said track, a shaft rotatably and slidably mounted on said member, a friction portion associated with said member, a disk on said shaft positioned to engage said portion to frictionally retain said movable member in adjusted position, means secured to said shaft to rotate said disk on said portion for slight adjustments of said movable member, means rotatably mounted on said shaft for moving the latter axially in one direction to disengage said disk from said portion to permit large adjustments of said movable member, and resilient means engaging said first mentioned means to move said shaft axially in the opposite direction to bring said disk into engagement with said portion to retain said movable member in adjusted position.

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