July 23, 1940. C. M. HURLBUT 2,208,846

CASKET LOWERING AND RAISING DEVICE

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Fig. 1

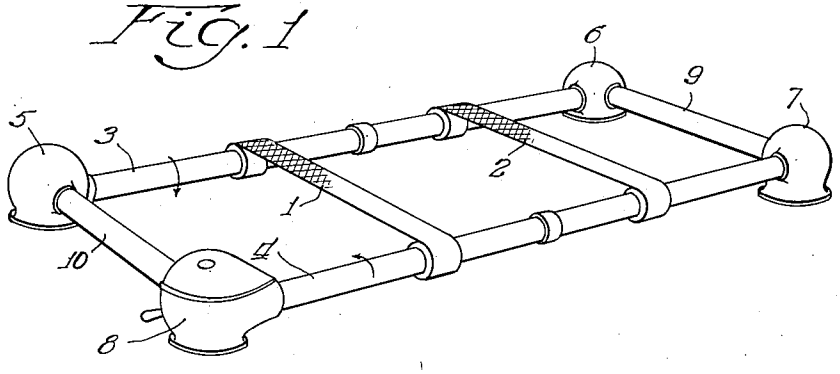
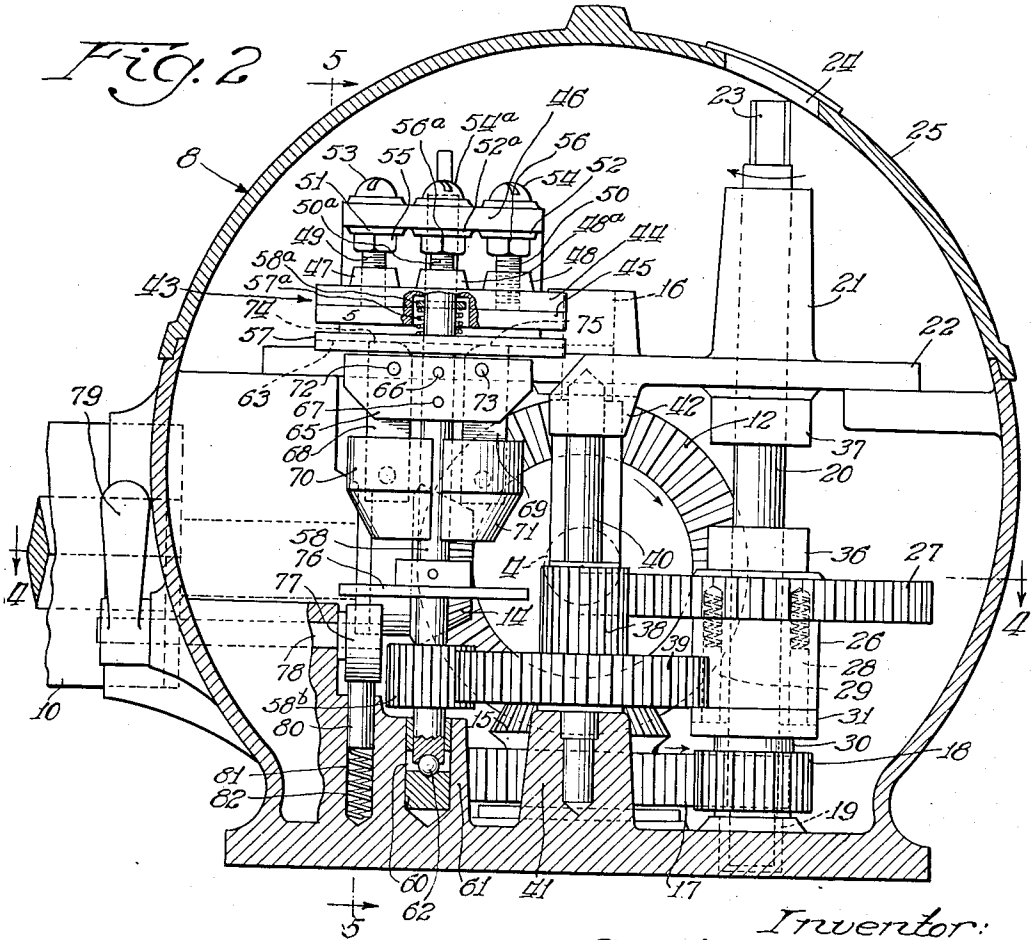


Fig. 2



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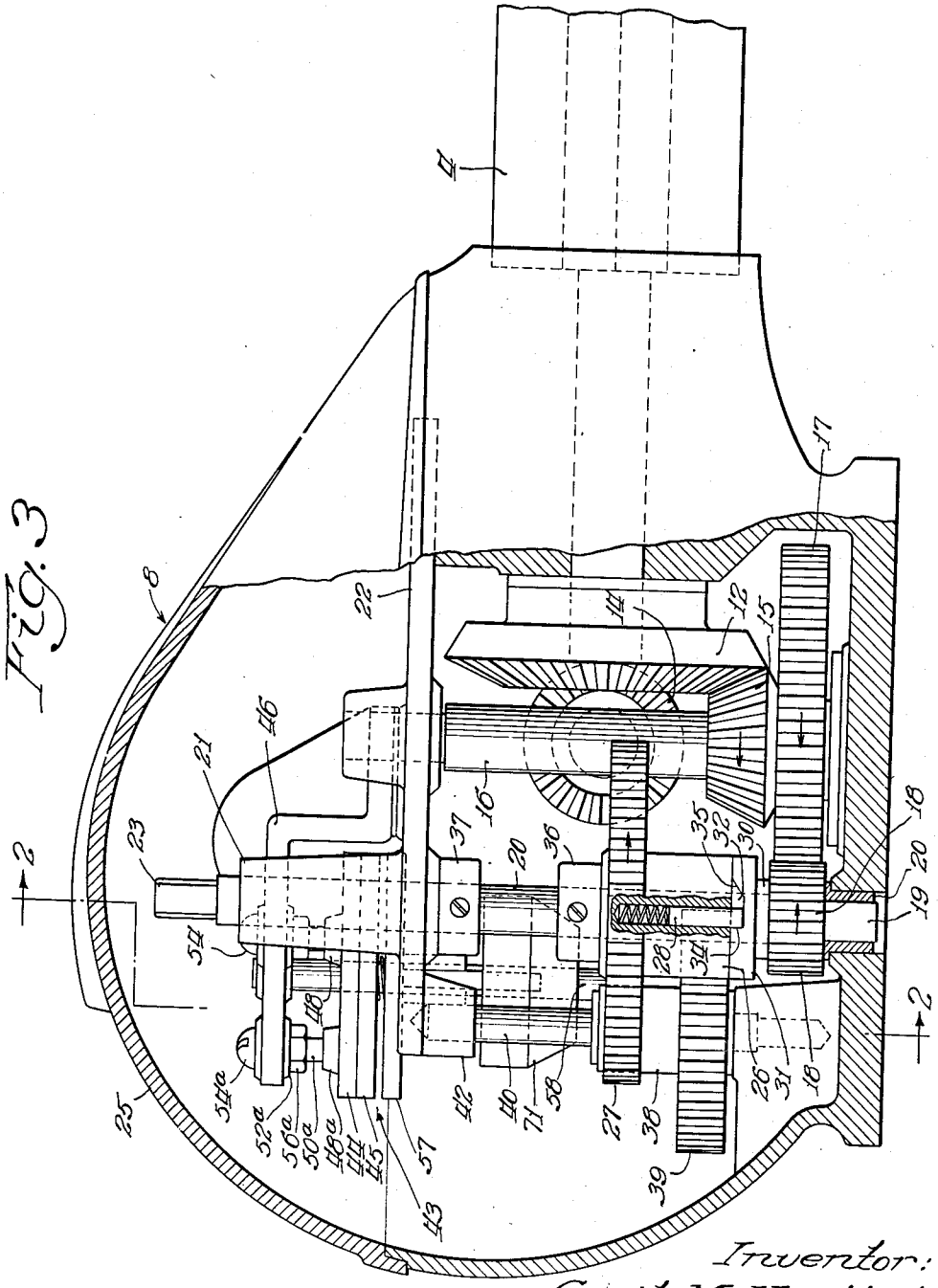
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Fig. 3



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Fig. 4

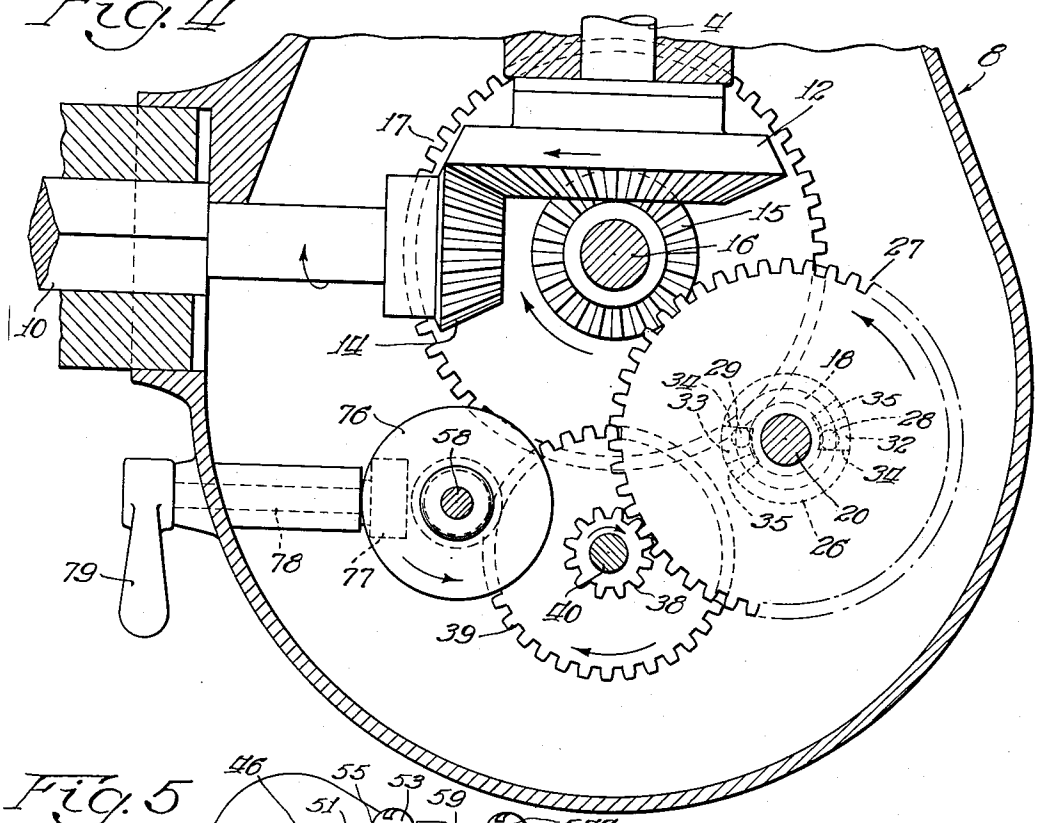


Fig. 5

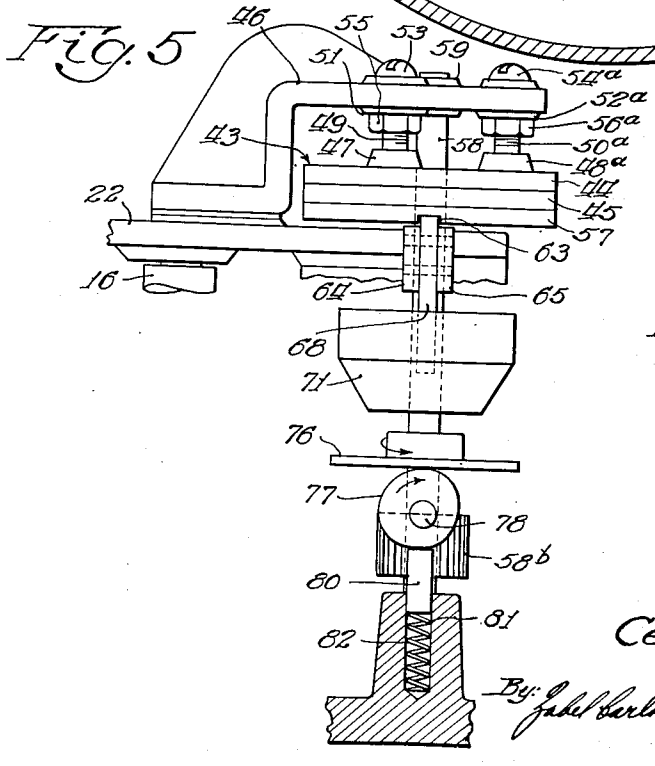
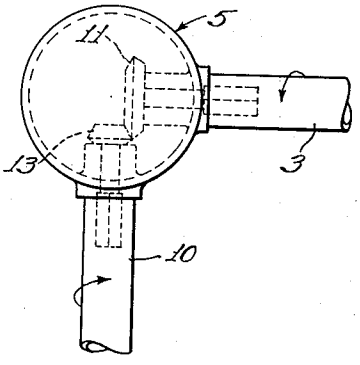


Fig. 6



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UNITED STATES PATENT OFFICE

2,208,846

CASKET LOWERING AND RAISING DEVICE

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Application November 10, 1938, Serial No. 239,832

8 Claims. (Cl. 27—32)

The present invention relates to casket lowering and raising devices and has for its principal purpose the provision of a device of this character which is particularly adapted to insure quiet and efficient control of the mechanism in such a way as to avoid sudden jerks and stops during the lowering or raising operation.

Lowering devices, as known in this art, often consist of a supporting frame having two spaced parallel rotatable rods which carry flexible bands on which the casket is carried during the lowering operation. The spaced rotatable rods rotate in opposite directions in unison and are positively connected together to cause this rotation by a cross member at one or both ends of the rods, which cross member is connected to the rods by suitable gearing, such as bevelled gears. In the rotation of the rods for lowering the casket it is essential that the device be provided with a suitable mechanism whereby to readily control the rate of rotation of the rods. It is also essential that this mechanism be so arranged as to prevent excessive lowering speed.

The present invention contemplates the provision of a suitable mechanism for rotating the rods, which mechanism includes a centrifugal governor for controlling the rotation of the rods during lowering, a clutch mechanism whereby the governor is rendered inoperable during the rotation of the rods in a direction to elevate the casket, and means whereby the lowering of the casket may be slowed down or stopped manually without regard to the operation of the centrifugal governor control.

A particular purpose of the invention is to provide, in a mechanism of this character, the aforesaid control means of such a construction as to eliminate objectionable noise and jerky operation, and to reduce the frictional loss in the mechanism below that of the known mechanisms of this character in the art, to permit the successful lowering of the lightest caskets and at the same time to have ample strength and mechanical advantage for lowering or raising heavy caskets.

The features and advantages of the present invention will appear more fully as the description proceeds, reference being had to the accompanying drawings wherein a preferred form of the invention is shown. It is to be understood, however, that the drawings and description are illustrative only and are not to be taken as limiting the invention except insofar as it is limited by the claims.

In the drawings, Fig. 1 is a perspective view of a casket lowering device showing the supporting frame, the casket supporting bands and the rotatable rods which carry them;

Fig. 2 is a sectional view taken substantially on the line 2—2 of Fig. 3 through one of the housings of the supporting frame and showing the control mechanism for the rotatable rods;

Fig. 3 is a sectional view taken at right angles to Fig. 2 through the housing for the control mechanism;

Fig. 4 is a plan sectional view taken substantially on the line 4—4 of Fig. 2;

Fig. 5 is a fragmentary view partly in side elevation and partly in section taken substantially on the line 5—5 of Figs. 2; and

Fig. 6 is a fragmentary plan view illustrating the manner in which the rotating rods are linked together so as to cause them to rotate in unison in opposite directions.

Referring now in detail to the drawings, the present invention is applicable to casket lowering devices generally. One form of casket lowering device is shown in Fig. 1, wherein a pair of casket supporting bands 1 and 2 are carried by spaced parallel rotatable rods 3 and 4. These rods usually are hollow, tubular rods, and, as shown in Fig. 1, they are journalled in a supporting framework consisting of four corner posts 5, 6, 7 and 8, and cross bars 9 and 10. The rods 3 and 4 are positively connected together by means of bevelled gears 11 and 12 (see Figs. 2 and 6) which are fixed to the supporting rods and bevelled gears 13 and 14, which are fixed to the cross bar 10. The bearings of the corner posts 5, 6, 7 and 8 are so arranged as to prevent relative end-wise movement between the rods, cross bars and corner posts. Obviously, the cross bar 9 may or may not be geared to the rods 3 and 4, as desired. The corner post 8 comprises a housing for the control mechanism by which the rods 3 and 4 are rotated to raise and lower a casket supported upon the bands 1 and 2. This mechanism comprises a bevelled gear 15 which meshes with the bevelled gear 12 (see Figs. 3 and 4) and which is journalled upon a stub shaft 16 that is fixed to the base of the post 8. The bevelled gear 15 is formed integrally with a second gear 17. The gear 17 meshes with a spur gear 18 that is keyed to a shaft 20 journalled in a suitable bearing 19 that is formed in the base of the post 8. The shaft 20 projects upwardly from the bearing 19 through a second bearing 21 that is formed on a supporting plate 22 mounted within the post 8. The shaft 20 has at its upper end a polygonal reduced head 23 which is directly below an opening 24

in a cover plate 25 of the post 8. The reason for the polygonal head 23 is for connection to a crank by which the gear 18 can be rotated to turn the rods 3 and 4 by means of the interconnecting gears from the gear 12 on the rod 4 to the gear 18, for the purpose of raising a casket or for winding and tightening the bands 1 and 2 on the rods 3 and 4 preparatory to placing a casket on the bands for lowering.

The shaft 20 has journalled thereon a hub 26 on which there is mounted a gear 27. The hub 26 also carries a pair of spring pressed pins 28 and 29. The gear 18 has integral therewith a hub portion 30 having a flange 31 which lies directly beneath the hub 26. The pins 28 and 29 are urged downwardly by their springs to press against the flange 31. The flange 31 has, in its upper surface, a pair of notches 32 and 33, which notches have an abrupt shoulder at one end as shown at 34 in Fig. 3 and a sloping face at the other end, as shown at 35 in Fig. 3. Thus, if the shaft 20 is rotated in one direction, that is, the direction for lowering a casket, the pins 28 and 29 will cause the hub 26 and the gear 27 to rotate with it, while if the shaft is rotated in the other direction by means of a hand crank applied to the head 23 for raising a casket or for winding and tightening the bands 1 and 2 on the rods 3 and 4, the pins 28 and 29 will ride up the sloping surfaces 35 and the gear 27 will not be rotated.

The one-way drive connection just described is a distinct advantage in the operation of a casket lowering device because it eliminates the entire frictional load and drag of the governor mechanism when the bands 1 and 2 are being wound on the rods 3 and 4 and whenever it is necessary to lift a casket on the bands 1 and 2. This advantage is gained without sacrificing the positive drive connection from the rods 3 and 4 to the governor when the rods are rotating in a direction to lower the casket.

In order to maintain the parts in their proper positions, the shaft 20 has thereon a collar 36 which bears on the top of the hub 26 and a collar 37 which bears against the lower surface of the hub 26. These collars are fixed to the shaft 20 by suitable set screws shown in Fig. 3.

The post 8 also houses a centrifugal governor and friction control mechanism which is connected to the gear 27 by means of a pinion 38 and a gear 39. The pinion 38 and gear 39 are formed integral and are journalled on a shaft 40, the lower end of which is fixed in a boss 41 at the base of the post 8, and the upper end of which is mounted in a boss 42 formed on the plate 22.

The centrifugal control mechanism includes a stationary friction element 43 which comprises a supporting plate 44 and a friction facing 45 therefor. The supporting plate 44 is suspended from a bracket 46, that is mounted on plate 22. Threaded bosses 47 and 48 and 48*a* are provided on the top of the plate 44 to receive the threaded studs 49 and 50 and 50*a*, which, in turn extend up through clearance holes in bosses 51 and 52 and 52*a* on bracket 46, and are provided with screw heads 53 and 54 and 54*a*. Threaded nuts 55 and 56 and 56*a* are provided on the studs 49 and 50 and 50*a* for the purpose of locking the studs in position and to limit the upward movement of the plate 44 when pressure is applied to the friction facing 45.

The friction facing 45 is adapted to be engaged by a second friction element 57 which is vertically slidable upon a shaft 58. A spring 57*a* is interposed between a collar 58*a* on the shaft 58 and the top of the element 57 to press down upon the element 57. The upper end of the shaft 58 is journalled in the bracket 46 at 59 so that it may turn and slide in its bearing. The lower end of the shaft 58 extends into a well 60 (see Fig. 2) which is drilled in a boss 61 on the base of the post 8. In the well 60 there is provided a ball-bearing 62 for the lower end of the shaft 58. The friction element 57 is in the form of a plate having a transverse groove 63 in the lower face thereof, by means of which it is connected to the shaft 58 for rotation therewith. The manner in which this connection is accomplished by centrifugally operated elements which also raise and lower the friction element 57 will now be described.

As shown best in Figs. 2 and 5, the shaft 58 has fixed thereon a pair of horizontally running plates 64 and 65. These plates are suitably secured, as by means of keys 66 and 67, so as to be rigid with the shaft 58. The plates 64 and 65 have pivoted thereto links 68 and 69. These links, as shown clearly in Figs. 2 and 5, extend up into the groove 63 so that the friction element 57 must rotate with the shaft 58 although it is free to move vertically into and out of engagement with the friction face 45 of the element 43.

The link 68 carries a weight 70 at its lower end, and the link 69 carries a weight 71 at its lower end. Now, if the shaft 58 is rotated, it will be obvious that centrifugal force will tend to swing the weights 70 and 71 outwardly and turn the links 68 and 69 upon their pivot pins 72 and 73. The higher the speed of the shaft 58 the farther out the weights 70 and 71 will swing. However, the distance to which they may swing is so limited that they can not engage the shaft 40. This limit is provided by forming the upper ends of the links 68 and 69 with camming surfaces as shown at 74 and 75 in Fig. 2. These surfaces, it will be noted, are so shaped that if the links 68 and 69 swing outward, the friction element 57 is forced upwardly into engagement with the facing 45. The space between the element 57 and the facing 45 may, of course, be adjusted by the studs 49, 50 and 50*a* any time this is found necessary.

The friction elements 43 and 57 are also utilized to control the speed of rotation of the shaft 58 independently of the centrifugal elements 70 and 71. It will be noted that the shaft 58 is slidable vertically in its bearings and therefore when the centrifugal elements 70 and 71 are not being thrown out far enough to apply sufficient pressure by the friction elements, the shaft 58 can be moved upwardly to apply greater pressure. This may be done even though the shaft 58 is not being rotated at all, and thus this shaft may be used as a lock to stop the gear train including the gears 27, 38 and 39 and the pinion 58*b* on the shaft 58. For this purpose a disc 76 is keyed to the shaft 58 in position to be engaged by a cam 77. The cam 77 is carried by a shaft 78 which is journalled in the body of the post 8 and which has a hand lever 79 on the exterior of the post 8. The cam 77 is frictionally held by a spring-pressed pin 80 which is housed in a socket 81 formed in the base of the post 8 and forced upwardly by a spring 82. The shape of the cam 77 is shown best by Fig. 5, wherein it is being utilized to force the disc 76, and with it the shaft 58, upwardly. The above described cam operated stop lock provides a positive quick acting device for stopping the lowering device and for releasing it again when lowering action is to be started,

the lock being of a cam and disc arrangement is always quiet and smooth in its operation.

The device is so constructed that lowering of a casket is under control of the centrifugal governor or control mechanism but the raising of a casket and the winding of the bands 1 and 2 upon the rods 3 and 4 are free of the load of the control mechanism. The rotation of the shaft 20 in a direction to wind the bands 1 and 2 upon the rods 3 and 4 will cause the clutch pins 28 and 29 to ride up out of the slots 32 and 33 along the faces 35 of the slots. The gear 27, therefore, would not turn at all during the time the bands were being wound up. The plate 57 may or may not be against the friction facing 45 during the raising operation. Thus the casket may be raised when desired or required after complete or partial lowering. If the casket were locked in the lower position by the cam 77 being in position to hold the plate 57 against the facing 45 with locking force, the casket when raised would be automatically locked in raised position until the cam 77 was released.

In order that the operation of this device will be more clearly understood, a complete cycle of operations will now be described. Assuming first that the bands 1 and 2 wound on the rods 3 and 4 have to be drawn up to the position in which they are shown in Fig. 1, the operator would first attach a crank to the head 23 of the shaft 20 and would rotate the shaft 20 in the direction of the arrow shown at the top of the shaft 20. This rotation would cause the gear 18 to be rotated with its hub 30 but the hub 26 and the gear 27 would not be rotated because the pins 28 and 29 would ride up the sloping faces 35 of the slots 32 and 33, thus leaving the gear 27 and the entire centrifugal control mechanism stationary. The gear 18 would turn the gear 17 in the direction indicated by the arrow in Fig. 2 which would result in turning the gear 12 in the direction of the arrow shown in Fig. 2. This would turn the rods 3 and 4 through their connecting bevelled gears 11, 12, 13 and 14 in a direction to wind the bands 1 and 2 thereon.

Assuming next that a casket is placed upon the bands 1 and 2, and it is desired to lower it, before placing the casket on the bands 1 and 2 the operator would operate the hand lever 79 to turn the cam 77 into the position shown in Fig. 5, thus forcing the friction elements 43 and 57 together so as to prevent the weight of the casket from turning the rods 3 and 4. Now, when the rods 3 and 4 are to be turned to lower the casket, the cam 77 is gradually moved back so as to allow the disc 76 and the shaft 58 to drop, effecting a gradual separation of the friction element 57 from the facing 45. The weight of the casket would then cause rods 3 and 4 to turn in the direction of the arrows shown on Fig. 1. This turning would be communicated to the gear 12 and through the gears 15 and 17 to the gear 18. The direction of rotation of the gears 12 and 17 would then be the direction shown in Figs. 3 and 4. This would turn the gear 18 in the opposite direction to which it was previously turned. Therefore, the pins 28 and 29 would now engage the shoulders 34 in the notches 32 and 33 and gear 27 would therefore be turned with the gear 18. Rotation of the gear 27 is communicated through gears 38 and 39 to the gear 58b on shaft 58, causing it to rotate, and as the speed picks up the centrifugal force will cause the weights 70 and 71 to swing outwardly. The cam surfaces 74 and 75 of the links 68 and 69 move the friction element 57 up as the weights 70 and 71 swing out so as to cause it to engage the facing 45 and thus apply a braking action to the shaft 58. This will prevent excessive lowering speed and as the lower level desired is reached by the casket, the operator, by utilizing the cam 77, can apply still greater braking action to stop the casket at the desired level.

The direction in which the cam 77 turns to apply lifting action to the disc 76 and the shaft 58 is such that the further rotation of the disc 76 tends to draw the cam in a direction to further the braking action. Therefore, there is no danger of the cam releasing itself once it is set to hold the load.

From the above description it is believed that the features and advantages of the present device will be readily apparent to those skilled in this art. Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a casket lowering and raising device having lowering straps, spaced rotatable rods carrying said straps and a supporting frame in which said rods are journalled, and a member positively connecting said rods whereby to cause them to rotate in unison in opposite directions, means for controlling the rotation of said rods comprising a gear positively connected to said rods, a centrifugal governor, a friction clutch means controlled by said centrifugal governor, and a one-way drive connection between said centrifugal governor and the gear which is positively connected to said rods.

2. In a casket lowering and raising device having lowering straps, spaced rotatable rods carrying said straps and a supporting frame in which said rods are journalled, and a member positively connecting said rods whereby to cause them to rotate in unison in opposite directions, means for controlling the rotation of said rods comprising a gear positively connected to said rods, a centrifugal governor, a friction clutch means controlled by said centrifugal governor, and a one-way drive connection between said centrifugal governor and the gear which is positively connected to said rods, said one-way drive connection including reducing gears.

3. In a casket lowering and raising device having lowering straps, spaced rotatable rods carrying said straps and a supporting frame in which said rods are journalled, and a member positively connecting said rods whereby to cause them to rotate in unison in opposite directions, means for controlling the rotation of said rods comprising a gear positively connected to said rods, a centrifugal governor, a friction clutch means controlled by said centrifugal governor, and a one-way drive connection between said centrifugal governor and the gear which is positively connected to said rods, and manually operable means operatively connected with said friction clutch means.

4. In a casket lowering and raising device having lowering straps, spaced rotatable rods carrying said straps and a supporting frame in which said rods are journalled, and a member positively connecting said rods whereby to cause them to rotate in unison in opposite directions, means for controlling the rotation of said rods comprising a gear positively connected to said rods, a centrifugal governor, a friction clutch means controlled by said centrifugal governor, and a one-way drive connection between said centrifugal governor and the gear which is posi-

tively connected to said rods, said friction clutch means comprising a stationary member, a rotatable member, a shaft upon which said rotatable member is slidably and non-rotatably mounted, said shaft carrying said governor and said governor having means to slide the rotatable member toward the stationary member as its speed increases.

5. In a casket lowering and raising device having lowering straps, spaced rotatable rods carrying said straps and a supporting frame in which said rods are journalled, and a member positively connecting said rods whereby to cause them to rotate in unison in opposite directions, means for controlling the rotation of said rods comprising a gear positively connected to said rods, means to rotate said gear, and a speed control device having a one-way drive connection with said gear.

6. In a casket lowering and raising device having lowering straps, spaced rotatable rods carrying said straps and a supporting frame in which said rods are journalled, and a member positively connecting said rods whereby to cause them to rotate in unison in opposite directions, means for controlling the rotation of said rods comprising a gear positively connected to said rods, means to rotate said gear, and a speed control device having a one-way drive connection with said gear, said speed control device including a braking means, and means for increasing the effect of the braking means when the speed of rotation of said gear exceeds a given speed.

7. In a casket lowering and raising device having lowering straps, spaced rotatable rods carrying said straps and a supporting frame in which said rods are journalled, and means positively connecting said rods whereby to cause them to rotate in unison in opposite directions, means for controlling the rotation of said rods comprising a gear positively connected to said rods, a shaft positively connected to said gear, a centrifugal governor, a friction clutch means controlled by said centrifugal governor, and a one-way drive connection between said centrifugal governor and said shaft, said shaft having means for attaching a hand crank thereto.

8. In a casket lowering and raising device having lowering straps, spaced rotatable rods carrying said straps, a supporting frame in which said rods are journalled and means positively connecting said rods whereby to cause them to rotate in unison in opposite directions, means for controlling the rotation of said rods comprising a shaft in said frame positively connected to said rods, a second shaft in said frame, a centrifugal governor positively connected to said second shaft, and means connecting said shafts comprising a one-way drive connection operable to cause rotation of said centrifugal governor upon rotation of the first named shaft in a direction to unwind the lowering straps, said drive connection being inoperative to drive said centrifugal governor when said first named shaft is rotated in the other direction whereby the first named shaft may be used to wind the lowering straps on the rods independently of the load of the governor.

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