Feb. 3, 1942. L. D. HAGENBOOK 2,272,049

DRAFT DEVICE

Filed Dec. 24, 1940 4 Sheets-Sheet 1

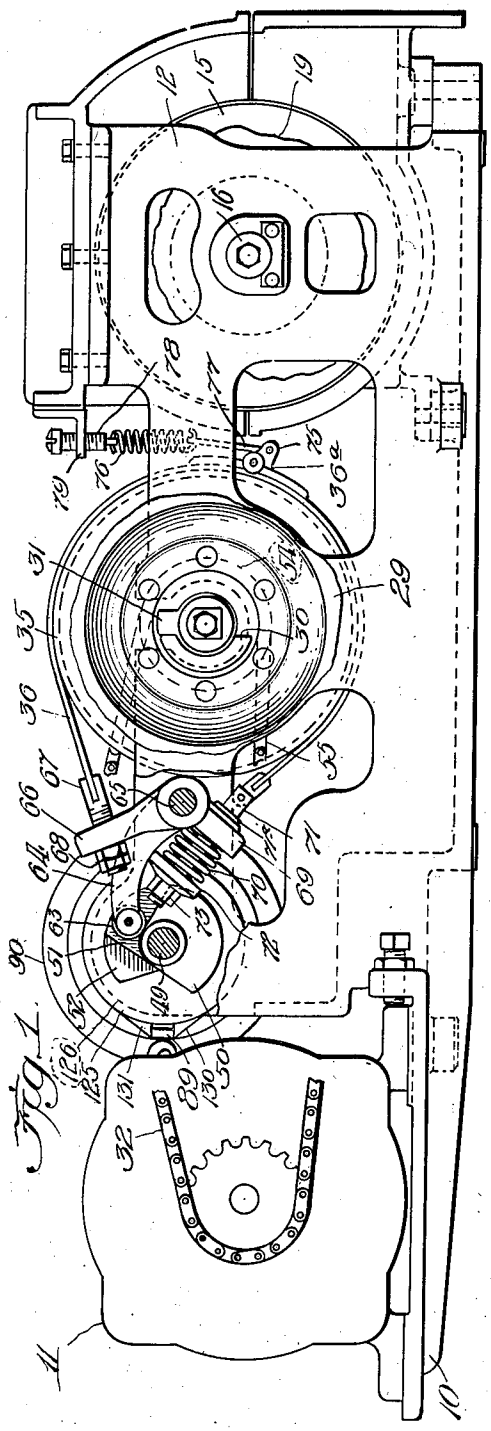


Fig. 1.

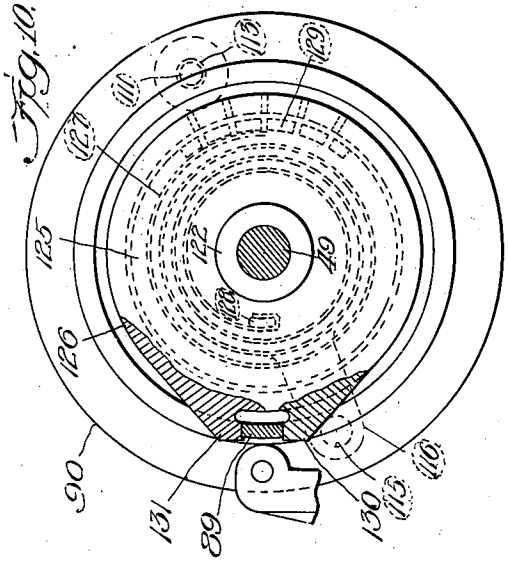


Fig. 10.

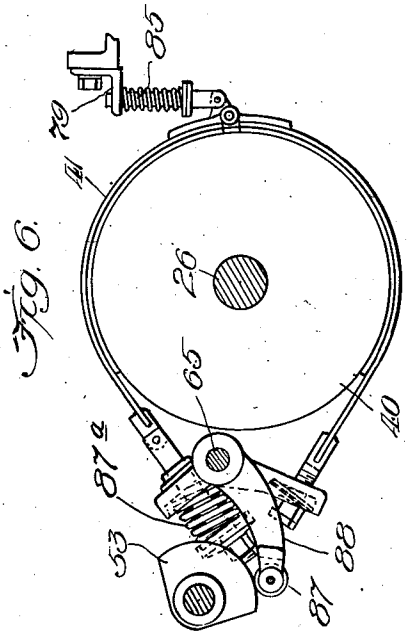


Fig. 6.

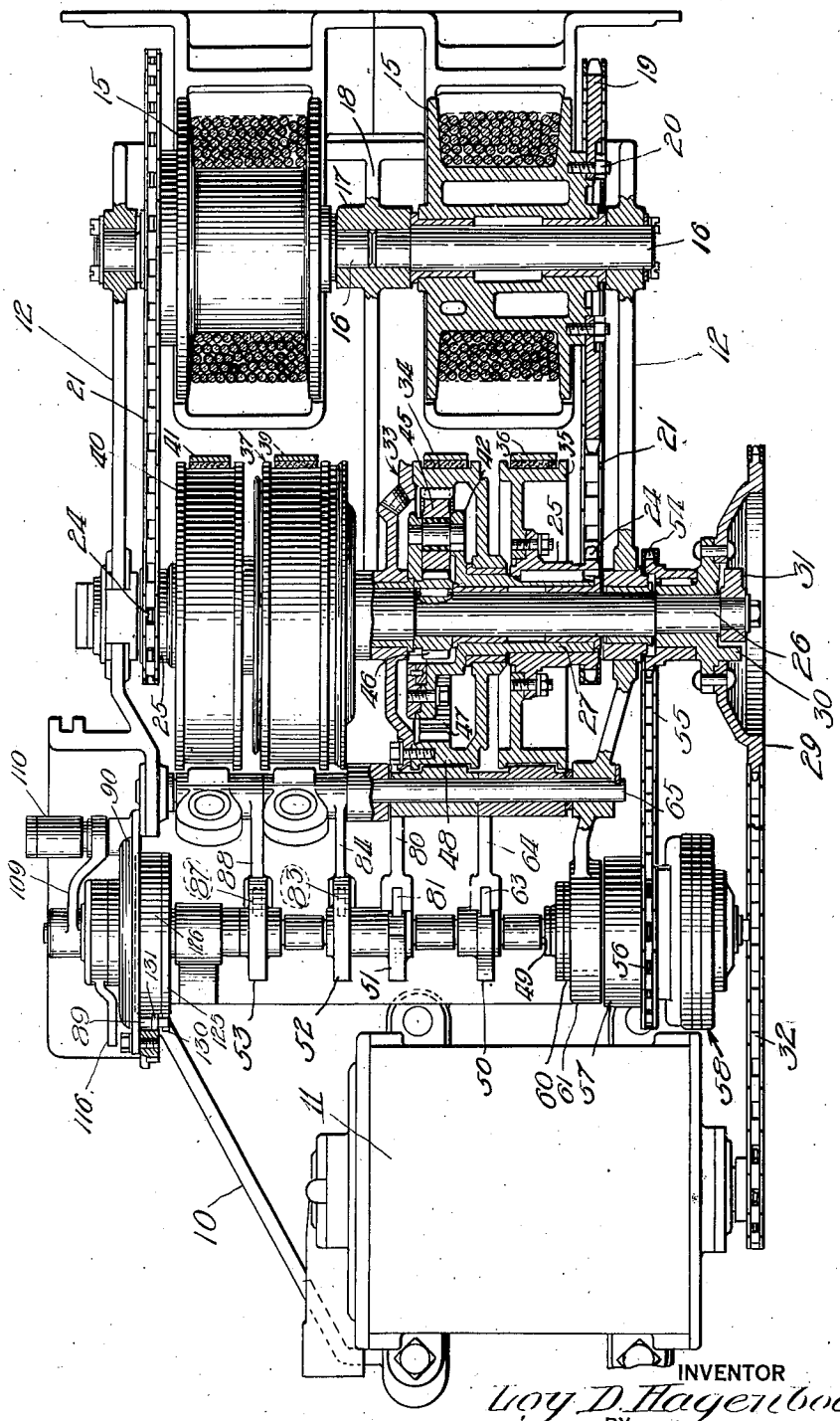
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Feb. 3, 1942. L. D. HAGENBOOK 2,272,049

DRAFT DEVICE

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Fig. 2.



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DRAFT DEVICE

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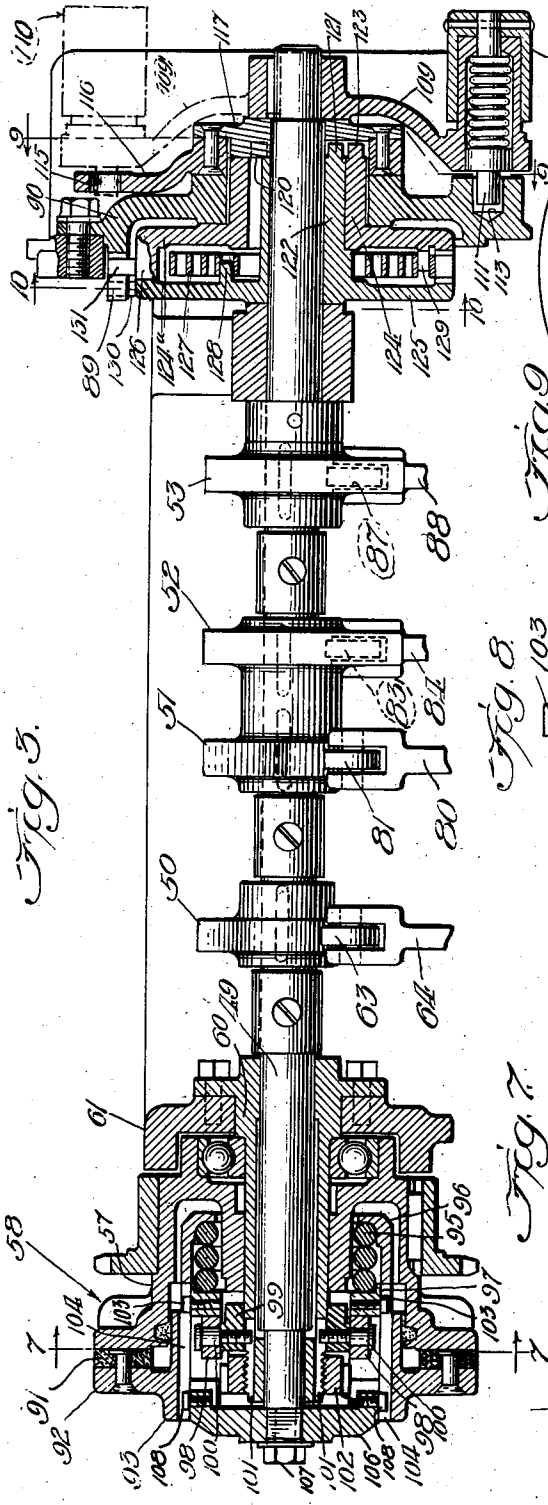


Fig. 5.

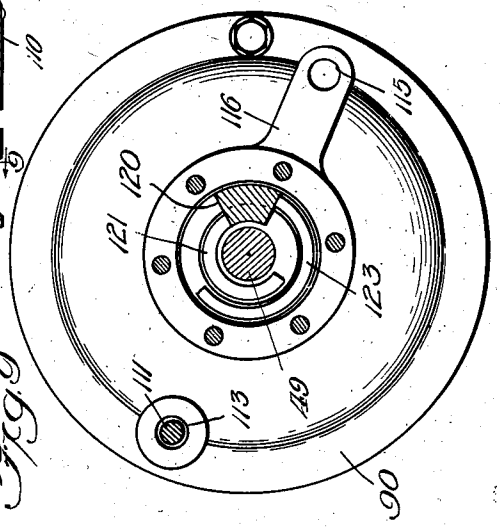


Fig. 9

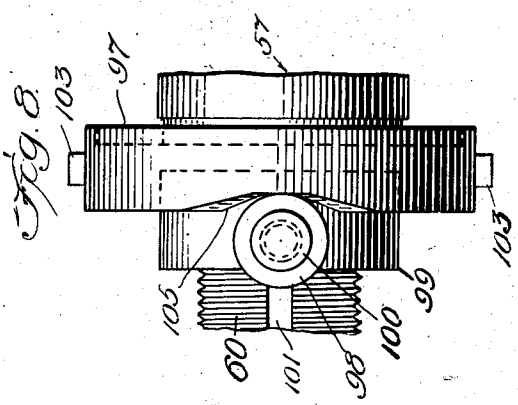


Fig. 8

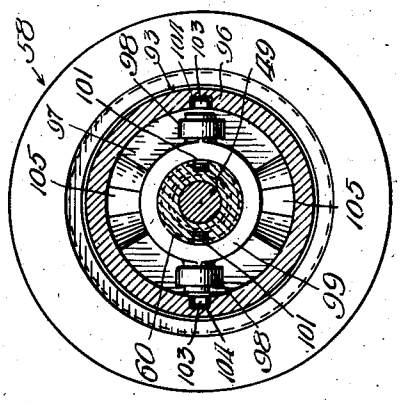


Fig. 7

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DRAFT DEVICE

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Fig. 4.

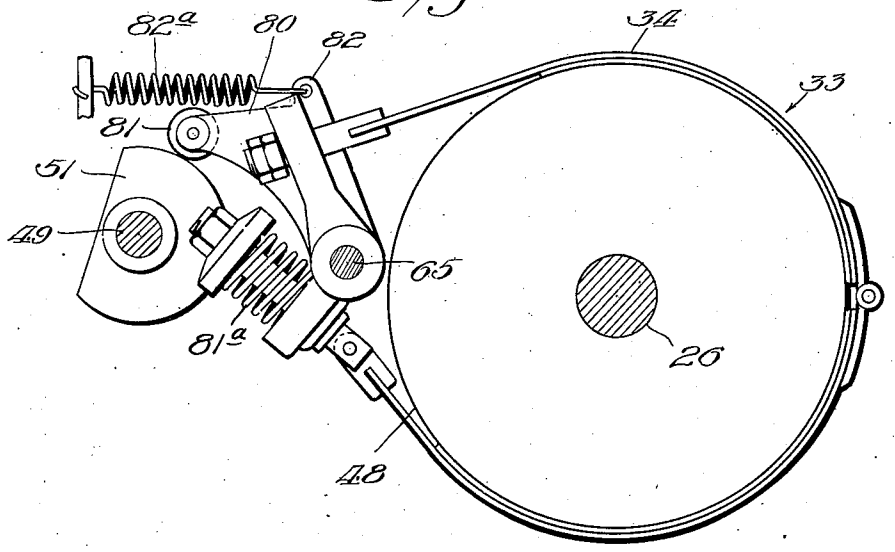
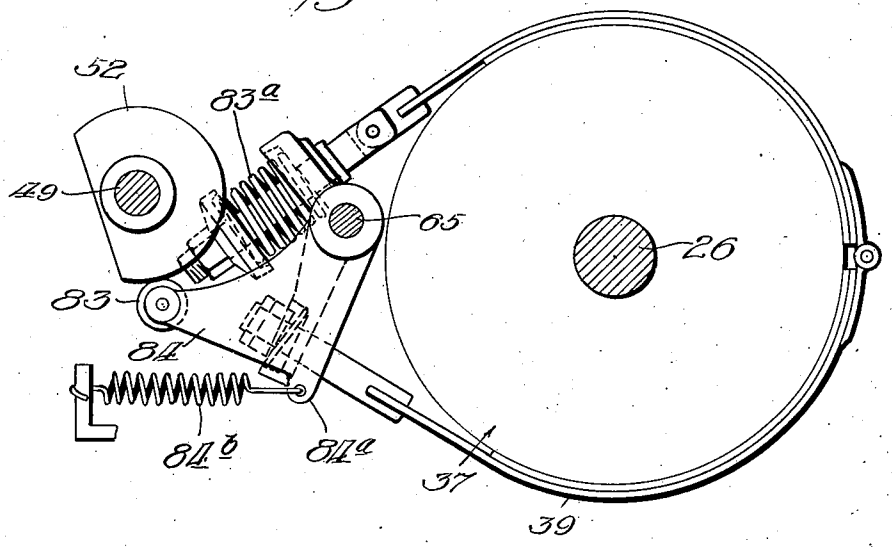



Fig. 5.




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Patented Feb. 3, 1942 2,272,049

# UNITED STATES PATENT OFFICE

2,272,049

## DRAFT DEVICE

Loy D. Hagenbook, Chicago, Ill., assignor to Goodman Manufacturing Company, Chicago, Ill., a corporation of Illinois

Application December 24, 1940, Serial No. 371,552

22 Claims. (Cl. 254—185)

This invention relates to improvements in draft devices of the type particularly adapted to laterally move a pick-up member on the forward end of a shaker conveyer across the working face of a mine.

The principal objects of my invention are to provide a new and improved draft device of the class described including a pair of winding drums and a drive and controlling connection from a common drive member to these winding drums, so arranged that either drum may be separately driven in a winding direction by reversing the direction of rotation of the common drive member.

Another object of my invention is to provide a novel drive and controlling connection for a pair of winding drums including means operative to drive one drum and permit the other drum to pay off cable against friction, upon rotation of the drive motor therefor in one direction, and to drive the second drum in a winding direction and permit cable to be payed off the first mentioned drum against friction by merely reversing the direction of rotation of said drive motor.

A further object of my invention is to provide a draft device including a pair of winding drums, with a common motor for driving these drums, and a drive and controlling connection from this motor to these winding drums, automatically operable for rotatably driving one drum when the motor rotates in one direction and rotatably driving the other drum when the direction of rotation of the motor is reversed, and for positively holding both drums from rotation in an unwinding direction, the instant the drive motor stops.

Other objects of my invention will appear from time to time as the following specification proceeds and with reference to the accompanying drawings wherein:

Figure 1 is a view in side elevation of a draft device constructed in accordance with my invention, with certain parts broken away and certain other parts shown in section;

Figure 2 is a plan view of the device shown in Figure 1, with certain parts broken away and certain other parts shown in horizontal section;

Figure 3 is an enlarged detail view of the control for the winding drums, with certain parts broken away and certain other parts shown in horizontal section;

Figures 4 and 5 are enlarged detail views illustrating certain details of the friction control for the planetaries for driving the winding drums;

Figure 6 is a detail view drawn to a somewhat smaller scale than Figures 4 and 5, illustrating certain details of the control for the friction band for a brake drum for one of the winding drums;

Figure 7 is a sectional view taken substantially along line 7—7 of Figure 3;

Figure 8 is an enlarged detail view illustrating certain details of the driving clutch for the control mechanism for the winding drums;

Figure 9 is a sectional view taken substantially along line 9—9 of Figure 3; and

Figure 10 is a sectional view taken substantially along line 10—10 of Figure 3.

Referring now in particular to the drawings, the embodiment of my invention illustrated includes generally in a base 10 having a motor 11 mounted thereon, adjacent one end thereof. Said base is provided with a pair of parallel spaced side frame members 12, 12 forming a mounting for a pair of winding drums 15, 15, mounted between said side frame members on aligned transversely extending shafts 16, 16, and also forming a mounting for the drive and control means for said winding drums.

The shafts 16, 16 are mounted at their outer ends in suitable supporting bosses formed in the side frame members 12, 12, and are mounted at their inner ends in a supporting boss 17 formed in an intermediate wall 18, projecting upwardly from the base 10.

The winding drums, as herein shown, each have a sprocket 19 secured to the outer side thereof by means of studs and nuts, generally indicated by reference character 20. Said sprockets are meshed with endless drive chains 21, 21, meshing with sprockets 24, 24, herein shown as being formed integral with sleeves 25, 25, mounted coaxially of a transverse drive shaft 26 (see Figure 2). Each sleeve 25 is keyed to a sleeve 27, journaled on said transverse shaft. Said shaft is herein shown as being rotatably driven from the motor 11 by means of a sprocket 29, mounted thereon and provided with a driving jaw 30 having spaced apart engaging faces adapted to engage a dog 31, secured to said shaft, to permit a predetermined free movement of said sprocket on said shaft, upon reversal of rotation of said sprocket, before causing said sprocket to drive said shaft. The purpose of this connection is to permit proper positioning of the control mechanism for said winding drums before rotatably driving the shaft 26, in a manner which will hereinafter more fully appear as this specification proceeds. A chain and sprocket drive 32 serves to connect said sprocket with said motor.

The sprocket 24, on the side of the frame 10

which is its right hand side when looking from the motor 11 towards the winding drums 15, 15, is driven from a planetary geared reduction device 33 controlled by a friction band 34. A brake drum 35, secured to the sleeve 25 and engaged by a friction band 36, is provided to hold the right hand winding drum from rotation. The sprocket 24 on the left hand side of said frame is driven from a planetary 37 controlled by a friction band 39, engaging the outer periphery thereof. A brake drum 40, secured to the sleeve 25 and adapted to be engaged by a friction band 41, is provided to hold said sprocket and the left hand winding drum from rotation. The construction of the planetaries 33 and 37 and the drive connections to the sprockets 24, 24 from these planetaries is similar, so only one of said planetaries need herein be described in detail.

The sleeve 27 is herein shown as being formed integral with a cage 42 of the planetary geared reduction device 33. A planetary pinion 45 is rotatably mounted in said cage and meshes with and is driven from a sun pinion 46, keyed on the transverse shaft 26. Said planetary pinion also meshes with an internal gear 47, herein shown as being formed integral with a casing 48 for said planetary geared reduction mechanism. Said internal gear forms a reaction member for said planetary and is held from rotation by means of the friction band 34.

A novel form of control is provided for said planetaries, so arranged that when the motor 11 rotates in one direction, one of the winding drums 15 will be driven in a winding direction and cable may be payed off the other winding drum under the control of friction; and when the direction of rotation of said motor is reversed, the other drum will be driven in a winding direction and cable may be payed off the first mentioned drum under the control of friction. Said control includes a cam shaft 49 arranged parallel with the shaft 26 and having cams 50, 51, 52 and 53 mounted thereon, for controlling the application or release of the friction bands 36, 34, 39 and 41, respectively. Said cam shaft is driven from a sprocket 54, herein shown as being keyed on the hub of the sprocket 29, through a chain 55 meshing with a sprocket 56 keyed on a housing and driving member 57 of a friction clutch 58, coaxial with said cam shaft. Said housing and driving member is journaled on a sleeve 60, secured to a support portion 61, herein shown as being formed integral with one of the side frame members 12 and forming a bearing support for one end of the shaft 49 (see Figures 1 and 3).

The operating and controlling connections from the cams 50, 51, 52 and 53 to the respective friction bands 36, 34, 39 and 41 are as follows:

The cam 50 is adapted to be engaged by a roller 63 on the outer end of a rocking arm 64 (see Figure 1). Said rocking arm is rockingly mounted on a transverse shaft 65 (see Figure 2). Said friction band is herein shown as being in two parts, connected together by a hinge 36a (see Figure 1). The upper end of said friction band is connected with an arm 66 of a bell crank. Said arm projects angularly upwardly and rearwardly from the shaft 65, and is herein shown as being formed integral with the rocking arm 64. The connection from said arm 66 to said friction band includes a connecting member 67, connected to said upper end of said friction band and extending through said arm 66. Lock nuts 68, 68 are provided to hold said connecting member in engagement with said arm. The opposite end of said friction band is connected to an arm 69 of said bell crank, which extends angularly downwardly from the shaft 65 in a direction towards the motor 11, and is herein shown as being formed integral with the arms 64 and 66. Said arm 69 forms a seat for a preloaded compression spring 70. The connection from said friction band to said arm includes a connecting member 71, transversely pivoted to said lower end of said friction band and extending through said seat and the open center of said spring. A retaining member 72 abuts the end of said spring opposite from said seat and is held in engagement therewith by means of a nut 73, threaded on said connecting member. A shoulder 71a is on said connecting member 71 and abuts the side of the lever arm 69 opposite from the spring 70, to permit preloading of said spring by means of the nut 73. Said spring being preloaded acts as a solid member except under a predetermined load at which time said spring will yield, to permit slippage of the brake drum 35. The lever arm from the center of the shaft 65 to the longitudinal center of the connecting member 67 is twice the lever arm from the center of said shaft to the longitudinal center of the connecting member 71.

A lug 75 projects from the hinged portion 36a of said friction band in a direction towards the winding drums 15, 15. A tension spring 76 is connected at its lower end to said lug by means of a link 77. The upper end of said spring is connected with a member 78 threaded in a support member 79 extending across the side walls 12, 12. Said tension spring is arranged to produce a drag on the brake drum 35 and tend to move the friction band 36 in a counterclockwise direction and initially apply said friction band. Counterclockwise movement of said friction band effected by the spring 76 rotates the lever arms 66 and 69 about the axis of the rock shaft 65 and tightens said friction band on said brake drum by reason of the fact that the lever arm 69 is shorter than the lever arm 66 and pays out less than the lever arm 66 takes up.

The cam 50, as herein shown, is in the form of a segment of a circle, with two plane sides extending at substantially right angles with respect to each other and connected together by a curved surface, to form a continuous regular depressed portion leading to a raised portion thereof formed by the periphery of the arc of the segment of the circle of said cam. When the roller 63 rides on the raised portion of said cam, the arm 66 is moved to a position to disengage the friction band 36 from its brake drum, and when said roller rides on the depressed portion of said cam, said friction band will be applied to said brake drum, by the spring 76 and the wrapping action of said band on said brake drum, to hold said brake drum from rotation in a counterclockwise direction up to the limit of load of the spring 70.

The operating connection to the friction band 34, for applying or releasing said friction band from the casing 48, is similar to the connection for applying the friction band 36 to or releasing it from the brake drum 35 (see Figure 4). Said connection includes a rocking arm 80 mounted on the shaft 65 and having a roller 81 on the free end thereof, adapted to engage the cam 51. Said rocking arm is provided with an upwardly extending connecting lug 82, to which is con-

nected a tension spring 82*a*, to initially engage the friction band 34 with the casing 48, when said roller is riding on the depressed portion of said cam and to insure release of the friction band 34 from the casing 48 when said roller is riding on the raised portion of said cam. The connections from said rocking arm to opposite ends of said friction band, to apply said friction band to or release it from the casing 48, are otherwise the same as the connections to the friction band 36, so need not herein be described in detail.

The cam 51, as herein shown, is in the form of a segment of a circle with one flat side so arranged that rotation of said cam in a counterclockwise direction from the position shown in Figure 4 will cause the roller 81 to ride along the flat side thereof, to permit said friction band to be engaged with said casing by the wrapping action of said friction band, to hold said casing from rotation in a counterclockwise direction up to the load limit of a preloaded compression spring 81*a*, and rotation of said cam in an opposite direction from the position just described, will cause said roller to ride along the periphery of the arc of the segment of the circle of said cam, to release said friction band from said casing.

The cam 52 is shaped similarly to the cam 51, and is adapted to be engaged by a roller 83 on the free end of a rocking arm 84, which rocking arm is freely mounted on the transverse shaft 65. Said rocking arm and roller are arranged to engage the underside of said cam 52, as may clearly be seen with reference to Figures 3 and 4. The reason for this is that the motor 11 is reversed to drive the left hand winding drum 15. Accordingly, cable must be wound on the left hand winding drum 15 in a direction opposite to which it is wound on the right hand winding drum, in order that said drum may wind cable thereon when driven by said motor. Thus the compression spring and lever mechanism for applying the friction band 39 must be inverted from the position of the mechanism for applying or releasing the friction band 34. A pre-loaded compression spring 83*a* has connection with the upper end of said friction band, instead of the lower end thereof, as with the friction bands 36 and 34. With the exception of this difference in location of parts, the connection to said friction band is the same and acts in the same manner as the connections to the friction band 36, so will not herein be described in detail. A lug 84*a* depends from the rocking arm 84 and has a tension spring 84*b* connected thereto, to hold the roller 81 in engagement with the cam 51 and to initially apply said friction band to hold the casing for the planetary 37 from rotation in a clockwise direction.

The cam 53 for applying the friction band 41 to or releasing it from the brake drum 40 is of the same form as the cam 50, but is engaged by a roller 87 disposed beneath the shaft 49 and mounted on the free end of a rocking arm 88. Said cam 53 is so arranged on the shaft 49 that said friction band will be applied when the friction band 39 is released, and vice versa, except when all of the cams are in an off position, in which position all of the friction bands are in a released position. Said roller and rocking arm are adapted to release said friction band 41 from the brake drum 40 when riding on the high part of the cam 53, or to permit said band to be applied thereto by the wrapping action of said friction band on said brake drum, to hold said brake drum from rotation in a clockwise direction. A preloaded compression spring 87*a* is provided to permit said friction band to release upon a predetermined load on said brake drum (see Fig. 6).

A yieldable spring pressed plunger 85 is connected to the friction band 41 at the hinged portion thereof. Said spring pressed plunger is mounted in the support member 79, for slidable movement with respect thereto, and is adapted to initially apply the friction band 41 to the brake drum 40 to hold said brake drum from rotation in an unwinding or clockwise direction when the roller 87 rides on the low part of the cam 53 and to place a slight drag on said brake drum when said friction band has been released by the arm 88, to prevent free unwinding of the left hand drum 15.

The cams 50, 51, 52 and 53 are so arranged that when in a neutral position, the rollers 63 and 87 will be on the reduced portions of their respective cams 50 and 53, to permit the friction bands 36 and 41 to be applied to their respective brake drums, to hold the winding drums from rotation in an unwinding direction, and the rollers 81 and 83 will be on the raised portions of their respective cams, to cause the friction bands 34 and 39 to be released from their respective planetary casings. When in this position there will be no drive through the planetaries and both winding drums will be held from rotation up to the limit of the preloaded springs 70 and 87*a*, respectively.

When the cam shaft 49 is turned a predetermined amount from a neutral position, the friction band 34 will be engaged with the casing 48, to hold said casing from rotation and to form a drive connection to the right hand winding drum 15, controlled by the friction band 34. At the same time, the roller 63 will be on the depressed portion of the cam 50, as in Figure 1. The friction band 36, however, will be automatically released from the brake drum 35, when said drum rotates in a clockwise or winding direction, due to the difference in length and bell crank action of the lever arms 69 and 66. The roller 83 will, however, be on the high portion of the cam 52, to release the friction band 39 from the planetary 37, and the roller 87 will be on the high portion of the cam 53, to cause the friction band 41 to be released from the braked rum 40 and to permit rotation of said drum in a counterclockwise or unwinding direction under a slight frictional resistance caused by the drag of said friction band on said brake drum imparted by the spring 85.

When the cam shaft 49 is rotated a predetermined distance in an opposite direction from that just described, which is herein shown as being approximately 180 degrees, the roller 81 will be on the raised portion of the cam 51, to release the friction band 34 from the casing 48, as shown in Figure 4, and the roller 83 will be on the reduced portion of the cam 52, to permit the friction band 39 to hold the casing of the planetary 37 from rotation. This will drive the left hand winding drum 15. At the same time, the roller 87 will be on the depressed portion of the cam 53, to cause said brake drum and the associated winding drum 15 to be positively held from rotation in an unwinding direction, but to permit said winding drum to be driven in a winding direction. The roller 63 will be on the raised portion of the cam 50, to cause the friction band 36 to be released from the brake drum 35, and to

permit said drum to rotate in a clockwise direction under sufficient frictional resistance, to prevent the free unwinding of cable from the right hand winding drum 15. It is thus obvious that either drum may be separately driven in a winding direction, by simply reversing the direction of rotation of the motor 11.

The control for the cam shaft 49 and the cams 50, 51, 52 and 53 and the drive to said shaft is so arranged that rotation of said shaft will be stopped when said cams are positioned to cause driving of either one or the other of the winding drums 15, depending upon the direction of rotation of said shaft, and the sprocket 56 and driving member 57 will continue to rotate when rotation of said shaft is stopped. Continued rotation of said sprocket and drive member after rotation of said shaft has been stopped, also tends to hold the cams 50, 51, 52 and 53 in the proper position for operating their respective friction bands. Said control and stopping means will be more fully explained as this specification proceeds.

The drive to said cam shaft is illustrated in particular in Figure 3 and includes an annular friction disk 91 mounted on a flange 92 of a driven member 93 of the clutch 58 and adapted to have engagement with the driving member 57. A compression spring 95 is provided to engage said friction disk with said driving member. Said spring is housed within and engages a seat formed in the inner end of an inwardly extending cylindrical portion 96 of said driven member. Said spring is held in compression by means of a retaining member 97, abutted by a pair of oppositely disposed rollers 98, 98, mounted on an engaging member 99 by means of threaded pins 100, 100 (see Figures 3, 7 and 8). Said pins are threaded within said engaging member and extend therethrough and their inner ends have engagement with slots or keyways 101, 101, formed in the sleeve 60, to hold said engaging member from rotation. A nut 102 is provided to hold said engaging member in position on said sleeve.

The retaining member 97 has oppositely disposed machine screws 103, 103 threaded therein, the heads of which slidably engage keyways 104, 104 formed within the inner periphery of the cylindrical portion 96 of the driven member 93. Said retaining member has a pair of oppositely disposed recessed portions 105, 105 formed therein and herein shown as being of a substantially V-shaped formation, with a flattened bottom. Said recessed portions are adapted to be engaged by the rollers 98, 98, and are so arranged that they will receive said rollers whenever either of the cams 51 or 52 are positioned to permit either of the friction bands 34 or 39 to be engaged with its respective planetary, to relieve the pressure with which the spring 95 engages the annular friction disk 91 with the driving member 57, and to permit slipping of said driving member with respect to said friction disk, but to exert a rotative force on said driven member and cam shaft. Said rotative force is only great enough to hold said cam shaft in position, thus relieving unnecessary drag on said clutch and the motor. Said shaft is driven from the driven member 93 by means of a member 106, secured to a reduced flattened outer end of said shaft by means of a nut 107. Said member has oppositely disposed machine screws 108, 108 threaded thereon, the heads of which are adapted to engage the keyways 104, 104.

Referring now to the novel means for controlling movement of the cams 50, 51, 52 and 53, a hand lever 109 is keyed on the end of the shaft 49, opposite from the friction clutch 58 (see Figure 3). Said hand lever is provided with a hand grip 110 having a spring pressed plunger 111 mounted thereon. Said plunger is adapted to register for engagement with an aperture 113 formed in a stationary centering frame 90, or an aperture 115 formed in an arm 116. When said plunger is engaged with the aperture 113, said cams are positively held from rotation and are so positioned that all of the friction bands 36, 34, 39 and 41 will be released from their respective drums, and when said plunger is engaged with the aperture 115 said cams may be rotatably moved to their several operative positions through the friction disk clutch 58. Said arm extends from a disk 117, freely mounted on the shaft 49.

The disk 117 is provided with an inwardly extending jaw 120 adapted to engage either end of a jaw 121 formed on the outer end of a sleeve 122, mounted on the cam shaft 49, for free rotation with respect thereto (see Figures 3 and 9). When the jaw 120 is rotatably moving in one direction and engages one end of the jaw 121, it will rotatably move said jaw until said jaw 120 engages a jaw 123 which will stop further rotation of said jaw 120. Said jaw 123 is herein shown as being formed integral with a sleeve 124, mounted on said sleeve 122, for free rotation with respect thereto. When said jaw 120 is rotatably driven in an opposite direction, it will engage the opposite end of the jaw 123 and will rotatably move said jaw and the sleeve 124 until it engages the opposite end of the jaw 121, which will stop further rotation of said jaw 120.

A flange 125 is herein shown as being formed integral with the end of the sleeve 122 opposite from the jaw 121. A stop 130 projects outwardly from the periphery of said flange and is adapted to abut one side of a stop 89, projecting from the centering member 90 towards the clutch 58. Said flange is abutted by the end of an annular portion 126 of a flange 124*a*, formed integral with the inner end of the sleeve 124. A stop 131 projects outwardly from the outer periphery of the annular portion 126 and is adapted to abut the side of the stop 89 opposite from the side thereof which is abutted by the stop 130. The flange 125, annular portion 126, and flange 124*a* form an enclosure for a spiral spring 127 connected between said flanges in such a manner as to cause rotation of either one or the other of said sleeves and their associated stops in a direction towards said stop 89 when one or the other of said stops has been moved away from said stop 89 and power has been relieved from the shaft 49. The purpose of this spring is to return the cams 50, 51, 52 and 53 to a neutral position, and to pivotally move the retaining member 97 a distance sufficient to cause the rollers 98, 98 to ride out of the recessed portions 105, 105 onto the face of the retaining member 97 and compress the spring 95 to form a positive drive for the cam shaft 49, through the driving member 57 and friction disk 91. Said spring 127 is secured at its inner end to a lug 128, formed integral with the flange 125, and is connected at its outer end to a lug 129, formed integral with the flange 124*a* (see Figure 3).

When the hand lever 109 is locked in the off position shown in Figure 3, or when said hand lever is locked to the arm 116 by the plunger 111

and power is turned off of the motor 11, the stops 130 and 131 will be in engagement with opposite sides of the stop 89. When said hand lever is in this last named position, it may rotatably drive said arm and the disk 117, upon pivotal movement of the cam shaft 49. Movement of said hand lever, however, from the aperture 113 to the aperture 115 will rotatably move the cam shaft 49, 180 degrees and position the cams 50, 51, 52 and 53 in a neutral position, so that both friction bands will be released from their respective planetaries and both brake bands will engage their respective brake drums.

Assuming said hand lever is moved in alignment with the arm 116 and the plunger 111 is in engagement with the aperture 115, rotation of the shaft 49 in one direction will engage the jaw 120 with the jaw 121, and rotatably move said jaw and the sleeve 122 until the jaw 120 engages the jaw 123 (see Figure 9). This will stop movement of the cam shaft 49. During such movement of the sleeve 122, the stop 130 will move away from the stop 89. Since the stop 131 is in engagement with the stop 89, this movement of the stop 130 will wind the spring 127, and the frictional resistance caused by slippage between the driving member 57 and friction disk 91 will maintain said spring in a wound condition. When the arm 116 has been rotated to a position where the jaw 120 engages the jaw 123, the friction band 34 will be engaged with the casing for the planetary 33, to hold said casing from rotation and to form a drive connection to the right hand winding drum 15 controlled by the friction band 34. The cam 50 will be positioned to cause the friction band 36 to be applied to the brake drum 35 to hold said right hand winding drum from rotation in an unwinding direction, but to permit said drum to rotate in a winding direction. The cams 52 and 53 will be in position to release the friction band 39 from the planetary 37 and the friction band 41 from the brake drum 40, to permit cable to pay off of the left hand winding drum 15 under a slight frictional resistance, as has hereinbefore been described. The instant power is relieved from said driving member, however, said spring will tend to move the stop 130 in a direction to engage the stop 89 and return the cams 50, 51, 52 and 53 to a neutral position so both friction bands will be released from their respective planetaries and both brake bands will be applied to their respective friction drums, to hold the associated winding drums from rotation in an unwinding direction.

When the jaw 121 has moved to a position where the jaw 120 engages the jaw 123 and is stopped by said last mentioned jaw, the retaining member 97 will have been rotated by the driven member 93 a distance sufficient to cause the rollers 98, 98 to ride in the recessed portions 105, 105 of said retaining member 97. This will relieve the force with which the spring 95 engages the disk 91 with the driving member 97.

When the direction of rotation of the motor 11 is reversed, the spring 127 will move the stop 130 until it engages the stop 89. The jaw 120 will then engage the jaw 123 and rotatably move the sleeve 124 and stop 131 in a direction away from the stop 89, and wind up the spiral spring 127 until the jaw 120 engages and is stopped by the jaw 121. This will rotatably move the retaining member 97 a distance sufficient to cause the rollers 98, 98 to ride into the recessed portions 105, 105 of the retaining member 97 as has before been described. It will also pivot the cams 50, 51, 52 and 53 an amount sufficient to cause the friction band 39 to engage its respective planetary and hold the casing thereof from rotation, and cause the friction band 34 to be released from its planetary. The left hand winding drum may thus be positively driven by the motor 11 in a winding direction which is reverse to the direction the right hand winding drum is driven, and the right hand winding drum may freely rotate on its supporting shaft. At the same time, the cam 50 will be positioned to disengage the friction band 36 from the brake drum 35, and the cam 53 will be in a position to cause the friction band 41 to hold the left hand winding drum from rotation in an unwinding direction. The instant power is turned off of the motor 11, the spring 127 will return the stop 131 to a position in engagement with the stop 89. This will move the cams 50, 51, 52 and 53 to the neutral position before mentioned, and will release power from both winding drums and apply the friction bands 36 and 41 to each brake drum, to positively hold said brake drums from rotation.

It should here be noted that when one winding drum 15 is being driven and the direction of rotation of the motor 11 is reversed to drive the other winding drum, that the sprocket 54 and shaft 49 will be rotated a distance sufficient to properly position the cams 50, 51, 52 and 53 to drive either of said winding drums, before the jaw 30 will engage the dog 31, to rotatably drive the shaft 26.

It may be seen from the foregoing that a novel and simplified form of drive and controlling connection has been provided from the motor 11 to the winding drums 15, 15, so arranged that either drum may be driven by merely reversing the direction of rotation of said motor, and that when said motor stops each drum will be held from rotation. It may further be seen that when one drum is driven in a winding direction, the other drum may pay off cable under frictional resistance. It may still further be seen that such a draft device is particularly adapted to move a pick-up member on the end of a shaker conveyer of the type disclosed in a companion application Serial No. 371,553, filed December 24, 1940, across a coal face in opposite directions to pick up material therefrom, one feed cable being attached to each side of the loading device, and to hold said pick-up member from lateral movement when desired, as in cases where the device is working across a laterally pitching seam and it is desired to hold the pick-up member in position during the gathering operation.

While I have herein shown and described one form in which my invention may be embodied, it will be understood that the construction thereof and the arrangement of the various parts may be altered without departing from the spirit and scope thereof. Furthermore, I do not wish to be construed as limiting my invention to the specific embodiment illustrated, excepting as it may be limited in the appended claims.

I claim as my invention:

1. In a draft device of the class described, a pair of winding drums one of which is adapted to pay out cable at substantially the same rate cable is wound in by the other winding drum, a reversible motor, drive connections from said motor to each of said winding drums, controlling connections for said drive connections, and drive

connections from said motor to said controlling connections operative to position said controlling connections to cause one of said first mentioned drive connections to drive one of said winding drums in a winding direction and permit the other to pay off cable, when said motor rotates in one direction, and to position said controlling connections to cause said other drive connection to drive the other of said winding drums in a winding direction and permit the first mentioned winding drum to pay off cable, when said motor rotates in an opposite direction.

2. In a draft device of the class described, a pair of winding drums one of which is adapted to pay out cable at substantially the same rate cable is wound in by the other winding drum, a reversible motor, drive connections from said motor to each of said winding drums, means for holding said winding drums from rotation in an unwinding direction, and controlling connections for said drive connections and holding means, said controlling connections being driven by said motor and being operative to cause one of said drive connections to drive one of said drums in a winding direction and permit the other to pay off under the resistance of friction when said motor rotates in one direction and to cause the other drive connection to drive the other of said winding drums in a winding direction and permit the first mentioned winding drum to pay off cable under the resistance of friction when said motor rotates in an opposite direction.

3. In a draft device of the class described, a pair of winding drums one of which is adapted to pay out cable at substantially the same rate cable is wound in by the other winding drum, a reversible motor, drive connections from said motor to each of said winding drums, means for holding said winding drums from rotation in an unwinding direction, and controlling connections for said drive connections and holding means, said controlling connections being driven by said motor and being operative to cause one of said drive connections to drive one of said drums in a winding direction and permit the other to pay off under the resistance of friction when said motor rotates in one direction and to cause the other drive connection to drive the other of said winding drums in a winding direction and permit the first mentioned winding drum to pay off cable under the resistance of friction when said motor rotates in an opposite direction, and said holding means being automatically operable to hold both of said winding drums from rotation upon stopping of said motor.

4. In a draft device of the class described, a pair of winding drums, a reversible motor, drive connections from said motor to each of said winding drums, a friction band associated with each of said drums, for holding said winding drums from rotation in an unwinding direction, another friction band associated with each of said drums, for controlling said drive connections, and controlling connections for said friction bands, controlled by the direction of rotation of said motor and operative to cause one of said drive connections to drive one of said winding drums in a winding direction and permit the other to pay off cable when said motor rotates in one direction and to cause said other drive connection to drive the other of said drums in a winding direction and permit the first mentioned drum to pay off cable when said motor rotates in an opposite direction, and said controlling connections for said friction bands being automatically operable to hold both of said winding drums from rotation upon stopping of said motor.

5. In a draft device of the class described, a pair of winding drums, a reversible motor, drive connections from said motor to each of said winding drums, a friction band associated with each of said drums, for holding said winding drums from rotation in an unwinding direction, another friction band associated with each of said drums, for controlling said drive connections, and controlling connections for said friction bands operative to cause one of said drive connections to drive one of said winding drums in a winding direction and permit the other to pay off cable when said motor rotates in one direction and to cause said other drive connection to drive the other of said drums in a winding direction and permit the first mentioned drum to pay off cable when said motor rotates in an opposite direction, and said controlling connections for said friction bands being automatically operable to hold both of said winding drums from rotation upon stopping of said motor and including a cam shaft driven by said motor and cams on said shaft arranged to control operation of said friction bands.

6. In a draft device of the class described, a pair of winding drums, a reversible motor, drive connections from said motor to each of said winding drums, a friction band associated with each of said drums, for holding said winding drums from rotation in an unwinding direction, another friction band associated with each of said drums, for controlling said drive connections, and controlling connections for said friction bands operative to cause one of said drive connections to drive one of said winding drums in a winding direction and permit the other to pay off cable when said motor rotates in one direction and to cause said other drive connection to drive the other of said drums in a winding direction and permit the first mentioned drum to pay off cable when said motor rotates in an opposite direction, and said controlling connections for said friction bands being automatically operable to hold both of said winding drums from rotation upon stopping of said motor and including a cam shaft driven by said motor and cams on said shaft arranged to control operation of said friction bands, and means for returning said cams and shaft to a position to cause said holding means to be applied to hold said drums from rotation, upon stopping of said motor.

7. In a draft device of the class described, a pair of winding drums, a reversible motor, drive connections from said motor to each of said winding drums, a friction band associated with each of said drums, for holding said winding drums from rotation in an unwinding direction, another friction band associated with each of said drums, for controlling said drive connections, and controlling connections for said friction bands operative to cause one of said drive connections to drive one of said winding drums in a winding direction and permit the other to pay off cable when said motor rotates in one direction and to cause said other drive connection to drive the other of said drums in a winding direction and permit the first mentioned drum to pay off cable when said motor rotates in an opposite direction, and said controlling connections for said friction bands being automatically operable to hold both of said winding drums from rotation upon stopping of said motor and including a cam shaft driven by said motor and

cams on said shaft arranged to control operation of said friction bands, and means for returning said cams and shaft to a position to cause said holding means to be applied to hold said drums from rotation, upon stopping of said motor, said means including a spring adapted to be wound by said motor, to store up energy therein, upon movement of said cams to a position to cause either of said winding drums to be driven by said motor, and adapted to rotatably move said cams in an opposite direction upon stopping of said motor.

8. In a draft device, a pair of winding drums, a motor, and a drive connection from said motor operative to drive one of said winding drums in a winding direction and to permit the other to pay off cable when said motor rotates in one direction and to drive the other of said drums in a winding direction and permit the first mentioned drum to pay off cable when said motor rotates in an opposite direction including a separate epicyclic gear train for each of said winding drums, each of said gear trains including a reaction member, means for holding said reaction members from rotation, means driven by said motor for applying said holding means to one reaction member and releasing said holding means from said other reaction member, when said motor is running in one direction and for releasing said holding means from said first reaction member and applying said holding means to said second reaction member, when said motor is running in an opposite direction.

9. In a draft device, a pair of winding drums, a motor, and a drive connection from said motor for driving one of said winding drums in a winding direction and permitting the other to pay off cable under frictional resistance, by causing said motor to rotate in one direction and for driving the other of said drums in a winding direction and permitting the first mentioned drum to pay off cable under frictional resistance by reversing the direction of rotation of said motor including a separate epicyclic gear train associated with each of said winding drums, each of said epicyclic gear trains having a reaction member, friction means for holding said reaction members from rotation to cause said epicyclic gear trains to positively drive their respective drums, brake means for each of said winding drums, and means driven by said motor for applying one of said friction means to one of said reaction members, and releasing the other friction means from the other reaction member when said motor rotates in one direction and for applying said other friction means to said other reaction member and releasing said first mentioned friction means from said first reaction member when the direction of rotation of said motor is reversed.

10. In a draft device, a pair of winding drums, one of which is adapted to wind in cable and the other of which is adapted to pay off cable at the same rate cable is wound in by the other drum, a motor, and a drive connection from said motor for driving one of said winding drums in a winding direction and permitting the other drum to pay off cable by causing said motor to rotate in one direction and for driving the other of said drums in a winding direction and permitting the first mentioned drum to pay off cable by causing said motor to rotate in an opposite direction including a separate epicyclic gear train associated with each of said winding drums, for driving said drums, each of said epicyclic gear trains including a reaction member and friction means for holding said reaction member from rotation, brake means for each of said drums, and means driven by said motor for applying one of said friction means and releasing the other when said motor rotates in one direction and for applying said other friction means and releasing said first mentioned friction means by changing the direction of rotation of said motor, said means being automatically operable to apply both of said brake means and release both of said friction means from their respective reaction members as soon as rotation of said motor is stopped.

11. In a draft device, a reversible motor, a pair of winding drums, either one of which may wind in cable and either of the other of which may pay off cable at the same rate cable is wound in by the other drum, one of said drums being adapted to be driven by said motor in a winding direction when said motor is rotating in one direction and the other of said drums being adapted to be driven by said motor in a winding direction when said motor is rotating in an opposite direction, and a drive connection from said motor to said winding drums including a separate planetary drive connection for each of said winding drums, each of said drive connections including a reaction member, a common member driven by said motor, for driving said planetaries, and control means driven by said motor and adapted to hold one of said reaction members from rotation to cause one of said drums to be driven by said motor in a winding direction, when said motor is rotating in one direction and to hold said other reaction member from rotation, to cause the other of said drums to be driven by said motor in a winding direction, when said motor is rotating in an opposite direction.

12. In a draft device, a reversible motor, a pair of winding drums having flexible cables wound thereon and each being adapted to wind in their respective cables by rotation in a reverse direction, a separate planetary geared reduction device having driving connection with each of said winding drums, each of said planetaries including a reaction member and means for holding said reaction member from rotation, a drive connection from said motor to said planetaries including a drive shaft, and a drive connection from said motor for releasing said holding means from one reaction member upon rotation of said motor in one direction and for releasing said holding means from said other reaction member upon the reversal of rotation of said motor including a cam shaft rotatably driven by said motor, and cams on said shaft having operative connection with said holding means, for controlling operation thereof.

13. In a draft device, a reversible motor, a pair of winding drums having flexible cables wound thereon and each being adapted to wind in their respective cables by rotation in a reverse direction, a separate planetary geared reduction device having driving connection with each of said winding drums, each of said planetaries including a reaction member and means for holding said reaction member from rotation, a drive connection from said motor to said planetaries including a drive shaft, and a drive connection from said motor for releasing said holding means from one reaction member upon rotation of said motor in one direction and for releasing said holding means from said other reaction member

upon the reversal of rotation of said motor including a cam shaft rotatably driven by said motor, cams on said shaft having operative connection with said holding means for controlling operation thereof, and other means having connection with said cam shaft, for turning said cams to a position to release both of said holding means when rotation of said motor is stopped.

14. In a draft device, a reversible motor, a pair of winding drums having flexible cables wound thereon and each being adapted to wind in their respective cables by rotation in a reverse direction, a separate planetary geared reduction device having driving connection with each of said winding drums, each of said planetaries including a reaction member and means for holding said reaction member from rotation, a drive connection from said motor to said planetaries including a shaft, brake means for holding each of said winding drums from rotation, control means driven by said motor, for applying said holding means to one reaction member upon rotation of said motor in one direction and releasing said holding means from said other reaction member upon rotation of said motor in another direction, and other means for releasing both of said holding means and applying both of said braking means when rotation of said motor is stopped.

15. In a draft device, a reversible motor, a pair of winding drums having flexible cables wound thereon and each being adapted to wind in their respective cables by rotation in a reverse direction, a separate planetary geared reduction device having driving connection with each of said winding drums, each of said planetaries including a reaction member and means for holding said reaction member from rotation, a drive connection from said motor to said planetaries including a shaft, brake means for holding each of said drums from rotation, control means driven by said motor, for causing said holding means for one planetary to be applied to one reaction member upon rotation of said motor in one direction and causing said holding means for said other planetary to be released from said other reaction member, upon rotation of said motor in another direction including a cam shaft rotatably driven by said motor, cams on said shaft for controlling operation of said holding and brake means, and means for stopping rotation of said cam shaft when said cams are positioned to cause either of said winding drums to be driven in a winding direction.

16. In a draft device, a reversible motor, a pair of winding drums having flexible cables wound thereon and each being adapted to wind in their respective cables by rotation in a reverse direction, a separate planetary geared reduction device having driving connection with each of said winding drums, each of said planetaries including a reaction member and means for holding said reaction member from rotation, a drive connection from said motor to said planetaries including a shaft, brake means for holding each of said drums from rotation, control means driven by said motor, for causing said holding means for one planetary to be applied to one reaction member upon rotation of said motor in one direction and causing said holding means for said other planetary to be released from said other reaction member upon rotation of said motor in another direction including a cam shaft rotatably driven by said motor, cams on said shaft for controlling operation of said holding and brake means, means for stopping rotation of said cam shaft when said cams are positioned to cause either of said winding drums to be driven in a winding direction, and said drive connection from said motor to said cam shaft being adapted to permit continued rotation of said motor upon stopping rotation of said cam shaft and to hold said cams in position against said stopping means due to continued rotation of said motor.

17. In a draft device, a reversible motor, a pair of winding drums having flexible cables wound thereon and each being adapted to wind in their respective cables by rotation in a reverse direction, a separate planetary geared reduction device having driving connection with each of said winding drums, each of said planetaries including a reaction member and means for holding said reaction member from rotation, a drive connection from said motor to said planetaries including a shaft, brake means for holding each of said drums from rotation, control means driven by said motor, for causing said holding means for one planetary to be applied to one reaction member upon rotation of said motor in one direction and causing said holding means for said other planetary to be released from said other reaction member upon rotation of said motor in another direction including a cam shaft rotatably driven by said motor, cams on said shaft for controlling operation of said holding and brake means, means for stopping rotation of said cam shaft when said cams are positioned to cause either of said winding drums to be driven in a winding direction, and said drive connection from said motor to said cam shaft being adapted to permit continued rotation of said motor upon stopping rotation of said cam shaft and to hold said cams in position against said stopping means due to continued rotation of said motor, and means for rotating said cam shaft, to a position to cause release of said holding means from said reacion members and the application of said brake means to hold said winding drums from rotation upon the stopping of rotation of said motor including a spring adapted to be wound by said shaft when said shaft is rotatably driven by said motor in either direction, to position said cams in an operative position, to store up energy therein, and adapted to rotatably drive said shaft in a direction opposite to which it has been driven by said motor, upon stopping of said motor.

18. In a draft device, a reversible motor, a pair of winding drums having flexible cables wound thereon and each being adapted to wind in their respective cables by rotation in a reverse direction, a separate reduction device having driving connection with each of said winding drums, each of said reduction devices including a reaction member and means for holding said reaction member from rotation, a drive connection from said motor to said reduction devices including a common drive shaft, brake means for holding each of said drums from rotation, and control means driven by said motor for applying said holding means to one reaction member upon rotation of said motor in one direction and releasing said holding means from said other reaction member upon rotation of said motor in a reverse direction including a cam shaft having cams thereon, for controlling operation of said holding and brake means, and a fraction slip drive connection from said motor to said cam shaft, adapted to slip when said cams are positioned to cause either of said winding drums to be driven in a winding direction and

to hold said cams in such a position by rotation of said motor.

19. In a draft device, a reversible motor, a pair of winding drums having flexible cables wound thereon and each being adapted to wind in their respective cables by rotation in a reverse direction, a separate reduction device having driving connection with each of said winding drums, each of said reduction devices including a reaction member and means for holding said reaction member from rotation, a drive connection from said motor to said reduction devices, brake means for holding each of said winding drums from rotation, and control means driven by said motor for applying said holding means to one reaction member upon rotation of said motor in one direction and releasing said holding means from said other reaction member upon rotation of said motor in another direction including a plurality of cams, for controlling operation of said holding and brake means, and a friction slip drive connection from said motor to said cams, adapted to slip when said cams are positioned to cause either of said winding drums to be driven in a winding direction and to hold said cams in such a position by rotation of said motor, said friction slip drive connection including a driving member, a driven member, yieldable means for holding said members in driving engagement with each other, and means for relieving the pressure with which said yieldable means engages said driven member with said driving member, upon a predetermined amount of rotation of said shaft.

20. In a draft device, a reversible motor, a pair of winding drums having flexible cables wound thereon and each being adapted to wind in their respective cables by rotation in a reverse direction, a separate reduction device having driving connection with each of said winding drums, each of said reduction devices including a reaction member and means for holding said reaction member from rotation, a drive connection from said motor to said reduction devices, brake means for holding each of said winding drums from rotation, and control means driven by said motor for applying said holding means to one reaction member upon rotation of said motor in one direction and releasing said holding means from said other reaction member upon rotation of said motor in another direction including a plurality of cams, for controlling operation of said holding and brake means, and a friction slip drive connection from said motor to said cams, adapted to slip when said cams are positioned to cause either of said winding drums to be driven in a winding direction and to hold said cams in such a position by rotation of said motor, said friction slip drive connection including a driving member, a driven member, yieldable means for holding said members in driving engagement with each other, and means for relieving the pressure with which said yieldable means engages said driven member with said driving member, upon a predetermined amount of rotation of said shaft, and other means for increasing the pressure with which said yieldable means engages said driving member with said driven member upon the stopping of rotation of said motor.

21. In a draft device, a reversible motor, a pair of winding drums having flexible cables wound thereon and each being adapted to wind in their respective cables by rotation in a reverse direction, a separate reduction device having driving connection with each of said winding drums, each of said reduction devices including a reaction member and means for holding said reaction member from rotation, a drive connection from said motor to said reduction devices, brake means for holding each of said winding drums from rotation, and control means driven by said motor for applying said holding means to one reaction member upon rotation of said motor in one direction and releasing said holding means from said other reaction member upon rotation of said motor in another direction including a plurality of cams, for controlling operation of said holding and brake means, and a friction slip drive connection from said motor to said cams, adapted to slip when said cams are positioned to cause either of said winding drums to be driven in a winding direction and to hold said cams in such a position by rotation of said motor, said friction slip drive connection including a driving member, a driven member, yieldable means for holding said members in driving engagement with each other, and means for relieving the pressure with which said yieldable means engages said driven member with said driving member, upon a predetermined amount of rotation of said shaft, and other means for increasing the pressure with which said yieldable means engages said driving member with said driven member upon the stopping of rotation of said motor including a tension member operatively connected with said shaft and adapted to store up energy upon rotation of said shaft when driven by said motor in either direction of rotation thereof, and to rotatably drive said shaft in an opposite direction upon stopping of said motor.

22. In a draft device of the class described, a pair of winding drums, a reversible motor, drive connections from said motor to said winding drums, controlling connections for said drive connections, and drive connections from said motor to said controlling connections, operative to cause said motor to drive one of said winding drums in a winding direction when said motor rotates in one direction and to cause said motor to drive said other winding drum in a winding direction when the direction of rotation of said motor is reversed.

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