A drive mechanism for folding or coenable partitions and the like where one rotatable member is used to extend the partition and another is used to retract or fold the partition. In use with foldable partitions separate takeup drums are provided for the opposite ends of the same cable or for separate cables and the drums are arranged such that each can be powered while the other is in a freewheeling or controlled freewheeling condition with respect to the drive means. The powered and freewheeling conditions of the drums are changed with reversal of operation of a drive motor and the diameters of the drums can be readily changed to insure maximum effectiveness of the drive for any partition, or the like, with which it is used.

14 Claims, 7 Drawing Figures
DRIVE MEANS FOR FOLDING OR COILABLE PARTITIONS AND THE LIKE

BRIEF DESCRIPTION

1. Field of the Invention
This invention relates to drive mechanisms for coilable and foldable partitions and the like and is particularly concerned with such drive mechanisms as may provide for freewheeling of a drum from which a cable is being payed out while at the same time a cable takeup drum is being powered and for reversal of operation of said drums.

2. Prior Art
In the past, there have been a number of drive units developed for driving partitions to alternatively expel or unfold and then coil or fold them. One such drive is shown in U.S. Pat. No. 2,524,222, issued July 23, 1953, to Clarence E. Carlo. Another drive is shown in my U.S. Pat. No. 3,465,805, issued Sept. 9, 1969. In each of these patents there is disclosed a drive means wherein a first rotatable member is powered by a drive motor in one direction while a second rotatable member is allowed to rotate free of the drive motor. Reversal of operation of the drive motor will automatically drive the second rotatable member in the opposite direction while allowing the first rotatable member to rotate.

SUMMARY OF THE INVENTION

The present invention provides apparatus for accomplishing the same drive functions. However, it does not use rotating inner shafts nor does it require the machining of matching cam teeth to insure shifting of driving sprockets, such as are found in these aforementioned known structures. In addition, the rotatable members of the present invention preferably include a takeup drum structure that can be economically adapted to accommodate any length and size of operating cables, so that maximum use is made of the drums and maximum travel of the partition is obtained for each revolution of the drum.

It is, therefore, an object of the present invention to provide a drive means that will simultaneously power one of two takeup drums while allowing the one not being powered to freewheel independently of the power source and that will alternatively power the drums upon mere reversal of power output from the power source.

Another object is to provide such a drive means wherein the drums can be uniformly constructed and yet be readily and economically modified to accommodate partition cables of any size and length, so that maximum partition travel will be obtained with a minimum number of drum rotations.

Principal features of the invention include an axially reciprocable jackshaft having driving hubs on the ends thereof, intermediate sprockets journaled for rotation about the jackshaft but held against movement axially of the shaft, cam followers fixed to and rotatable with the sprockets and cams on the hubs, adapted to be engaged with and disengaged from the cam followers.

Additional objects and features will become apparent from the following detailed description, taken together with the accompanying drawing and claims and disclosing what is presently contemplated as being the best mode of the invention.

THE DRAWING

In the drawing:
FIG. 1, is a top plan view of the drive unit of the invention arranged to operate the cable or cables of a powered folding partition, the partition not being shown;
FIG. 2, a side elevation view;
FIG. 3, an end elevation view showing the takeup drums and the brake means therefor;
FIG. 4, an enlarged front elevation view of a part of the jackshaft and one hub having a drive sprocket thereon;
FIG. 5, an enlarged front elevation view of an intermediate sprocket; and
FIG. 6, an enlarged end elevation view, a drum of the invention; and

FIG. 7, a vertical section taken on the line 7-7 of FIG. 6.

DETAILED DESCRIPTION

Referring now to the drawings:
In the illustrated preferred embodiment the invention includes a drive motor 10 that operates through a gearbox 11 to turn a driving sprocket 12.

A chain 13 passes around sprocket 12 and around an intermediate sprocket 14. Sprocket 14 is fixed by screws 15 (FIG. 4) to the end of a hub 16 and the hub is pinned by a pin 17 or is otherwise affixed at its outer end, to one end of a jackshaft 18 that is inserted therein. An enlarged bore 19 in the hub then surrounds the shaft 18 at the other end of the hub 16.

A similar hub 20 is secured by a pin 21 or is otherwise affixed at its outer end to the other end of the jackshaft 18. An enlarged bore 22 in the hub 20 then surrounds the shaft at the other end of the hub. However, hub 20 does not have a sprocket affixed thereto, as does hub 16.

The hubs 16 and 20 each have cam surfaces 23 formed on their inner ends. The cam surfaces 23 start at a point 24 most remote from the connection of the hubs and the jackshaft and are smoothly cut back along the curved cylindrical wall of the hub. Each curved cam surface 23 extends from its point 24 beneath the other point 24 and then is reversely curved at 23a to engage the point and to form a hook 25. Thus, each hub has a hook 25 on its cylindrical inner end, and the hooks 25 are oppositely extending with respect to one another.

A pair of intermediate sprockets 26 and 27 respectively surround and are fixed to sleeves 28 and 29 that are mounted for sliding movement on the jackshaft 18. The jackshaft is journaled through bearings 30 and 31 mounted in pillow blocks 32 and 33 between the sprockets. Each of the sleeves 28 and 29 has a pin or post 34 projecting therefrom such that it is adapted to be engaged by the hooks of the adjacent hub 16 or 20 when that hub is turned in one direction and to be forced away from those hooks when the hub is turned in the opposite direction.

Some clearance is provided between each sleeve 28 and 29 and its adjacent pillow block 32 or 33 to allow the sleeves to initially slide along the jackshaft until the sleeve contacts its adjacent pillow block. At this time, a reactionary force develops to move the jackshaft in the opposite direction until the pins 34 can be engaged by or cleared by the hooks 25 as the hubs are turned.

As previously noted, the hubs 16 and 20 are arranged such that their hooks 25 are oppositely extending. Thus, rotation of the jackshaft 18 in one direction, i.e., counterclockwise as viewed in FIG. 1, will initially result in the cam surface 23 of hub 20 pushing the pin 34 of sleeve 28 away. When the sleeve 28 contacts a limit means in the form of pillow block 32 a reactionary force axially moves the jackshaft 18 until the hook 25 on hub 16 is in position to engage the pin 34 on sleeve 29.

Continued rotation in the same direction will then turn hub 16, sleeve 29, and the sprocket 27 affixed to the sleeve. At the same time, sprocket 26 fixed to sleeve 28, is free to turn independently of the rotation of jackshaft 18.

Conversely, operation of motor 10 to drive hub 16 and the jackshaft 18 affixed thereto through sprocket 12, chain 13 and sprocket 14, in the opposite direction will cause the pin 34 of sleeve 29 to initially move away from the hook 25 on hub 16. After the sleeve 29 contacts a limit means in the form of pillow block 33 the reactionary force axially moves the jackshaft 18 such that hook 25 of hub 20 will engage the pin 34 projecting from sleeve 28. This will drive sprocket 26 in a direction opposite to the direction sprocket 27 was driven by the jackshaft, while at the same time sprocket 27 will be free to rotate independently of the jackshaft.

Chains 35 and 35a, respectively, connect the sprockets 26 and 27 with sprockets 36 and 37. The sprockets 36 and 37 are preferably similar in construction and are attached by welding, or the like, to a takeup drum, shown generally at 38, FIG. 3 to make a sprocket-drum unit 39, as best seen in FIG. 7.
Each sprocket drum unit preferably includes a drum hub with a bronze bushing therein to serve as a bearing that is journalled about a shaft. A pair of spaced flanges and are affixed to and radiate out from the drum hub and bolts are inserted through matching holes spaced equally around the flanges and a set radial distance from the drum hub. Nuts are screwed onto the ends of bolts to hold the sprocket in place. As shown, eight bolts are used, but it should be apparent that more or fewer could be used as desired. Additional matched sets of holes are provided at different radial distances from the drum hub so that it is a simple matter to change the bolts, thereby providing a cable takeup surface formed by the bolts of different diameter. With this construction a single sprocket and hub can be readily adapted to use with any size folding or collapsible partition, or the like, and a maximum takeup of cable, per rotation of drum, can be obtained, consistent with having a sufficient area within the flanges and outside the circumference formed by the bolts to store the length of cable used with the partition and to be wound on the drum.

When motor drives sprocket through jackshaft and sprocket and its attached sleeve, the sprocket is free to rotate independently of the rotation of the jackshaft. Thus the drum attached to sprocket can be powered to take up cable end while at the same time the drum attached to sprocket can be paying out cable end. In the same manner, when sprocket is powered, sprocket and the drum attached thereto are free to rotate independently of the operation of sprocket.

Brake means may be provided to prevent complete freewheeling of the drums, and this is frequently necessary to keep the cables from becoming entangled. As shown, the brake means includes a flexible band of steel or other suitable material, secured at one of its ends by a hook 50 to an anchor 51 that is attached to a base 52 on which the entire drive means is mounted. The anchor 51 is at one side of the drum 38 and the drum 53 is secured to a base 52 at the other side. A rod 54 is pivotally connected at one of its ends 54a to anchor 53 and the other end 54b of the rod is threaded and is inserted through a hole provided therefor in the other end of band 50.

A spring 55 is telescoped over the end 54a of rod 54, a washer 56 is placed thereover and a nut 57 is threaded thereon to compress the spring to the extent desired. A braking action results from the frictional engagement of the band 50 with the peripheral edges of the flanges and of each sprocket drum unit. The amount of frictional engagement can be easily adjusted by turning nut 57 onto or off of the rod 54.

Other braking can be obtained by providing brakeshoses to act on the sides of sprockets and the brakeshoses are each pivotally connected to an arm 62, the other end of which is pivotally connected at 63 to a pillow block 64 that secures the bearings for the shaft about which the sprockets 36 and 37 are journalled.

A spring 65 connects the arms 62 and acts to pull the brakeshoses (which may have pads of asbestos or any other suitable braking material thereon) against the sprockets 26 and 27. If desired, spring-adjusting means, not shown, could be provided to adjust the spring tension and thus the braking pressure applied to the sprockets. The pivot mounting of the arms 62 insures pressure of the brakeshoses to the sprockets 26 and 27 even as jackshaft is shifted axially in response to reversal of motor 10.

While the drive means of this invention has been herein illustrated as driving a pair of sprocket drum units, it should be obvious that it could as well be used to drive one sprocket drum and a post for a collapsible partition, such as shown in my aforementioned U.S. Patent No. 3,465,805, or the drive other rotatable elements. Also, while drive connections have been described and illustrated as being sprockets and chains, other commonly known drive connections such as belts and pulleys, etc., could as well be used.

Although a preferred form of my invention has been herein disclosed, it is to be understood that the present disclosure is by way of example and that variations are possible, without departing from the subject matter coming within the scope of the following claims, which subject matter I regard as my invention.

1. A drive means for foldable partitions and the like comprising:
   a. a jackshaft mounted for rotation and axial reciprocation within the bearing means;
   b. a hub fixed to each end of the jackshaft, said hubs having opposed cam surfaces extending therearound, each of said cam surfaces terminating in a hook at a point most remote from the hub and the hooks on the respective hubs being oppositely directed to with respect to one another;
   c. sleeves rotatably surrounding the jackshaft and arranged for reciprocation therealong into the hubs;
   d. projections extending outwardly from the sleeves to be engaged by the hooks; and
   e. limit means to stop movement of said sleeves, whereby rotation of said jackshaft and the hubs thereon will cause engagement of one of said cam surfaces with one of said projections to move the sleeves attached to said projection against said limit means and to thereafter move said jackshaft until continued rotation thereof will cause the other of said hooks to engage the other of said projections.

2. A drive means as in claim 1, further including means to reversibly drive the jackshaft.

3. A drive means as in claim 1, wherein the means to reversibly drive the jackshaft comprises:
   a. a reversible motor; and
   b. means coupling the output shaft of said motor to the jackshaft.

4. A drive means as in claim 1, further including rotatably mounted driven members, and
   a. means coupling each of said sleeves to a different one of said driven members.

5. A drive means as in claim 4, wherein the means coupling each of said sleeves to a different one of said driven members comprises:
   a. a sprocket on each sleeve;
   b. a sprocket on each driven member; and
   c. a chain extending around the sprocket on each sleeve and a sprocket on a driven member.

6. A drive means as in claim 4, wherein the driven members include at least one cable takeup drum.

7. A drive means as in claim 6, wherein each cable takeup drum comprises:
   a. a central hub;
   b. a pair of spaced flanges radiating out from the hub; and
   c. a row of bolts equidistantly spaced from said hub extending through the said flanges.

8. A driven means as in claim 7, further including a plurality of rows of aligned holes through the said flanges, each of said rows being equidistant from the hub and with the aligned holes then being adapted to receive the bolts.

9. A drive means as in claim 1, further including retarder brake means acting on the sleeves to prevent complete freewheeling thereof on the jackshaft.

10. A drive means as in claim 5, further including retarder brake means acting on the sleeves to prevent freewheeling thereof on the jackshaft, said brake means including a brakeshose mounted to engage each of the sprockets, means mounting the brakeshoses for movement with the sprockets axially of the jackshaft and means biasing the brakeshoses into continuous engagement with the said sprockets.

11. A drive means as in claim 7, further including
brake means to prevent freewheeling of each cable uptake drum, said brake means comprising a flexible band extending around the periphery of at least one of the flanges of the hub and means biasing the band against the flange.

12. A drive means as in claim 1, further including a reversible motor;
means coupling the output shaft of the motor to the jackshaft, including a sprocket connected to the output shaft of the motor for rotation therewith, a sprocket fixed to one of the hubs and rotatable therewith and a chain drivingly interconnecting the sprockets fixed to the output shaft of the motor and to the hub;
a sprocket fixed to and radiating from each sleeve;
driven members rotatably mounted on the shaft, each of said driven members comprising a hub journaled on the shaft, a sprocket fixed to and radiating from the hub, a pair of spaced flanges radiating from each hub, and a row of bolts equidistant from the hub and extending through the said flanges to form a cable uptake drum; and a chain drivingly connecting each of the sprockets fixed to the sleeves with a sprocket of a driven member.

13. A drive means as in claim 12, further including retarder brake means acting on the sleeves to prevent freewheeling thereof on the jackshaft, said brake means including a brakeshoe mounted to engage each of the sprockets, means mounting the brakeshoes for movement with the sprockets axially of the jackshaft and means biasing the brakeshoes.

14. A drive means as in claim 13, further including brake means to prevent freewheeling of each cable uptake drum, said brake means comprising a flexible band extending around the periphery of at least one of the flanges of the hub and means biasing the band against the flange.