# United States Patent

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[54] **REEL-HOLDING DEVICE**
**5 Claims, 5 Drawing Figs.**


[52] **U.S. Cl.** ..... **242/68.4,** 242/75.4
[51] **Int. Cl.** ..... **B65h 19/02,** B65h 75/02, B65h 23/06
[50] **Field of Search** ..... 242/68.4, 58.6, 85, 75.4



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**ABSTRACT:** This invention relates to reel-holding devices, and more particularly to devices for holding large reels such as those used for photographic films. It consists of a base with two arms movable toward or away from each other with reel-engaging discs projecting inwardly from the outer free ends of each of said arms. By means of two jackscrews the arms are caused to move toward or away from each other so that a reel may be engaged or disengaged by the said discs. Between each disc and its complementary support, there is a brake in the form of a washer-shaped element of compressible material so that the rotation of the reel may be frictionally retarded. The jackscrews cooperate with nuts which can be cylindrical, hexagonal, or any other shape. The nuts are internally threaded and are located in a cavity near the base ends of the arms. The cylindrical nuts are arranged in the cavities and have a loose fit in the direction perpendicular to the axis of the jackscrew. This construction eliminates the precision machining and adjustment that would be required for making a jackscrew function properly that is restrained by more than two bearing points.

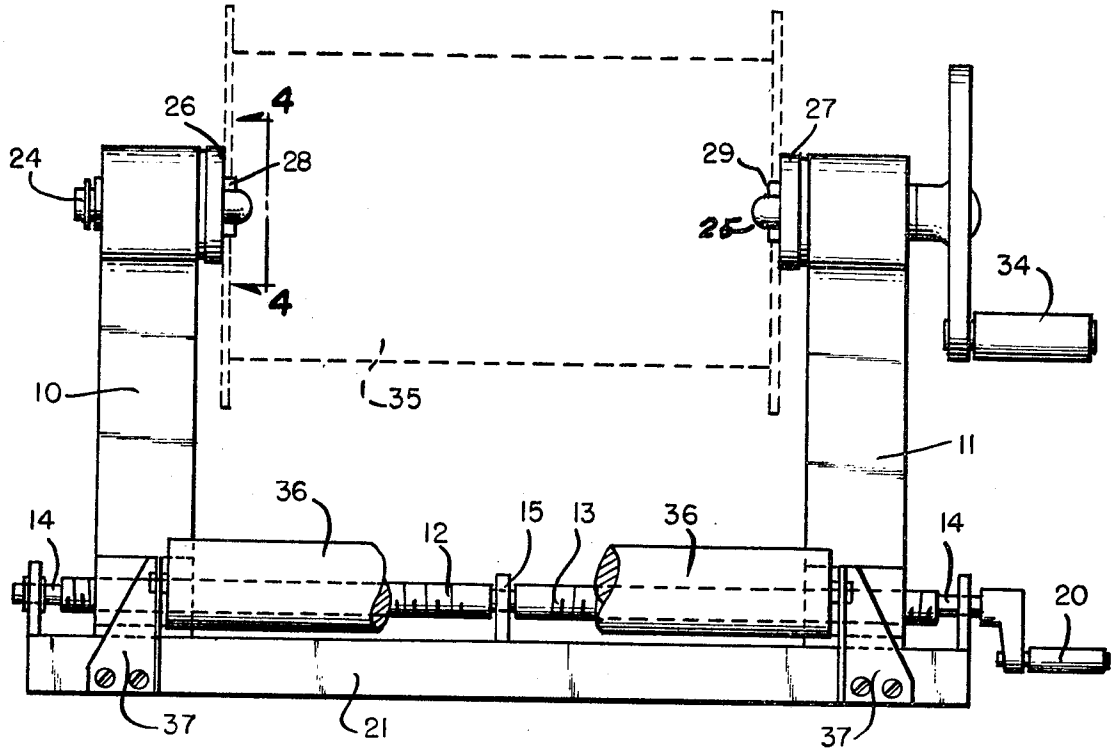



FIG. 1.

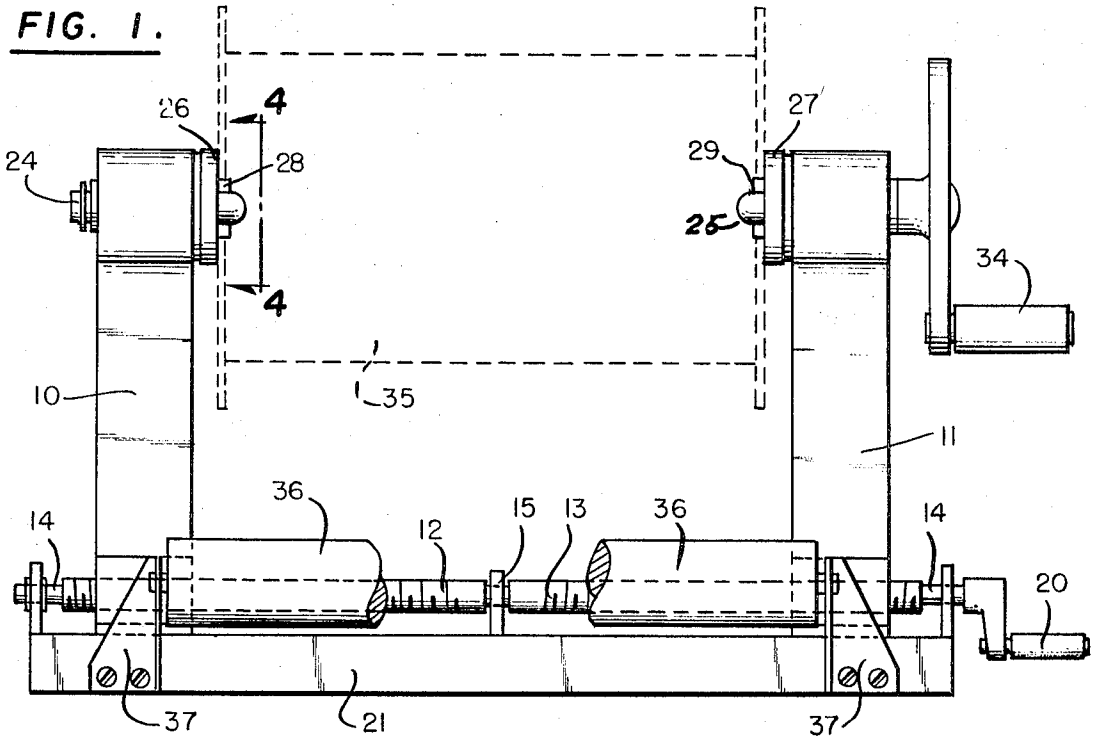
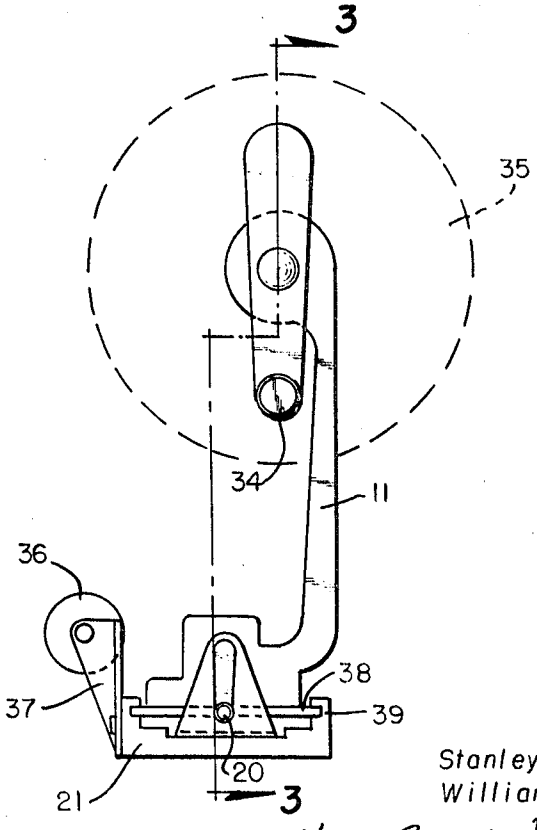



FIG. 2.




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FIG. 3.

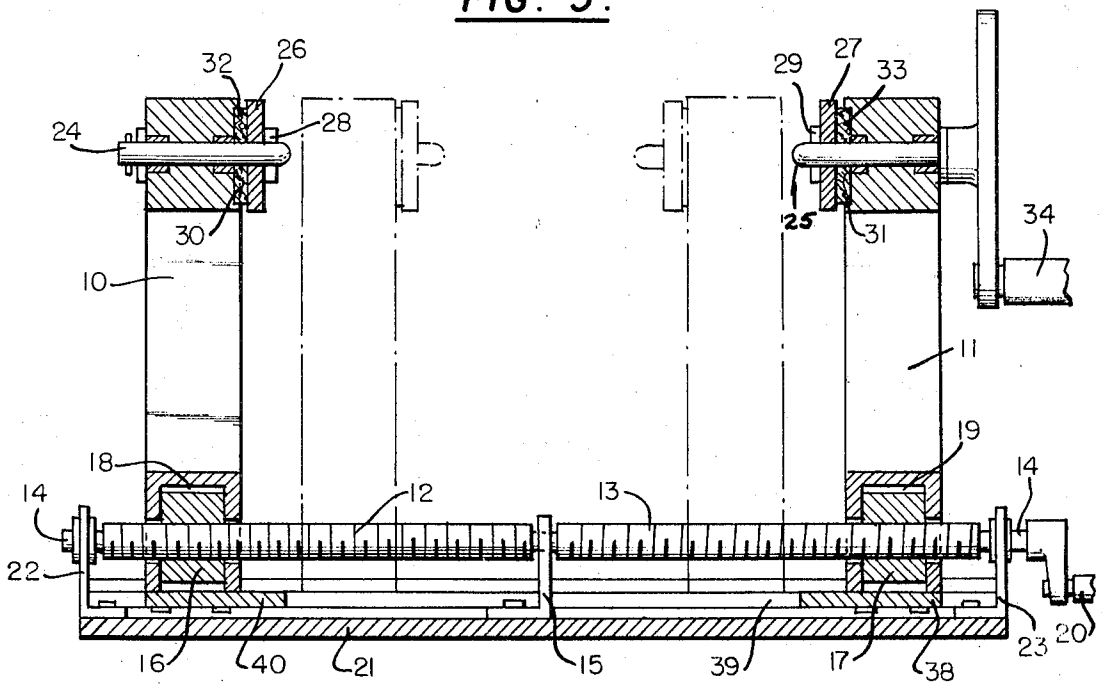



FIG. 4.

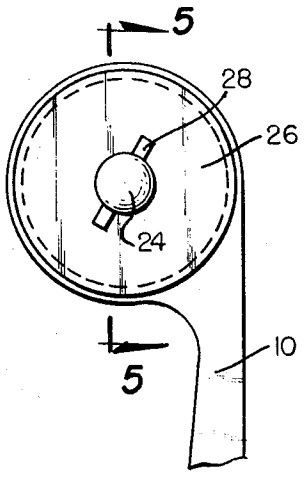
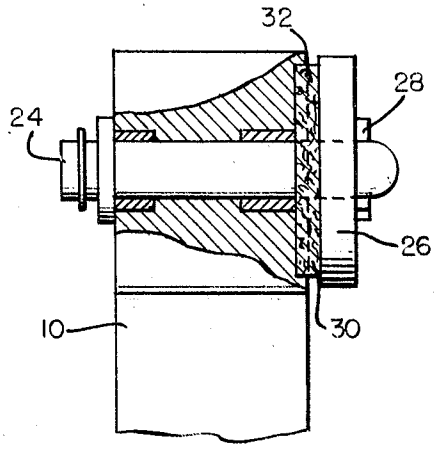



FIG. 5.




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# REEL-HOLDING DEVICE

## BRIEF SUMMARY OF THE INVENTION

One inventive feature involves the washer-shaped brake element which provides frictional restraint for the reel-engaging discs when the jackscrew is rotated to apply pressure to opposite ends of the reel. This of course presses the reel-holding discs against the washer-shaped brake which in turn applies pressure against the outer end of one of said arms and thus provides the necessary friction. The amount of frictional restraint may be varied by turning the jackscrew to get the desired degree of pressure on the washer-shaped brake element. Another inventive feature employs the use of a nut on the jackscrew and fitting the support so that very accurate alignment of the jackscrews in the direction that the nuts slide in the cylindrical cavities is not required.

The invention always automatically centers the reel in the reel holder since there are two jackscrews that respectively move the two supports for the reel in opposite directions at equal rates when the jackscrews are rotated.

In the drawings:

FIG. 1 is a front view of the reel-holding device with a portion of the apparatus broken away.

FIG. 2 is a right end view of FIG. 1.

FIG. 3 is a sectional view along line 3–3 of FIG. 2.

FIG. 4 is a view along line 4–4 of FIG. 1.

FIG. 5 is a sectional view along line 5–5 of FIG. 4.

Referring to FIGS. 1 to 5 collectively, there are two upright supports 10 and 11 which are moved toward or away from each other by jackscrews 12 and 13 which are located on the surface of shaft 14. This shaft is supported horizontally in its midsection by a stationary adjustable bearing 15. As shown in FIG. 3, the jackscrews 12 and 13 respectively cooperate with the internal threads of nuts 16 and 17 which are respectively located in cavities 18 and 19 formed in the lower ends of supports 10 and 11 respectively. In a plane perpendicular to the axis of the shaft 14, the nuts 16 and 17 are restrained from rotation in any suitable way and are allowed to translate in the closely fitting cavities 18 and 19 in one or more directions that are perpendicular to the axis of the shaft so as to make snug sliding fits in the cavities. The nuts 16 and 17, however, preferably fit snugly in the cavities 18 and 19 respectively, so far as endwise motion (parallel to shaft 14) is concerned.

A crank 20 enables the shaft 14 to be rotated either clockwise or counterclockwise. A main base 21 supports all of the parts, including bearings 15, 22 and 23 for shaft 14. Each of these bearings and their supports may be made of a suitable plastic.

At the outer or free ends or arms of supports 10 and 11 there are shafts or pins 24 and 25, respectively, which are free to rotate and which carry integrally therewith discs 26 and 27 respectively. These discs are respectively provided with keys 28 and 29. The pins 24 and 25, the discs 26 and 27, and the keys 28 and 29, all cooperate to engage a reel or spool 35 (FIG. 1) which may be inserted between them. Located between the disc 26 and the arm or support 10 is a washer-shaped brake element 30 which surrounds shaft 24. This brake element 30 is preferably composed of leather (such as shoe leather) and is rough on both of its faces. It is relatively compressible as compared to the aluminum used for the support 10 and the stainless steel used for the disc 26. The outer end of support 10 has a round indent 32 to thus receive the brake element 30. Between the disc 27 and the aluminum support 11 is another brake element 31 fitting in an indent 33 and having the same composition, construction and function as that of brake element 30. A crank 34 is provided for rotating shaft 25.

A freely rotatable roller 36 mounted on supports 37 (FIGS. 1 and 2) is provided so that film from the reel may pass over the same.

The arms or supports 10 and 11 are provided at their inner ends with mounting plates 38 and 40. These plates travel in groove 39 located in base 21, to support and thus guide the arms or supports 10 and 11 accurately along the base.



The operation of the device is as follows. The crank 20 may be rotated in one angular direction to turn the jackscrews 12 and 13 that respectively move nuts 16 and 17 (and also supports 10 and 11 toward each other. This causes pins 24 and 25 to engage holes at opposite ends of the reel 35 and the keys 28 and 29 to enter openings in that reel. The discs 26 and 27 move toward each other and thus clamp the reel 35. This causes discs 26 and 27 to compress brake elements 30 and 31 respectively. The degree of braking and hence the degree of frictional restraint applied to the rotation of the reel 35 may be adjusted by turning crank 20 in one angular direction or the other to thereby move supports 10 and 11 toward or away from each other. If it is desired to wind film on the reel 35, the crank 34 may be turned.

One problem involved in the assembly of the device is making sure that the jackscrews 12 and 13 are properly aligned with the supports 10 and 11. If instead of using the nuts 16 and 17 the upright supports 10 and 11 had threaded holes therethrough for receiving the jackscrews, there would be serious alignment problems during assembly. Such holes in the movable supports would necessarily be accurately aligned with bearings 22 and 23. A device constructed in that manner, if accurately aligned at the time of manufacture, could easily lose its free, smooth operation and such accurate alignment in response to continuous use and/or rough treatment during actual usage. However, our invention employs the nuts 16 and 17 which are snug sliding fits in cavities or chambers 18 and 19 respectively and this largely overcomes the alignment problems, adverted to above, and insures reliability in operation and enables easy and rapid assembly of the entire device.

We claim:

1. A reel-holding device comprising a base, first and second movable elongated reel-supporting arms extending away from said base, guiding means for limiting the motion of said arms to a single plane, a shaft adjacent said base and passing through both arms, a first jackscrew on that portion of the shaft that passes through the first arm and a second jackscrew on that portion of the shaft that passes through the second arm, each arm defining a (chamber) cavity around its complementary jackscrew, and a nut in each (chamber) cavity having internal threads engaging those of its complementary jackscrew, each nut having (play) loose fit within its (chamber) cavity in a direction perpendicular to the axis of the shaft yet being restrained from substantial rotation by its complementary arm to thereby permit easy assembly of the shaft.

2. A reel-holding device comprising a base, a pair of supporting elements extending away from said base, each of said supporting elements defining a cavity adjacent said base, guiding plates movable in a plane perpendicular to said supporting elements and attached to said supporting elements, said base defining a guiding groove therein for guiding said guide plates, a shaft located closely adjacent said base and extending adjacent said upright supporting elements, a first jackscrew on said shaft adjacent the first of said elements, a first nut free to translate in the first of said elements, said first nut cooperating with said first jackscrew for moving said first element when the said shaft is rotated, a second jackscrew on said shaft adjacent the second of said elements, a second nut free to translate in said cavity that is in said second element, said second nut cooperating with said second jackscrew for moving said second element when said shaft is rotated, said first and second jackscrews and their cooperating first and second nuts being arranged to move the elements toward each other when the shaft is rotated, first and second reel-holding rotatable shafts respectively supported at the free end of the supporting elements, each of said reel-holding rotatable shaft extending from its supporting element toward the other such supporting element and each having a clamping disc thereon located between the two supporting elements, driving means coupled to one of said reel-holding rotatable shafts to thereby rotate

said reel, and brake element means between each such disc and its complementary supporting element, each brake element means being of material that is relatively compressible when compared to the material of the said supporting elements.

3. The reel-holding means as defined in claim 2 wherein said first and second nuts in said cavities have a loose fit in the direction perpendicular to the axis of said shaft.

4. The reel-holding means as defined in claim 2 wherein said driving means is a crank.

5. A reel-holding device comprising, a base, a pair of supporting elements extending away from said base with each supporting element defining a cavity near its base end, guiding means on said base for limiting the motion of said supporting elements to a single plane, a shaft located closely adjacent said base and extending adjacent said upright supporting elements, a first jackscrew on said shaft adjacent the first of said elements and arranged to pass through the cavity associated with the first of said pair of supporting elements, a first threaded means cooperating with said first jackscrew and located in said first cavity for moving said first element when said shaft is rotated, said first threaded means being in the form of a nut which has a loose fit in a direction perpendicular to the axis of said first jackscrew whereby to permit easy assembly of said first jackscrew, a second jackscrew on said shaft adjacent the second of said elements and arranged to pass through the cavity associated with the second of said pair of supporting elements, a second threaded means cooperating with said second jackscrew and located in said second cavity for moving said second element when said shaft is rotated, said second threaded means being in the form of a nut which has a loose fit in a direction perpendicular to the axis of said second jackscrew whereby to permit easy assembly of said second jackscrew, the first and second jackscrews and their cooperating first and second threaded means being arranged to move the elements toward each other when the shaft is rotated in one direction and away from each other when the shaft is rotated in the other direction, first and second reel-holding rotatable shafts respectively supported at the free ends of the supporting elements and on a common axis, each of said reel-holding rotatable shafts extending from its supporting element toward the other such supporting element and each having a clamping disc thereon located between the two supporting elements, driving means coupled to one of said reel-holding rotatable shafts for rotating said one of said reel-holding rotatable shafts to thereby rotate said reel, and brake element means between each said disc and its complementary supporting element, each brake element means being of material that is relatively compressible when compared to the material of the said supporting elements.