

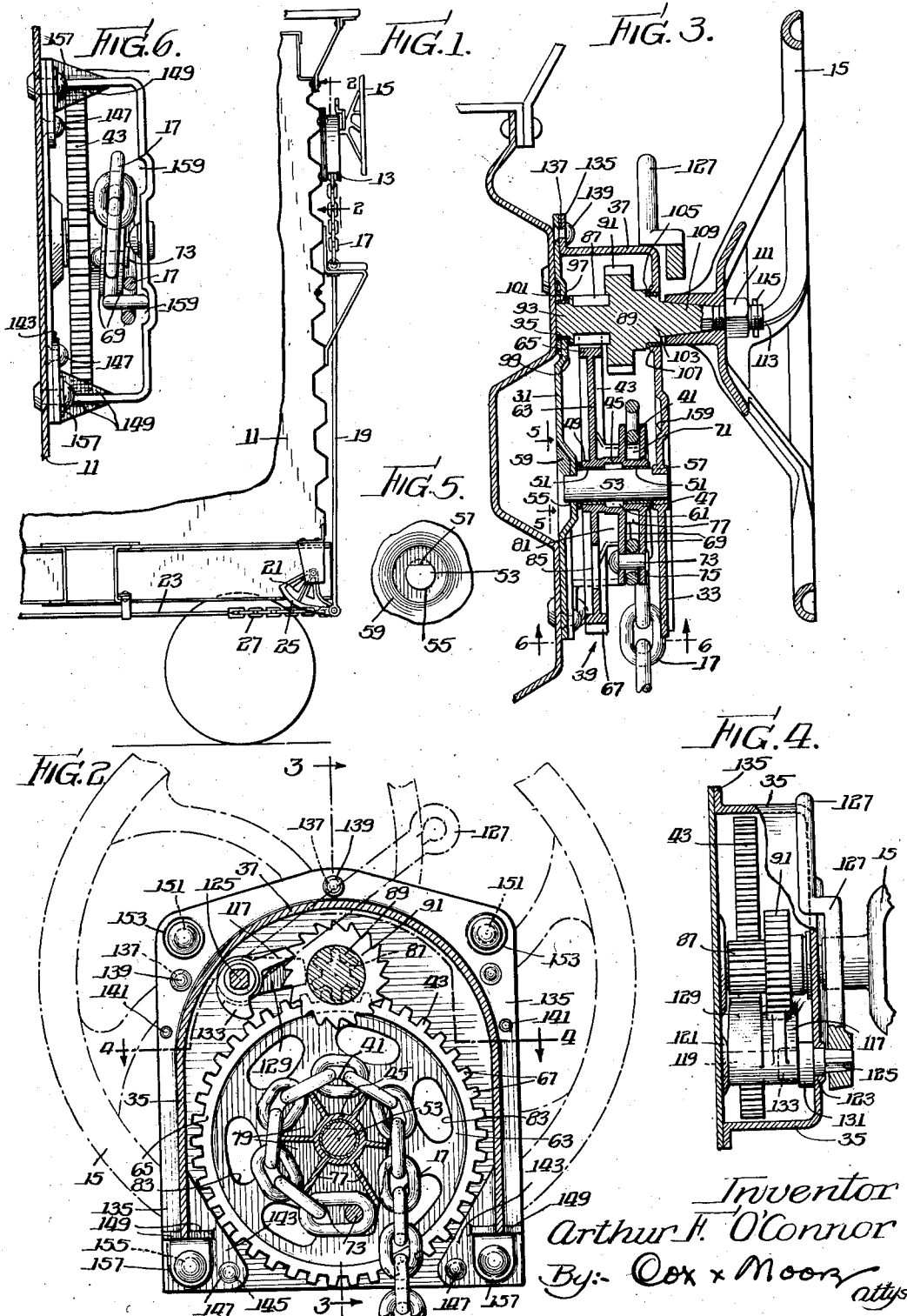
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BRAKE MECHANISM

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BRAKE MECHANISM

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My invention relates in general to brake-operating mechanism and has more particular reference to operating mechanism for railway car hand brakes.

5 An important object of the invention is to provide a winding mechanism, including a casing, of simplified construction facilitating assembly and hence reducing the cost of manufacturing the same.

10 Another important object is to provide a casing of improved design in which to mount a winding drum, drum-driving gear, gear-driving pinion having an associated holding ratchet, a pawl co-operating with the ratchet and a manually operable pawl trip, said casing being formed to journal the drum and drum-driving gear, and to journal the pinion and holding ratchet and having grooved means in a wall thereof to accommodate a tensioning element, in the form of a chain, adapted to be wound on the winding drum, a further object being to provide a casing of simplified form having unusual strength and rigidity to perform its housing and element-supporting function in the finished device, said casing having improved means to support the pinion and the shafts on which the winding drum and the holding pawl are carried in the assembly.

Another important object is to provide a casing including a back plate and cover member, the back plate being of a form readily fabricated as a sheet metal stamping and the cover particularly adapted to be formed as a casting having a front wall portion and depending side walls adapted to be secured to the back plate in order to form the casing, wherein the depending side walls are formed with an opening and integral inwardly and outwardly extending flanges for the purpose of strengthening the cover member and facilitating attachment thereof to the back plate.

40 Another important object is to form the front wall of the cover with an outstanding bead encircling a journal formed in the cover to support an element within the casing, said outstanding bead being for the purpose of strengthening the cover and to afford a way for an element movable within the cover.

50 Numerous other objects and advantages of the invention will be apparent from the following description, which, taken in connection with the accompanying drawing, discloses a preferred embodiment of the invention.

Referring to the drawing:

55 Figure 1 is a view in vertical section taken longitudinally through the end of a railway car show-

ing a device embodying my present invention in operating position;

Figure 2 is a view in vertical section taken substantially along the line 2-2 in Figure 1 in order to show the internal construction of the device embodying my present invention;

Figure 3 is a vertical section taken substantially along the line 3-3 in Figure 2;

Figure 4 is a view in horizontal section taken along the line 4-4 in Figure 2 in order to illustrate certain details of the improved casing; and

Figures 5 and 6 are sectional views taken substantially and respectively along the lines 5-5 and 6-6 in Figure 3.

To illustrate my invention, I have shown 15 the drawing a brake-operating mechanism adapted to be mounted in operating position as on the end of a railroad car 11, said mechanism including a housing 13 adapted to be secured to the wall of the car 11, and winding mechanism supported within the housing 13, and adapted to be manually operated as by means of the hand wheel 15 in order to tension a flexible tensioning element, such as a chain 17. The tensioning element 17 is connected to the brake rigging of the car 25 11 in any suitable fashion. In the illustrated embodiment, it is attached to a draw rod 19, which, in turn, is connected to one arm of a tiltable bell crank 21 carried on the frame of the car 11 whereby to transfer the movement of the 30 pull rod 19 to a rod 23, which is connected for operating the brake rigging.

Obviously, any preferred equivalent of the bell crank, power-transferring element may be employed, although it is desirable to use a transfer 35 element of a form adapted to multiply the brake-applying force, which, in the illustrated embodiment, is accomplished by forming the bell crank with a winding surface 25 having a progressive diminishing radius on which a flexible element 27 40 is wound as the brake-applying movement is transferred to the brake rod 23.

The housing 13 may be of any suitable construction and is formed for attachment on the wall of the car 11. The casing comprises a preferably drawn sheet metal backing plate 31 and a cover 33, preferably formed as a casting, comprising a front wall having preferably integral means forming spaced side walls 35 and a preferably curved top wall 37, the free edges of said 50 walls being formed for attachment to the backing plate in any convenient or preferred fashion so that the front of the cover is supported in spaced-apart relationship with respect to the backing plate to form a housing provided with an 55

opening 39 opposite the curved wall portion 37. The winding mechanism is supported within the housing between the backing plate and the front wall of the cover with the tension element 17 extending through the opening 39 in position to connect with the tension rod 19.

The winding mechanism comprises a winding drum 41 and a drum-driving gear 43 preferably formed as an integral element comprising a central bearing 45 having end portions 47 and 49 respectively opposite the drum 41 and gear 43 and adapted to receive bushings 51 spaced at the opposite ends of the bearing 45 whereby to rotatably mount the element on a shaft 53. The opposed ends of the shaft 53 are secured respectively in the back plate 31 and in the front wall of the cover 33, said back plate and front wall having openings 55 of non-circular configuration to receive the correspondingly configured ends of the shaft 53. Said perforations 55 and the ends of the shaft 53 are preferably circular throughout the major portions of their peripheries, the remaining peripheral portions being flattened as at 57 so that the flattened portions face upwardly in the assembly whereby the rounded portions of the perforations 55 may afford upward support upon the ends of the shaft 53 while the shaft is prevented from rotating with respect to the casing walls by the interaction of the flattened portions 57. This arrangement is easy to effect and facilitates the assembly of the shaft and the rotatable element thereon in the casing.

The backing plate 31 also is preferably dished inwardly toward the front wall of the cover 33 where the perforation 55 is formed in order to provide a strengthening embossment 59 in the sheet metal backing plate. The bearing 45 also is preferably formed with an annular integral recess 61 between the end portions 47 and 49 which, if desired, may be loaded with a suitable lubricant, as by filling the space with absorbent material saturated with oil in order to afford lubrication between the bushings 51 and the shaft 53.

The drum-driving gear 43 comprises a web 63 preferably extending in a plane intersecting the axis of the bearing 45 at right angles, the edge of the web 63 being formed with a peripheral rim 65 in which gear teeth 67 are formed. The winding drum comprises spaced web portions 69 formed helically with respect to the axis of the bearing 45 to define a helical winding space 71 between the webs 69 adapted to receive the tensioning element 17, one end of which is attached to an anchor pin 73 extending between the webs 69, which are formed as at 75 to provide support lugs for the anchor pin. Where a chain is used as the tension element 17, the pin 73 is threaded through the end link of the chain as shown in Figure 2 of the drawing, said link lying with its plane extending between the planes of the webs 69.

The winding drum also is formed with webs 77 extending between the webs 69 and lying substantially in planes extending radially of the axis of the bearing 45. These webs 77 extend from the bearings 45 outwardly to points within the peripheral edges of said web 69 for the purpose of strengthening the same and to define pockets 79 for receiving alternate links of the chain, including the end link which is anchored to the pin 73, the remaining links of the chain extend with their planes substantially parallel with the axis of the bearing 45 and lie upon the outer edges of the webs 69, which are flattened to provide link-supporting surfaces extending at progressively

decreasing distances measured vertically from the axis of the bearing 45 throughout the circumference of the winding drum so that when the winding drum is turned in a counterclockwise direction, viewing Figure 2 of the drawing, the chain will be wound upon the winding drum in a direction to draw the rod 19 upwardly, viewing Figure 1, to actuate the brake rigging to set the brakes with progressively increasing force due to the decreasing distance between the chain links and the axis of the bearing 45 as the chain is wound on the winding drum.

The webs 77 are extended as at 81 on one side of the winding drum to the web 63 of the drum-driving gear, said web extensions 81 being integral with the drum and the gear web in order to strengthen the rotatable winding element.

The web 63 also is formed with perforations 83 in order to reduce the weight of the element and save material without sacrificing requisite strength and a perforation 85 is formed in the web 63 in alignment with the anchor pin support opening 75 in order to facilitate the application of the anchor pin 73 between the webs 69 of the winding drum. This pin is preferably riveted in place permanently during the assembly of the mechanism.

The drum-driving gear is drivably associated with a gear-driving pinion 87, which is mounted in the upper portions of the housing 13, that is to say, the pinion 87 is mounted within the curved wall portions 37 of the casing. The pinion 87 is also preferably formed as an integral part of a rotatable element 89, which is journaled for rotation in the back plate 31 and the front wall of the cover 33 and carries an integral ratchet 91 formed thereon.

The element 89 is formed with a bearing portion 93 journaled in a bushing 95 inserted in a perforation 97 formed in the back plate 31 centrally of an embossed portion 99, which is formed in the back plate for the purpose of strengthening the same at this point. The bushing 95 also is secured in place by means of an annular anchoring element 101, which is seated in the embossment 99.

The pinion 87 is preferably formed in the element 89 adjacent the bearing portion 93 in position to register with the toothed periphery of the drum-driving gear 43, the ratchet 91 being arranged on the element 89 substantially opposite the winding drum 41.

The element 89 also is formed with a second bearing portion 103 journaled in a bushing 105, which, in turn, is mounted in a seat 107 formed in the front wall of the casing 33. The element 89 also has a preferably integral tapered shank 109 extending outwardly of the front wall of the casing 33, said shank 109 being preferably squared to receive a correspondingly squared portion of the hand wheel 15, which is held in place on the shank 109 by means of a nut 111 secured on the threaded outer end 113 of the shank 109, the nut being retained in position in any suitable fashion as by means of a cotter pin 115.

The actuating mechanism also includes a pawl 117 co-operatively associated with the ratchet 91, said pawl comprising a fitting rotatably mounted on a shaft 119, which is journaled for rotation at one end in a perforation formed in a dished portion 121 on the backing plate, and which, at its other end, is journaled in and extends through a bearing 123 formed in the front wall of the cover, the shaft 119 has an end 125 projecting outwardly of the front wall casing and formed in a non-

circular fashion preferably square to fit into a correspondingly formed opening at one end of a handle 127, by means of which the shaft 119 may be rotated in the casing. The pawl 117 has a tip in position to engage the periphery of the ratchet 91, and means is provided to normally urge the tip of the pawl into engagement with said ratchet, said means preferably comprising a weighted projection 129, which may be conveniently arranged to swing in the space adjacent the pawl and opposite the pinion so that the pawl is actuated by the gravitational effect upon the weighted portion 129, which is preferably formed integral with the pawl.

In order to raise the pawl from ratchet-engaging position, the shaft 119 carries a collar 131 fixed on the shaft adjacent the pawl, said collar having a pawl-raising finger 133 adapted to underlie the pawl so that as the handle 127 is moved in a counter-clockwise direction, viewing Figure 2, the pawl-actuating finger 133 will engage the underside of the pawl 117 and force it out of engagement with the ratchet against the normal urge of the weighted projection 129. It will be noted, that movement of the pawl 117, under the influence of the finger 133, will be limited by the curved top wall 37 so that the pawl and its projecting weight 129 cannot reach a position in which the weight 129 will urge the pawl in a direction away from ratchet-engaging position. The pawl-actuating finger 133 also is preferably formed so that it engages the pawl before the handle 127 reaches a vertical position.

The cover 33 also is formed in order to improve the strength and rigidity of the casing. To this end, the edges of the side walls 35 and top wall 37 are provided with an outwardly extending flange 135 and this flange and the back plate 31 are provided with registering perforations 137 for receiving rivets 139 whereby the parts may be secured together. Before the application of the rivets, however, the cover and back plate may be aligned by means of dowel pins applied in the corresponding pin openings 141 formed in the back plate and the flange 135. The flange 135 is extended inwardly and downwardly at the lower ends of the side walls 35 opposite the opening 39 as at 143 and said flange extensions 143 are each provided with perforations 145, corresponding registering perforations being formed in the back plate to receive rivets 147 for holding the lower portions of the cover to the backing plate. Inwardly and outwardly extending strengthening webs 149 are also provided between the lower ends of the walls 35 and the flange extensions 143 in order to strengthen the structure. The devices carried in the casing and including the rotatable pinion and ratchet element 89, the pawl and its carrying shaft 119 and the winding drum and gear with its shaft, are assembled in place on the backing plate. The cover is then applied upon the backing plate with the members 89, 119, and 53 seated in the proper openings in the front wall of the cover. The cover and backing plate are aligned by means of the dowel pins placed in the openings 141 and the rivets 139 and 147 are applied. The handle 127 and the brake hand wheel 15 are then applied, thus completing the assembly, it being understood that the chain 17 is anchored on the winding drum before the same is assembled.

In order to provide means for attaching the device in place on the wall of the car, suitable bolt holes 151 are formed through the flange 135 and the backing plate in the top corners of the casing, the flange 135 being provided with suitable bosses 153 for receiving the fastening members

by which the device is mounted in position on the car. Bolt holes 155 are also formed through the backing plate and the flange extensions 143 in the lower portions of the casing in order to anchor the bottom of the casing on the car wall, bosses 157 being formed in said flanged extensions for the purpose of receiving the holding members.

The casing construction described is unusually rigid due at least in part to the arrangement of the flanges 35 and the flange extension 143. The cover 33 is also formed with an outwardly extending shallow U-shaped groove 159 opposite the path traveled by the chain in being wound upon the drum. This groove not only provides ample room to permit the chain to pass into the casing, but also improves the appearance of the cover 33 as well as its strength and rigidity.

It will be noted that the handle 127, unless forcibly shifted, tends to remain in the position illustrated in Figure 2 of the drawing, thus permitting the pawl to normally engage the ratchet under the influence of the weight 129. As the hand wheel 15 is rotated in a clockwise direction, viewing Figure 2, in order to wind the chain 17 on the drum 41, the ratchet 91 will likewise be shifted in a clockwise direction, the pawl 117 seating in successive notches of the ratchet so as to prevent releasing movement when the hand wheel is released and holding the brakes in set position. When it is desired to release the brakes, it is only necessary to raise the handle 127 in order to disengage the pawl from the ratchet whereupon back tension in the brake rigging will rotate the winding drum in a clockwise direction and the pinion and ratchet in a counter-clockwise direction, viewing Figure 2, until the brakes are fully released.

If the handle 127 is released when to the right of a vertical plane through the axis of its pivot, its weight will return it to the position shown in dotted lines. The pawl likewise will return to ratchet-engaging position to automatically condition the apparatus for the brake-tensioning operation. If the handle, when released, is on the left hand side of a vertical plane through its pivot, its weight will urge it to a position pressing the pawl against the curved portion 37 of the casing out of ratchet-engaging position.

The construction is unusually simple and inexpensive to manufacture and the casing has inherent rigidity rendering it particularly well adapted to support the winding mechanism firmly and securely during rough usage to which such apparatus is subjected.

It is thought that the invention and numerous of its attendant advantages will be understood from the fore-going description and it is obvious that numerous changes may be made in the form, construction, and arrangement of the several parts without departing from the spirit or scope of my invention or sacrificing any of its attendant advantages, the form herein described being a preferred embodiment for the purpose of illustrating my invention.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is as follows:

1. A brake-operating mechanism comprising, in combination with a winding member and associated power-multiplying devices for turning the winding member in response to the manipulation of a hand wheel, a housing, enclosing said winding member and associated devices, comprising a back plate and a cover member having a front wall and integral side walls adapted to be se-

cured to said back plate to form a housing, means for securing the upper portions of said cover member to said back plate, and inwardly extending flange means formed on said side walls for securing the lower portions of said cover on said backing plate.

2. A brake-operating mechanism comprising, in combination with a winding member and associated power-multiplying devices for turning the winding member in response to the manipulation of a hand wheel, a housing, enclosing said winding member and associated devices, said housing comprising a back plate and a cover member having a front wall and integral side walls adapted to be secured to said back plate to form a housing, flange means on said side walls for securing the upper portions of said housing to said back plate, and inwardly extending flange means formed on said side walls for securing the lower portions of said cover on said back plate.

3. A brake-operating mechanism comprising, in combination with a winding member and associated power-multiplying devices for turning the winding member in response to the manipulation of a hand wheel, a housing, enclosing said winding member and associated devices, said housing comprising a back plate and a cover member having a front wall and integral side walls adapted to be secured to said back plate to form a housing, means forming a flange extending outwardly of said side walls for securing the upper portions of said housing to said back plate, and inwardly extending flange means formed on said side walls for securing the lower portions of said cover on said back plate.

4. A brake-operating mechanism comprising in combination with a winding member and associated power-multiplying devices including a handwheel for turning the winding member in response to the manipulation of the hand wheel, a housing, in which said winding member and associated devices are enclosed and supported, comprising a back plate and a cover member secured to said back plate to form a housing having a downwardly facing opening, and means to mount the winding member for rotation between said back plate and cover member, said cover member being embossed substantially opposite the periphery of said winding member to strengthen said cover member and provide a passage for the accommodation of a tensioning element carried by said winding member.

5. A brake-operating mechanism comprising a housing having a back plate and a cover member secured together to form a mechanism casing having a downwardly facing opening, a winding member and associated power multiplying devices including a handwheel for turning the winding member in response to the manipulation of the handwheel, said winding member and multiplying devices being mounted on the housing with the winding member disposed between the back plate and the cover member, said front wall being embossed opposite said winding drum to strengthen said wall, said strengthening embossment comprising a groove including a curved portion opposite the periphery of the winding drum and an interconnected straight portion extending substantially tangentially to the curved portion and to an edge of the front wall at said downwardly facing opening of the casing.

6. A brake-operating mechanism comprising means forming a housing having a back plate and cover member secured together in spaced relationship to form a casing having a downward-

ly facing opening, a winding drum and associated power multiplying devices for turning the winding drum in response to the manipulation of a handwheel, said drum and multiplying devices being mounted on the housing with said drum disposed between the back plate and the cover member, said cover member being embossed opposite said winding drum to strengthen said member, a flexible tensioning element carried on said drum and extending through the downwardly facing opening of the housing and the strengthening embossment comprises a groove in the cover member opposite the winding member in position to accommodate the flexible tensioning element.

7. A brake-operating mechanism comprising, in combination with a winding member and associated power-multiplying devices for turning the winding member in response to the manipulation of a hand wheel, a housing, enclosing said winding member and associated devices, comprising a back plate and a cover member having a front wall, integral parallel flat and spaced-apart side walls, and an integral top wall interconnecting said side walls at one end of said casing, said side and top walls extending to said back plate, said side walls terminating at the end of the casing opposite from the top wall to define an opening, said side and top walls having an outwardly extending flange secured to said back plate and said side walls having continuations of said flange extending inwardly of and beyond the terminal ends of said side walls in order to strengthen the cover and afford additional means for securing the cover to said back plate opposite said casing opening.

8. A brake-operating mechanism as set forth in claim 7, wherein said winding member comprises a drum having a hub journaled on a shaft extending between and supported by the back plate and cover, said back plate being bossed inwardly to engage an end of the hub and maintain same against axial movement on the shaft, a flexible tension element extending through the casing element and carried on the periphery of said drum, and said cover having an internal groove, a portion of which follows and is disposed opposite at least a portion of the periphery of the drum, another portion of said groove being opposite the normal track of said tension element from the casing opening to said drum.

9. A brake-operating mechanism comprising, in combination with a winding member and associated power-multiplying devices for turning the winding member in response to the manipulation of a hand wheel, a housing, enclosing said winding member and associated devices, comprising a back plate and a cover member having a front wall and integral side walls adapted to be secured to said back plate to form a housing, means for securing the upper portions of said housing to said back plate, and inwardly extending flange means formed on said side walls for securing the lower portions of said cover on said backing plate.

10. A brake-operating mechanism comprising in combination with a winding member having a helical winding track and associated power-multiplying devices for turning the winding member in response to the manipulation of a hand wheel, a housing, in which said winding member and associated devices are enclosed and supported, comprising a back plate and a cover member having a front wall, means to support said cover member on said back plate with said winding member supported between said front wall and back plate, said cover member being embossed out-

wardly opposite said winding member for the purpose of strengthening the cover.

11. A brake-operating mechanism comprising in combination with a winding member and associated power-multiplying devices for turning the winding member in response to the manipulation of a hand wheel, a housing, enclosing said winding member and associated devices, comprising a back plate and a cover member having a front wall, integral parallel flat and spaced-apart side walls, and an integral top wall inter-connecting

said side walls at one end of said casing, said side and top walls extending to and secured to said back plate, said side walls terminating at the end of the casing opposite from the top wall to define an opening, said side walls having a flange extending inwardly of said side walls in order to strengthen the cover and afford additional means for securing the cover to said back plate opposite said casing opening.

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