

Oct. 13, 1942.

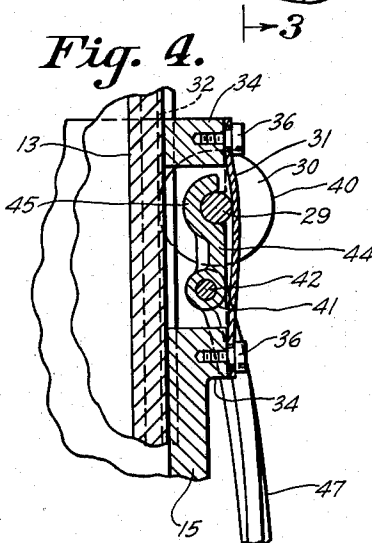
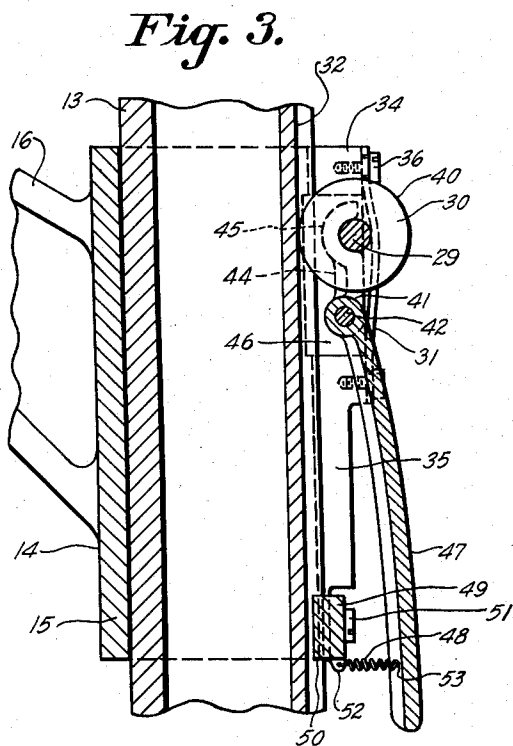
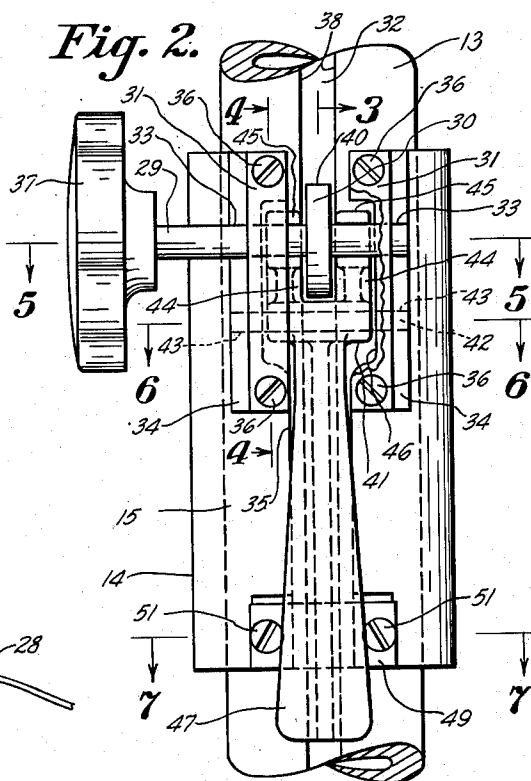
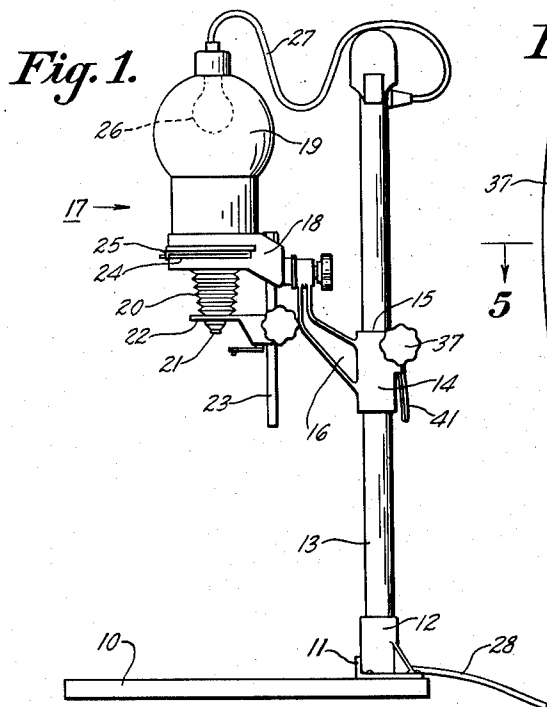
J. J. LAZNA

2,298,741

PHOTOGRAPHIC ENLARGER

Filed Sept. 17, 1940

2 Sheets-Sheet 1



INVENTOR

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Oct. 13, 1942.

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Fig. 5.

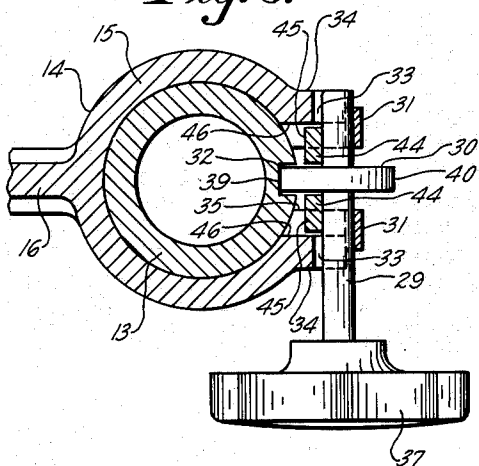


Fig. 6.

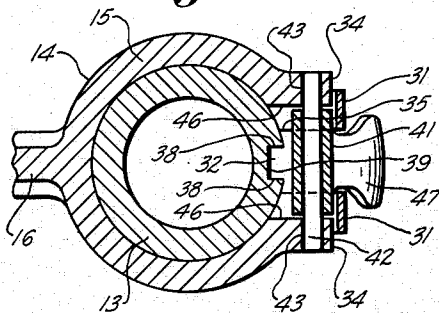


Fig. 7.

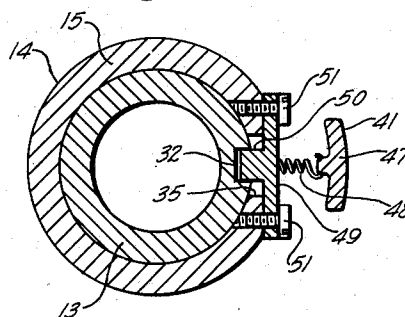


Fig. 8.

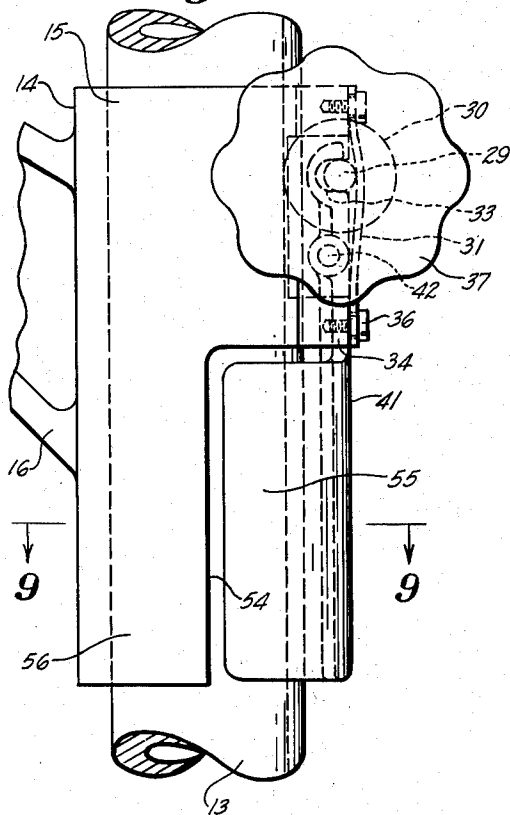
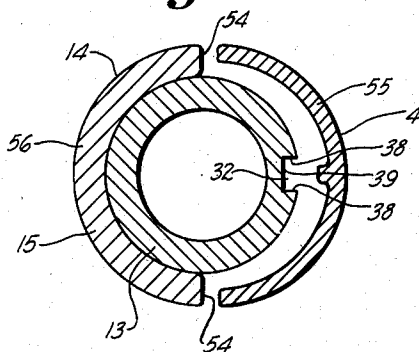


Fig. 9.



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UNITED STATES PATENT OFFICE

2,298,741

PHOTOGRAPHIC ENLARGER

James J. Lazna, Cleveland Heights, Ohio

Application September 17, 1940, Serial No. 357,152

18 Claims. (Cl. 248—125)

My invention relates in general to photographic enlarging apparatus of the type comprising a head assembly movable relative to a sensitized-paper easel or baseboard to thereby enable a wide range of enlargements or reductions to be made. More particularly, my invention relates to raising and lowering mechanism for the head assembly of such enlarging apparatus.

In composing enlargements on the sensitized-paper easel of photographic enlargers, frequent adjustments of the enlarger head on the support column are usually made. These adjustments may be classified into two types, i. e., large adjustments, the enlarger head being moved through a considerable distance on the support column to approximately the desired position thereon to thereby obtain the approximate size enlargement desired, and small adjustments, made during the final stages of the enlargement composing operation, by which the enlarger head is moved through small distances on the support column to the exact final position thereon to thereby produce the exact desired size enlargement.

In the most common form of enlarger construction in use at present, the enlarger head assembly is supported by a bracket having a split sleeve slidably mounted on the support column, the head assembly being secured at the desired elevation on the support column by means of a hand screw which clamps the split sleeve to the support column. While with such a construction the large adjustments and positioning of the enlarger head approximately in its desired position on the support column is accomplished with more or less ease, the small adjustments and positioning of the enlarger head in its exact final position on the support column entails a considerable amount of inconvenience inasmuch as the hand clamping screw has to be first unloosened, then both hands of the operator used to move the enlarger head, and the clamping screw then retightened, each time an adjustment of the enlarger head is made.

In another form of enlarger construction in use at present, the sliding bracket is provided with a friction drive mechanism consisting of a rotatable friction roller which is spring-pressed against a track on the support column. Rotation of the friction roller raises or lowers the sliding bracket on the support column thus providing, in effect, a vernier adjustment therefor, while the pressure of the roller against the track securely holds the bracket in any given position to which it has been adjusted on the support

column. Such an arrangement is especially convenient for making the small adjustments of the sliding bracket during the final stages of the enlargement composing operation since it is only necessary to turn the hand knob controlling the friction drive through a fraction of a turn or so in order to adjust the enlarger head to the exact desired final position on the support column. However, the friction drive construction is very inconvenient for making large adjustments of the enlarger head, such as are frequently necessary during the initial stages of the enlargement composing operation, due to the considerable turning force which must be applied to the hand control knob in order to operate the friction drive and due also to the relatively small amount of movement of the enlarger head along the support column per turn of the hand control knob.

One object of my invention is to provide an improved raising and lowering mechanism for the head assembly of photographic enlarging apparatus.

Another object of my invention is to provide a photographic enlarger having raising and lowering mechanism for the head assembly which will enable both large and small adjustments of the enlarger head on the support column to be made quickly and conveniently.

Still another object of my invention is to provide a photographic enlarger having raising and lowering mechanism for the head assembly enabling the latter to be quickly and easily adjusted approximately to the desired position on the enlarger support column during the initial stages of the enlargement composing operation and providing, in addition, vernier adjustment means for quickly and conveniently adjusting the enlarger head to the exact desired final position on the support column during the final stages of the enlargement composing operation.

A feature of the invention is the use of a conventional friction drive arrangement on the support bracket of the enlarger head assembly together with a release mechanism for disabling the friction drive and rendering the same inoperative whereby the support bracket may be freely slid along the support column. A further feature of the invention is the use of a hand release lever for the friction drive mechanism extending closely adjacent the column-engaging or sleeve portion of the head support bracket so that both the said sleeve portion and the hand lever may be grasped simultaneously with one hand.

Further objects and advantages of my inven-

tion will be apparent from the following description of an embodiment thereof and from the accompanying drawings in which:

Fig. 1 is a side elevation, on a reduced scale, of a photographic enlarger comprising my invention; Fig. 2 is a fragmentary rear elevation of the support column and the sliding bracket of the enlarger shown in Fig. 1; Fig. 3 is a fragmentary sectional view taken on the line 3—3 of Fig. 2; Fig. 4 is a fragmentary sectional view taken on the line 4—4 of Fig. 2; Figs. 5, 6 and 7 are sectional views taken on the lines 5—5, 6—6 and 7—7, respectively, of Fig. 2; Fig. 8 is a side elevation of a modification of my invention; and Fig. 9 is a sectional view on the line 9—9 of Fig. 8.

Referring to the drawings, the photographic enlarger there shown comprises a supporting baseboard or easel 10 on which the sensitized paper is adapted to be positioned to receive a projected image. The baseboard 10 is provided, at one end thereof, with a bracket 11 secured to the upper surface of the baseboard and having an upwardly extending hub 12 adapted to receive a vertically extending and preferably cylindrical supporting post or column 13. Slidably mounted on the support post or standard 13 is a head assembly comprising a bracket 14 having a sleeve portion 15 and a laterally extending arm 16 to which a camera assembly 17 is secured. The said camera assembly is of usual construction and comprises a back or support frame member 18 attached to the sliding bracket arm 16, a lamp housing 19 mounted on the said support frame 18, a depending bellows 20 fastened to the underside of the support frame, and a lens 21 mounted on a suitable lens board 22 connected to the support frame by the bellows 20 and slidably mounted on a vertical shaft 23 to thereby enable movement of the lens relative to the support frame for the purpose of focusing. The support frame 18 is provided with a slot 24 adapted to receive a negative holder 25 in which is placed a negative (not shown) the image of which is projected, by means of light from a suitable light source 26 within the housing 19, through the lens 21 and onto the sensitized paper positioned on the baseboard 10. The light source 26, preferably an electric lamp, is adapted to be connected to a suitable source of electric current (not shown) by means of an electric cord 27, 28.

To provide for vertical adjustment of the head assembly relative to the baseboard 10, the sliding bracket 14 is equipped with an adjustment and locking device according to the invention and comprising, in general, a friction drive mechanism for quickly and conveniently making adjustments of the enlarger head through relatively small distances on the support column and for maintaining the enlarger head in any given position to which it has been adjusted on the support column, and release means for rendering the friction drive mechanism inoperative so as to permit free and easy sliding movement of the bracket on the support column.

The friction drive mechanism employed is of the conventional type comprising a friction drive shaft 29 mounted on the rear of the cylindrical bracket sleeve 15 at right angles to the axis thereof and provided intermediate its ends with a unitary friction wheel or roller 30, and spring means 31 for pressing the friction roller against a longitudinal track 32 on the support column 13. The friction drive shaft 29 is mounted in hori-

zontally aligned recesses or slots 33, 33 in a pair of transversely spaced opposed lugs 34, 34 on the sleeve 15, the said lugs being located adjacent the top of the sleeve and extending longitudinally thereof. The slots 33 are located at a point intermediate the ends of the lugs 34 and are of a width such that the shaft 29 is snugly received therein and of a depth such that the shaft 29 is spaced from the bottom of the slots when the roller 30 is in engagement with the track 32 on the support column. The slots 33 thus serve as a floating bearing for the shaft 29, locking the latter against movement longitudinally of the sleeve 15 while permitting radial inward and outward movement with respect thereto. The friction drive shaft 29 is mounted on the bracket 14 with the friction roller 30 disposed midway between the lugs 34. To permit engagement of the friction roller 30 with the track 32 on the support column, the bracket sleeve 15 is provided with a longitudinal slot 35 between the lugs 34, 34 through which slot the roller projects into engagement with the said track 32. The slot 35 preferably extends the entire length of the sleeve so that the latter constitutes, in effect, a split sleeve. The spring means 31 for urging the friction roller 30 into engagement with the track 32 preferably comprises a pair of vertically extending flat plate springs arranged on opposite sides of the friction roller and extending transversely across the rear of the friction drive shaft 29 so as to overlie the same. The said springs 31, 31 are secured at their ends to the lugs 34, 34 by suitable fastening screws 36, 36 and bear against the rear or outer side of shaft 29, thus urging the shaft 29 and associated friction roller 30 forwardly, i. e., radially inward, so that the roller is forced into frictional engagement with the track 32 on the support column 13. The springs 31 are designed to exert sufficient pressure on the shaft 29 so that the resultant frictional force between the friction roller 30 and the track 32 on the support column is sufficient to sustain and positively secure the entire enlarger head and bracket assembly in any given position on the support column.

A hand knob 37 is provided on one end of shaft 29 to enable manual rotation of the shaft and its associated friction roller 30. When the knob 37 is turned, the friction roller rotates and rides on the track 32, thus raising or lowering the bracket 14 and camera assembly 17 depending, of course, on the direction of rotation of the knob and friction roller. In this manner, a vernier adjustment for the enlarger head assembly is provided which enables small adjustments of the enlarger head to be made quickly and easily and with accuracy. Such a feature is especially convenient during the final stages of the enlargement composing operation when a number of small readjustments of the enlarger head is frequently made.

As shown in the drawings, the track 32 on the support column 13 is preferably in the form of a longitudinal groove of rectangular cross-section, i. e., with parallel side walls 38 (Fig. 6) and a flat bottom surface 39 at right angles to the side walls. The friction wheel or roller 30 for co-operation with such a track is in the form of a flat disc the peripheral edge 40 of which lies flatly against the bottom surface 39 of the groove 32, as shown in Fig. 5. The friction roller 30 is preferably made of a width approximating that of the groove 32, but not sufficiently so as

to prevent free and easy rotation of the roller in the groove.

Instead of being in the form of a groove, the track 32 may simply consist of a longitudinally extending flattened surface ground on the support column 13, or instead, it may be a groove having inwardly converging side walls, such as a V-shaped groove, with the friction roller 30 likewise V-shaped to conform to and engage the converging side walls of such groove.

While the friction drive mechanism described above is especially convenient for raising and lowering the enlarger head assembly through relatively small distances along the support column, it is somewhat inconvenient for making the larger adjustments of the head assembly which are frequently necessary. To obviate this disadvantage, the friction drive mechanism is supplemented, in accordance with the invention, with a release or disabling mechanism independent of said friction drive mechanism whereby the friction drive may be quickly and easily rendered inoperative so as to permit free and easy sliding movement of the enlarger head bracket 14 and associated camera assembly 17 on the support column 13.

The release mechanism according to the invention comprises a vertically extending lever 41 arranged between the lugs 34, 34 and pivotally mounted at a point intermediate its ends on a horizontally arranged pivot pin 42 disposed a slight distance below and extending parallel to the friction drive shaft 29. The pivot pin 42 is supported in horizontally aligned bearings 43, 43 formed in the lugs 34, 34 on the enlarger head bracket 14. The upper portion of the lever 41 comprises a pair of spaced arms or prongs 44, 44 which are disposed on opposite sides of the friction roller 30 so as to straddle the same and are preferably positioned closely adjacent thereto. The arms 44 extend underneath the friction drive shaft 29, i. e., they extend between the said shaft and the support column 13, as shown particularly in Figs. 4 and 5, and are arranged to engage the under or inner side of such shaft, upon actuation of the lever, preferably at points substantially diametrically opposite those points at which the springs 31 engage the shaft 29. Each arm 44 is provided with a bearing or journal portion 45 in which the friction drive shaft 29 seats. To accommodate the lever arms 44 therebetween, the two lugs 34, 34 are recessed or cut away, as indicated at 46 in Fig. 2, to thereby provide a widened space within which the lever arms 44 are received.

The lower portion 47 of the lever 41 is formed as a handle which extends downwardly between the lugs 34, 34 and preferably closely adjacent the bracket sleeve 15 so that both the bracket sleeve and the lever handle can be conveniently grasped simultaneously in one hand by the operator. A small helical tension spring 48 is preferably connected between the lever handle 47 and the bracket sleeve 15 for the purpose of holding the journal portions 45 of the lever arms 44 in engagement with the friction drive shaft 29 and thus provide a play-free mounting for the lever 41 on the bracket sleeve. When the lever handle 47 is squeezed inwardly toward the support column 13, the lever 41 pivots on its pivot pin 42 with the result that the lever arms 44, being in engagement with the friction drive shaft 29, exert outward pressure thereon. This outward pressure of lever arms 44 on shaft 29

tends to force or pull the friction roller 30 away from the support column track 32 against the resistance of springs 31. By exerting sufficient pressure on the lever handle 47, the force exerted by the springs 31 on the friction drive shaft 29 may be overcome to such an extent that the frictional force between the roller 30 and the support column 13 is insufficient to lock or maintain the bracket 14 and associated camera assembly 17 in place on the support column, thus, in effect, releasing the friction drive mechanism and permitting free sliding movement of the bracket along the support column. Obviously, the ease of movement of the bracket on the support column depends on the degree of the counteracting force exerted on the friction drive shaft 29 by the lever arms 44. Thus, when the counteracting force of the lever arms 44 exactly equals the force of the springs 31 on the shaft 29, then there is no resultant force producing friction between the roller 30 and the support column 13 and therefore the bracket 14 will slide freely and easily on the support column 13. Of course, the amount of force which it is necessary to exert on the handle 47, in order to release the friction drive mechanism, will depend on the lever arm ratio of the lever 41. When the pressure on the lever handle 47 is removed, the friction drive mechanism once again becomes operative to lock the bracket 14 and camera assembly 17 in place on the support column 13 and to permit vernier adjustments of the head assembly on said column.

The arrangement of the handle 47 of the friction drive release lever 41 in a vertically extending position at the rear of the bracket sleeve 15 and closely adjacent the lower portion thereof enables the operator to simultaneously grasp both the sleeve 15 and the lever handle 47. As a result, the friction drive mechanism can be easily and quickly released and the enlarger head assembly immediately slid up or down on the support column 13 without changing the position of the operator's hand, the latter automatically being in a suitable position on the bracket 14 to raise or lower the enlarger head assembly on the support column. By a simple squeezing operation of the operator's hand, the friction drive mechanism can be disabled so as to permit the enlarger head assembly to be quickly and conveniently set approximately to the desired position on the support column during the initial stages of the enlargement composing operation, after which the friction drive mechanism, upon being rendered again operative by removal of the pressure on the release lever, can be thereafter used as a vernier adjustment means to conveniently and accurately position the head assembly in the exact desired final position on the support column.

To positively lock the bracket 14 against rotation on the support column 13, a key plate 49 having a lug 50 extending into and closely fitting within the groove 32 in the support column, may be provided on the bracket sleeve 15, preferably at its lower end. The plate 49 may be secured to the bracket sleeve by means of screws 51, and is preferably provided with an eye 52 (Fig. 3) to which one end of the tension spring 48 may be connected. The other end of the spring 48 is connected to an eye 53 on the handle portion 47 of the lever 41.

In the modification shown in Figs. 8 and 9, approximately one half of the arcuate extent of the bracket sleeve 15 is cut away at one end

thereof to provide a recessed portion 54. The lever 41 is formed with a handle portion 55 of arcuate section which is received within the cut-away portion 54 of the bracket sleeve 15 and is shaped to substantially conform to the curvature of the said sleeve so as to constitute more or less of a continuation of the cylindrical surface of the arcuate-shaped bracket sleeve end portion 56, as shown particularly in Fig. 9. Such a construction provides an especially convenient hand-grip on both the sleeve 15 and the handle 55 of the release lever 41.

While I have shown and described the invention in connection with an enlarger having a single support column, it is obvious that it is applicable as well to enlargers provided with other types of support columns, such as the tripod form of column in use at present on certain enlargers. In addition, the invention may be advantageously employed on enlargers of the well known counterweighted or spring counterbalanced type. Because of the counterbalancing of the weight of the enlarger head assembly in such type enlargers, the spring pressure on the friction roller, and therefore the pressure of the roller against the support column, obviously may be made relatively light, just sufficient to insure raising and lowering of the enlarger head assembly by the friction drive mechanism. In such case, the friction drive mechanism does not maintain, by itself, the enlarger head in position on the support column, such supporting action being performed instead principally by the counterweighting mechanism.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A photographic enlarger comprising a support column, a bracket slidably mounted on said support column, a friction drive mechanism on said bracket for moving said bracket along said support column, and manual control means on said bracket independent of said friction drive mechanism for rendering said friction drive mechanism inoperative.

2. A photographic enlarger comprising a support column, a head assembly including a bracket slidably mounted on said support column, a friction drive mechanism on said bracket for moving said head assembly along said support column, and a release lever pivotally mounted on said bracket for rendering said friction drive mechanism inoperative so as to permit free sliding movement of said bracket on said support column.

3. A photographic enlarger comprising a support column, a bracket slidably mounted on said support column, a roller rotatably mounted on said bracket to ride on said support column longitudinally thereof and normally pressed into tight frictional engagement therewith, and manual control means on said bracket for counteracting the pressure of said roller against said support column.

4. A photographic enlarger comprising a support column, a bracket slidably mounted on said support column, a friction drive mechanism on said bracket for moving said bracket along said support column, said friction drive mechanism comprising a drive shaft having a unitary roller arranged to ride on said support column longitudinally thereof and normally pressed into tight frictional engagement therewith, and manual control means on said bracket independent of said friction drive mechanism and co-operating with said drive shaft to counteract

the pressure of said roller against said support column and thereby render said friction drive mechanism inoperative.

5. A photographic enlarger comprising a support column, a head assembly including a bracket slidably mounted on said support column, a friction drive mechanism on said bracket for moving said head assembly along said support column, said friction drive mechanism comprising a drive shaft having a unitary roller arranged to ride on said support column longitudinally thereof and normally pressed into tight frictional engagement therewith, and a release lever pivotally mounted on said bracket for co-operation with said drive shaft to reduce the pressure between said roller and support column and thereby render said friction drive mechanism inoperative.

6. A photographic enlarger comprising a support column, a head assembly including a bracket having a sleeve portion slidably mounted on said support column, a friction drive mechanism on said bracket for moving said head assembly along said support column, said friction drive mechanism comprising a drive shaft having a unitary roller arranged to ride on said support column longitudinally thereof and normally pressed into tight frictional engagement therewith, and a release lever on said bracket for co-operation with said drive shaft to reduce the pressure between said roller and support column and thereby render said friction drive mechanism inoperative, said release lever having a handle portion disposed closely adjacent said sleeve so as to enable the simultaneous manual grasping of both said release lever and sleeve.

7. A photographic enlarger comprising a support column, a head assembly including a bracket having a cylindrical sleeve portion slidably mounted on said support column, a friction drive mechanism on said bracket for moving said head assembly along said support column, said friction drive mechanism comprising a drive shaft having a unitary roller arranged to ride on said support column longitudinally thereof and normally pressed into tight frictional engagement therewith, and a release lever on said bracket for co-operation with said drive shaft to reduce the pressure between said roller and support column and thereby render said friction drive mechanism inoperative, said sleeve having a recessed portion and said lever having a handle portion disposed within said recessed portion and conforming substantially to the curvature of the cylindrical outer surface of said sleeve.

8. A photographic enlarger comprising a support column, a head assembly including a bracket having a sleeve portion slidably mounted on said support column, a friction drive mechanism on said bracket for moving said head assembly along said support column, and a release lever pivotally mounted on said bracket for rendering said friction drive mechanism inoperative, said release lever having a handle portion disposed closely adjacent said sleeve so as to enable the simultaneous manual grasping of both said release lever and said sleeve.

9. A photographic enlarger comprising a support column, a head assembly including a bracket slidably mounted on said support column and provided with a hand grip portion, a friction drive mechanism on said bracket for moving said head assembly along said support column, and a release lever pivotally mounted on said bracket for

rendering said friction drive mechanism inoperative, said release lever having a handle portion disposed closely adjacent the said hand grip portion of said bracket so as to enable the simultaneous manual grasping of both said release lever and said hand grip portion.

10. A photographic enlarger comprising a support column, a bracket slidably mounted on said support column, a friction drive mechanism on said bracket for moving said bracket along said support column, said friction drive mechanism comprising a roller arranged to ride on said support column longitudinally thereof and resilient means normally urging said roller into tight frictional engagement with said support column, and release means on said bracket operative to counter-act the force of said resilient means on said roller.

11. A photographic enlarger comprising a support column, a head assembly including a bracket slidably mounted on said support column, a friction drive mechanism on said bracket for moving said head assembly along said support column, said friction drive mechanism comprising a drive shaft extending transversely of said support column and having a unitary roller arranged to ride on said support column and resilient means engaging the outer side of said drive shaft and normally urging said roller into tight frictional engagement with said support column, and a release lever pivotally mounted on said bracket and arranged to engage the inner side of said drive shaft to thereby exert a force thereon counter-acting that of said resilient means thereon.

12. A photographic enlarger comprising a support column, a head assembly including a bracket slidably mounted on said support column, a friction drive mechanism on said bracket for moving said head assembly along said support column, said friction drive mechanism comprising a drive shaft having intermediate its ends a unitary roller arranged to ride on said support column longitudinally thereof and resilient means engaging the outer side of said shaft on opposite sides of said roller and normally urging said roller into tight frictional engagement with said support column, and a release lever pivotally mounted on said bracket and having a forked arm straddling said roller and arranged to engage the inner side of said drive shaft on opposite sides of said roller to thereby exert a force on said drive shaft counter-acting that of said resilient means thereon.

13. A photographic enlarger comprising a support column, a head assembly including a bracket slidably mounted on said support column, a friction drive mechanism on said bracket for moving said head assembly along said support column, said friction drive mechanism comprising a drive shaft having intermediate its ends a unitary roller arranged to ride on said support column longitudinally thereof and normally spring-pressed into tight frictional engagement therewith, and a release lever pivotally mounted on said bracket and having a forked arm straddling said roller and arranged to engage the inner side of said drive shaft on opposite sides of said roller.

14. A photographic enlarger comprising a support column, a head assembly including a bracket having a sleeve portion slidably mounted on said support column, said sleeve portion being provided with a pair of transversely spaced opposed lugs extending longitudinally of said sleeve portion and provided with transversely aligned bearing slots, a drive shaft received within said bearing slots and having a unitary roller arranged to ride on said support column longitudinally thereof and normally spring-pressed into tight frictional engagement therewith, and a release lever pivotally mounted on said bracket and having a portion extending between said lugs arranged to cooperate with said drive shaft to reduce the pressure between said roller and support column.

15. A photographic enlarger comprising a support column, a bracket slidably mounted on said support column, a friction drive mechanism on said bracket for moving said bracket along said support column, said mechanism including a drive shaft having a unitary friction wheel pressed into frictional engagement with said support column, and release means on said bracket cooperating with said unitary drive shaft and friction wheel to exert pressure thereon tending to force said friction wheel out of frictional engagement with said support column.

16. A photographic enlarger comprising a support column, a bracket slidably mounted on said support column, a friction wheel rotatably mounted on said bracket to ride on said support column longitudinally thereof and normally spring-pressed into tight frictional engagement therewith, and release means on said bracket for counteracting the spring pressure on said friction wheel to thereby reduce the pressure between said friction wheel and said support column.

17. A photographic enlarger comprising a support column, a bracket slidably mounted on said support column, a friction drive mechanism on said bracket for moving said bracket along said support column, said friction drive mechanism comprising a friction wheel arranged to ride on said support column longitudinally thereof, resilient means on said bracket for normally pressing said friction wheel into tight frictional engagement with said support column, and fastening means for securing said resilient means to said bracket, and release means on said bracket for rendering said friction drive mechanism inoperative.

18. A photographic enlarger comprising a support column, a head assembly slidably mounted on said support column and provided with a hand grippable portion, a friction drive mechanism on said head assembly for moving said head assembly along said support column, and a release lever pivotally mounted on said head assembly for rendering said friction drive mechanism inoperative, said release lever having a handle portion disposed closely adjacent the said hand grippable portion of said head assembly so as to enable the simultaneous manual grasping of both said release lever and the said hand grippable portion of said head assembly.

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