May 4, 1943. P. B. CAMP ET AL. 2,318,569

HAND BRAKE

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Fig. 1

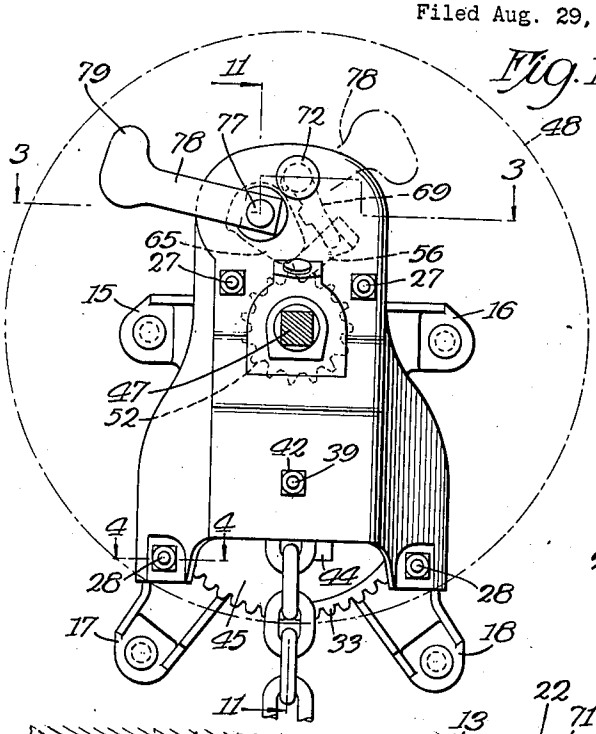
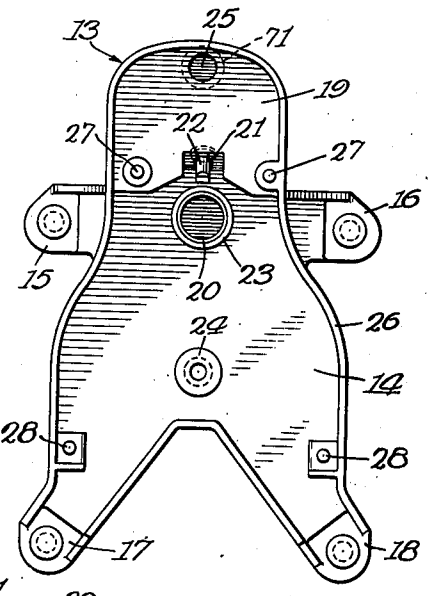


Fig. 2



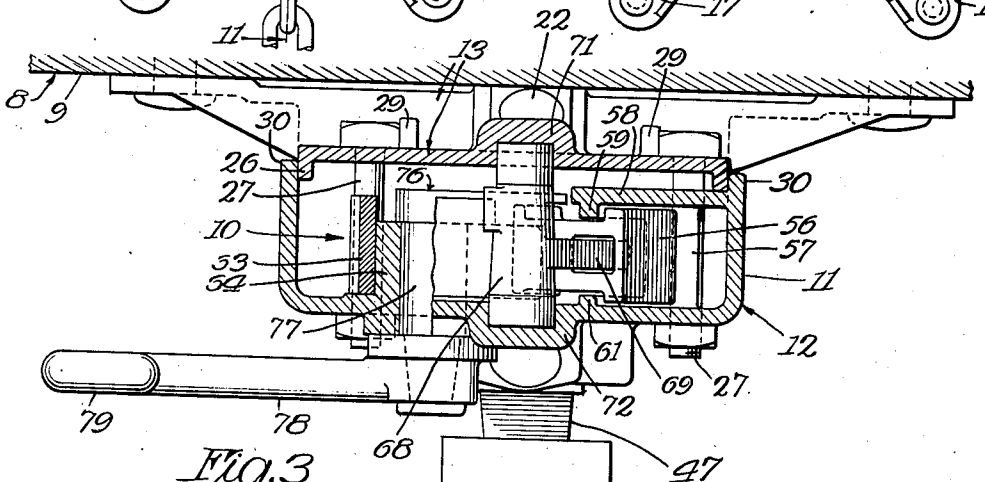
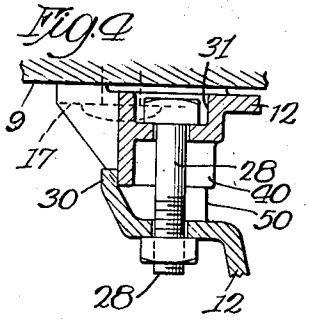
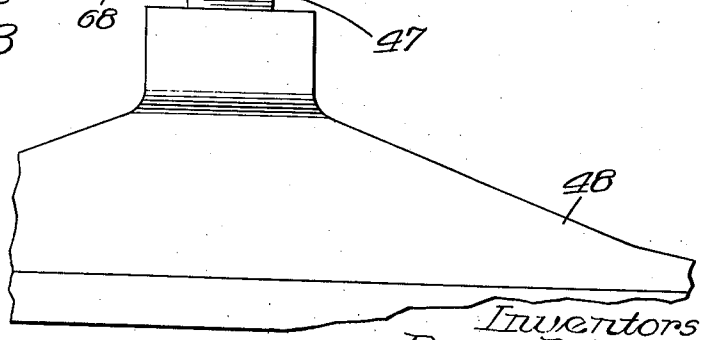


Fig. 3

Fig. 4





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Fig. 5

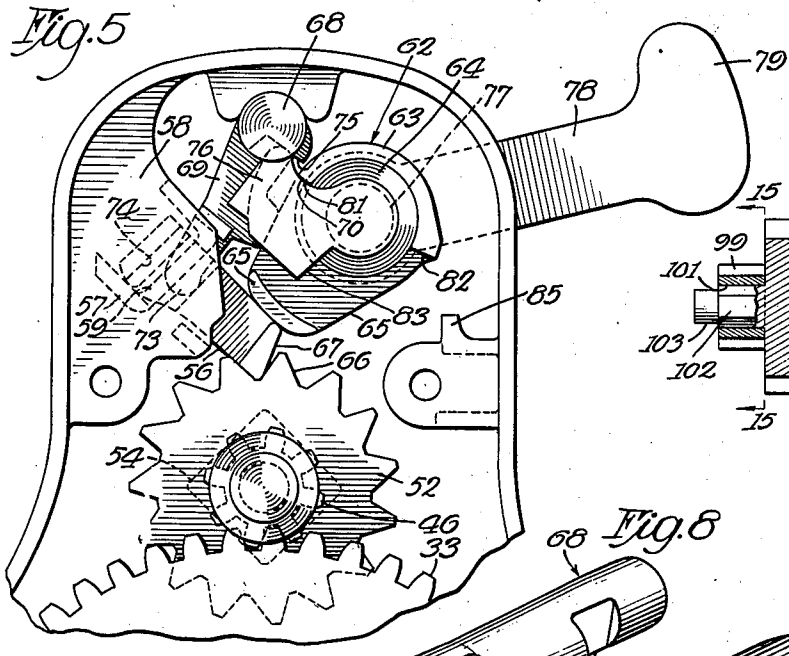


Fig. 14

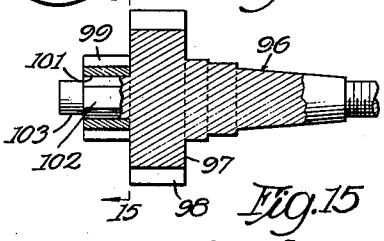


Fig. 15

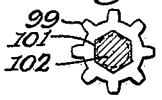


Fig. 8

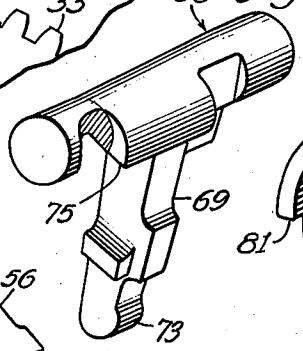


Fig. 9

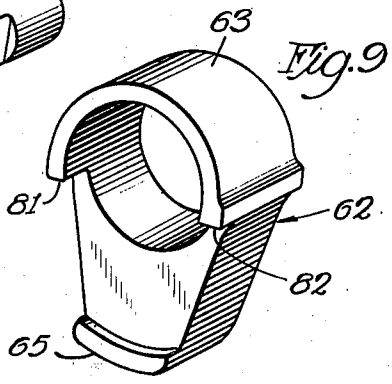


Fig. 7

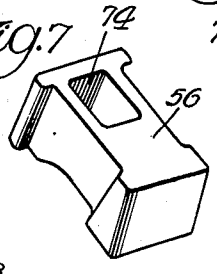


Fig. 6

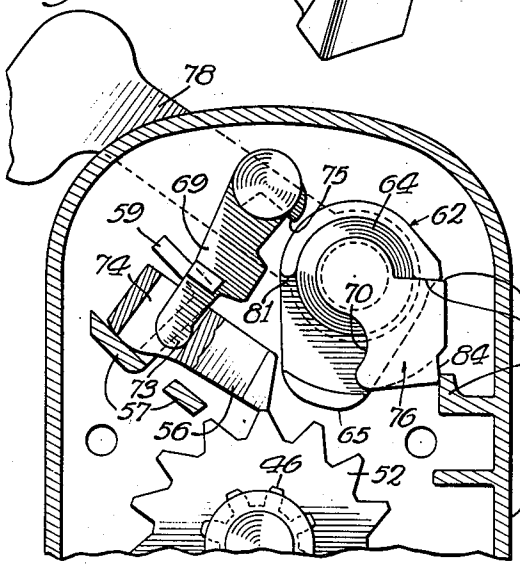
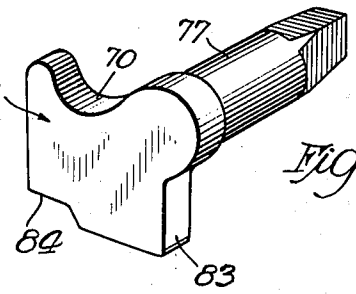


Fig. 10



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Fig. 11

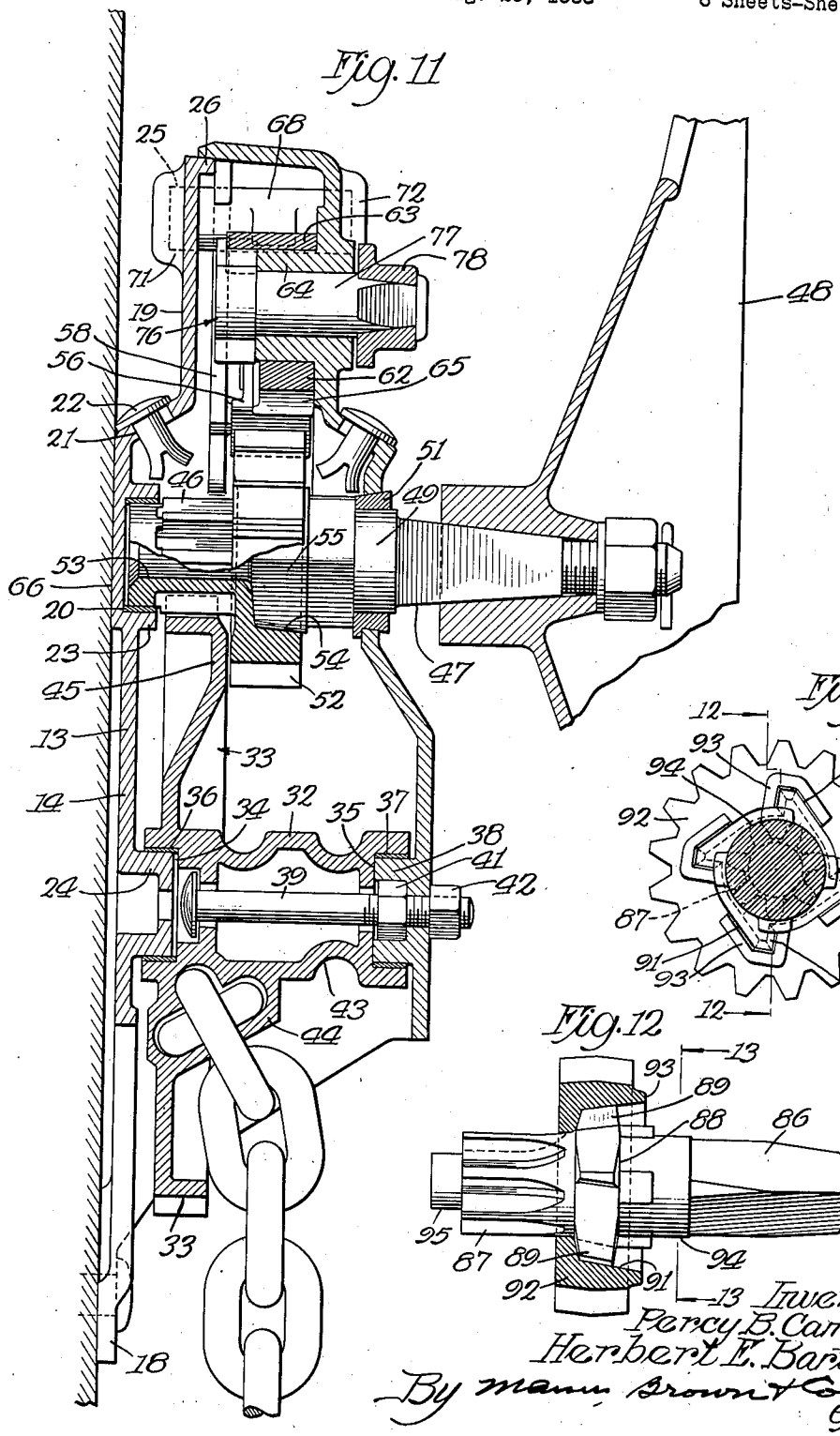


Fig. 13

Fig. 12

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Fig. 16

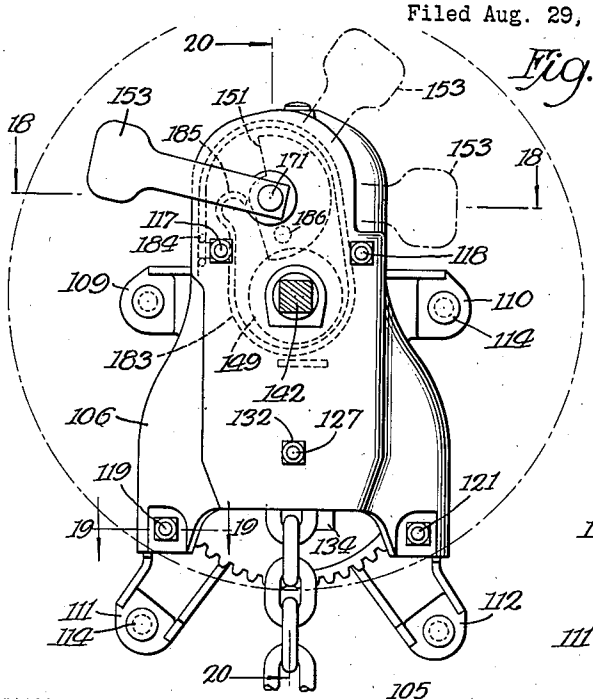
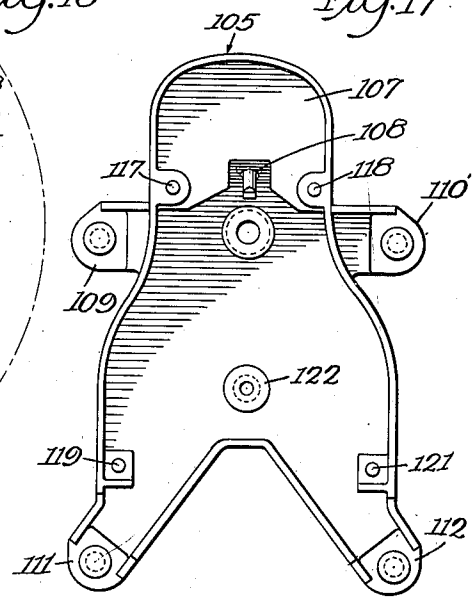


Fig. 17



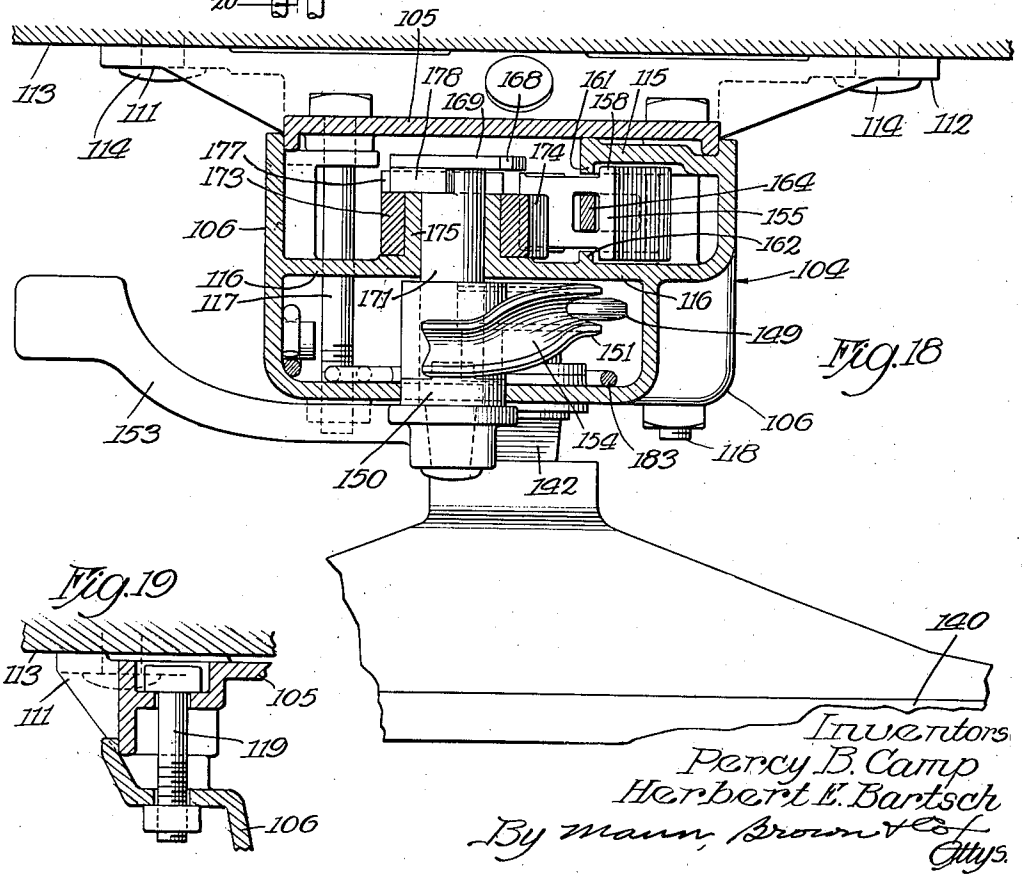


Fig. 18

Fig. 19

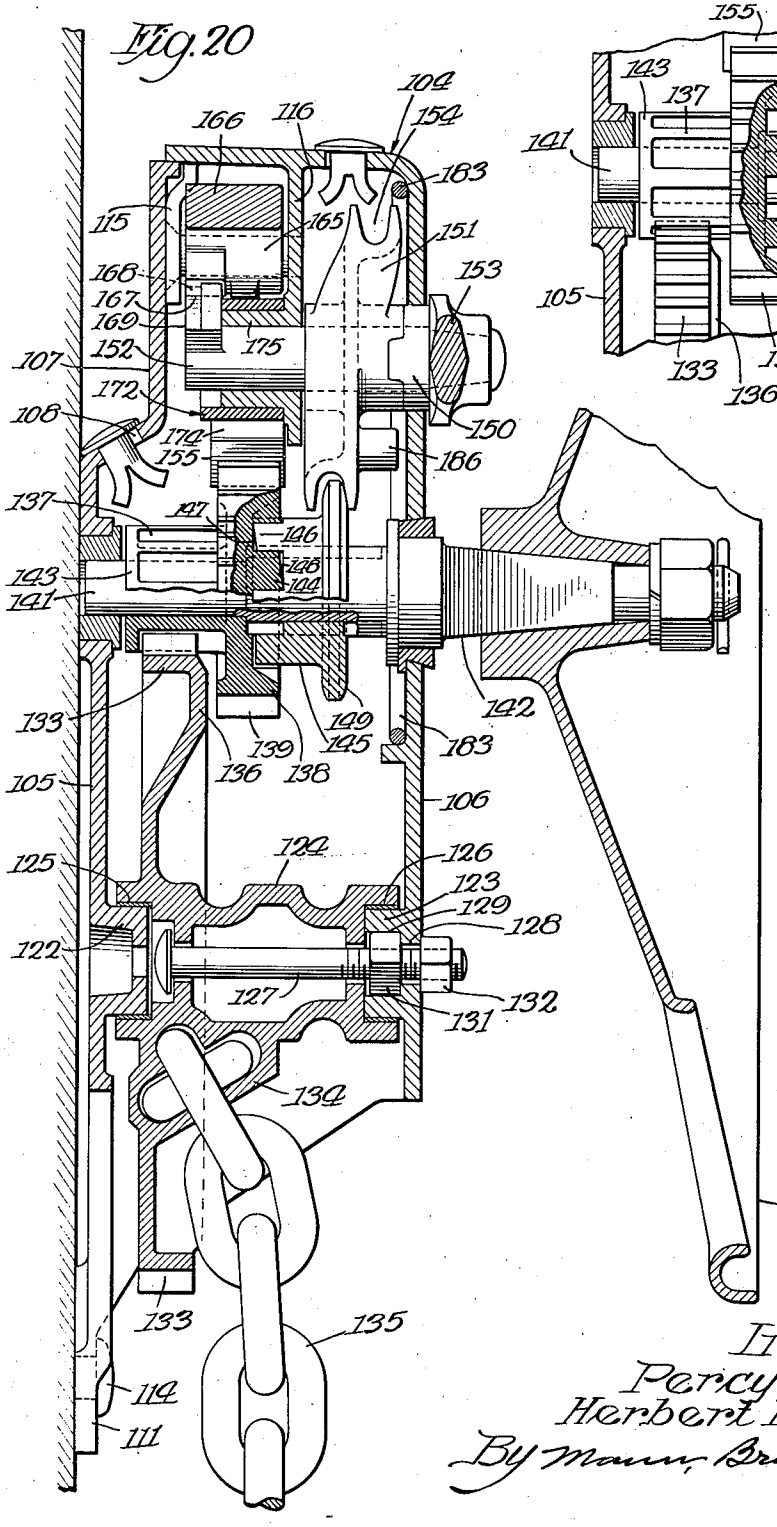
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HAND BRAKE

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Fig. 20



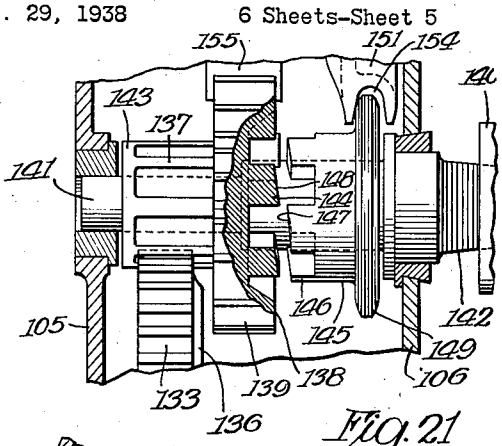


Fig. 21

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Fig. 22

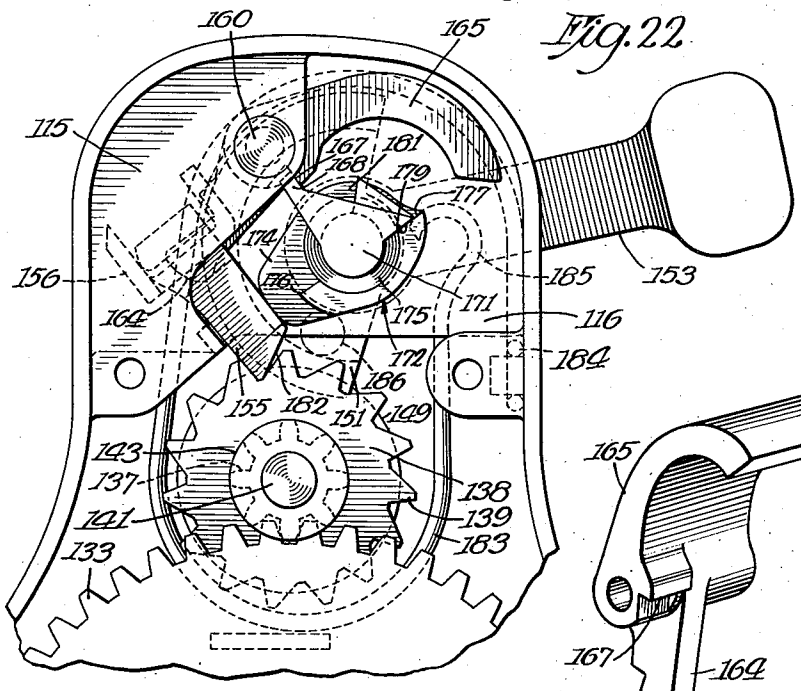


Fig. 25

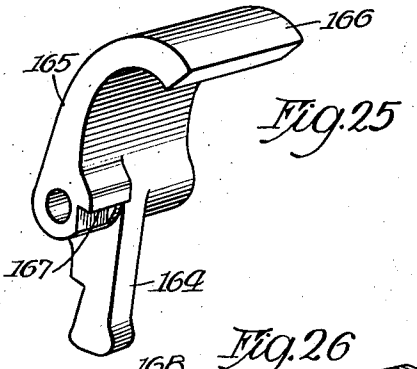


Fig. 24

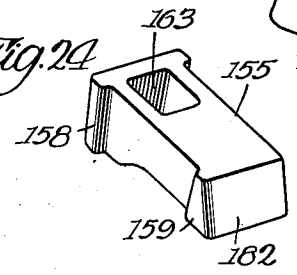


Fig. 26

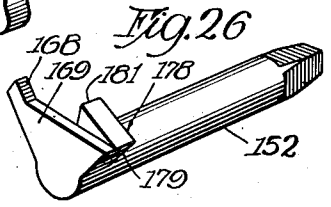
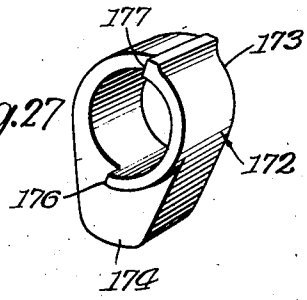


Fig. 23

Fig. 27



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Patented May 4, 1943

2,318,569

UNITED STATES PATENT OFFICE

2,318,569

HAND BRAKE

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Application August 29, 1938, Serial No. 227,328

6 Claims. (Cl. 74—505)

This invention relates to railway brakes and more particularly to the manually operated type.

One of the objects of the invention is the provision of new and improved mechanism for applying the brakes together with novel means for mounting the brake actuating mechanism within a two-part housing so that the entire mechanism may be removed with one of the parts.

Another object of the invention is the provision of a new and improved sectional housing for containing the brake actuating mechanism that is so constructed that the parts may be readily and easily assembled and the actuating mechanism so mounted on one of the sections that it may be readily removed with such section without disturbing the remaining section.

A further object of the invention is the provision of new and improved brake actuating mechanism so constructed as to occupy a small space whereby the dimensions of the housing for containing the mechanism is reduced to a minimum.

Another object of the invention is to provide an improved brake actuating mechanism having novel means for mounting the mechanism and for forming the drive shaft.

Still further objects of the invention are to provide an improved housing and brake operating mechanism having great strength and durability, that is inexpensive to manufacture, easily assembled, that provides ready access to the gearing by the removal of one section only of the housing and that permits the gearing to be entirely removed with such section and the removed assembly to be replaced in whole or in part if expedient or desirable.

Other and further objects and advantages of the invention will appear from the following description, taken in connection with the accompanying drawings, in which—

Fig. 1 is a front elevation of the device;

Fig. 2 is a front elevation of the attaching plate;

Fig. 3 is a section on the line 3—3 of Fig. 1;

Fig. 4 is a section on the line 4—4 of Fig. 1;

Fig. 5 is a rear view of the casing and assembled mechanism with the release handle shown in operative position, with parts broken away;

Fig. 6 is a similar view but showing the release handle in inoperative or released position;

Fig. 7 is a perspective view of the holding pawl;

Fig. 8 is a perspective view of the pawl actuating shaft and finger;

Fig. 9 is a perspective view of the holding pawl stop;

Fig. 10 is a perspective view of the release handle shaft and cam;

Fig. 11 is a section on the line 11—11 of Fig. 1;

Fig. 12 is a vertical section of a modified form of pinion, ratchet and drive shaft taken on the line 12—12 of Fig. 13;

Fig. 13 is a section on the line 13—13 of Fig. 12;

Fig. 14 is a longitudinal vertical section of a further modified form of drive shaft, pinion and ratchet wheel;

Fig. 15 is a section on the line 15—15 of Fig. 14;

Fig. 16 is a view similar to Fig. 1 but showing a modified form of brake operating mechanism;

Fig. 17 is a front elevation of the attaching plate of the construction shown in Fig. 16;

Fig. 18 is a section on the line 18—18 of Fig. 16;

Fig. 19 is a section on the line 19—19 of Fig. 16;

Fig. 20 is a section on the line 20—20 of Fig. 16 and showing the clutch in operative position;

Fig. 21 is a view similar to Fig. 20 but with parts broken away and showing the clutch in inoperative position;

Fig. 22 is a rear elevation of the brake casing with brake operating mechanism assembled therein; with parts broken away, and with the release handle in normally operating position;

Fig. 23 is a view similar to Fig. 22, with parts broken away, but showing the release handle in its intermediate position;

Fig. 24 is a perspective view of the holding pawl;

Fig. 25 is a perspective view of the pawl actuating member;

Fig. 26 is a perspective view of the release handle shaft and dog attached thereto; and

Fig. 27 is a perspective view of the holding pawl stop.

Referring now to the drawings, the reference character 8 indicates a railway car to one end 9 of which is attached the brake operating mechanism 10 which is contained in a housing 11.

The housing 11 is in two sections comprising a front casing 12 and a back section or attaching plate 13. The back section or attaching plate 13 comprises a body portion 14 having attaching lugs 15, 16, 17 and 18 extending outwardly therefrom by means of which the plate is rigidly connected to the end wall of the car as by being riveted or bolted thereto. The upper portion 19 of the attaching plate is offset outwardly to provide a ledge which in turn has a lubricating opening 21 normally closed by a closure 22. Oil may be supplied to the winding shaft through this opening, as will presently appear.

Immediately below the offset portion 19, the

plate is provided with a boss 23, Figs. 2 and 11, which is recessed to receive a bearing 20 for the winding shaft. Below the boss 23, the plate is provided with a hub 24 forming a trunnion journal which is adapted to be received in a bearing in the inner end of the shaft for the winding drum, as will hereinafter be described.

A depression or recess 25, Figs. 2 and 11, is provided in the extreme upper end of the plate which forms a bearing for the inner end of the pawl actuating shaft. The plate 13 is also provided with a narrow flange 26 which extends outwardly a short distance about the margin of the plate, the outer edges of which are in a common plane.

The casing 12 is open at its rear side and is adapted to be closed by the plate 13 and has a flange 30 about its inner edge that telescopes the flange 26, Figs. 3 and 4, when the parts are assembled. These telescoping flanges will prevent lateral movement of the outer casing during the winding operation. The brake operating mechanism 10, or at least a major portion of it, is mounted within this casing in such a manner as to be removable therewith. The casing 12 is detachably secured to the back plate 13 by means of suitable bolts 27 which extend through the upper portions of the casing and plate and with bolts 28 which extend through the lower portions of the casing and plate. The bolts 27 extend through the outwardly offset portion of the back plate which is provided with lugs 29 for engaging the side face of the bolt heads for preventing turning of the bolts as when they are applied, Fig. 3. The back plate is provided with angular recesses as at 31, see Fig. 4, for receiving the heads of the bolts 28 at the lower portion of the plate for preventing turning of the bolts. It is also provided with flanges or projections 40 that cooperate with corresponding shoulders or projections 50 formed on casing 12, Fig. 4, for forming spacer members between the lower portions of the two sections of the casing.

The casing 12 has mounted therein the brake operating mechanism 10 or control, Fig. 3, and the parts are so arranged that when the casing is removed, this mechanism is removed with the casing without disturbing its assembly. This mechanism comprises a brake drum 32 having integral therewith a gear 33 for turning the drum. The drum 32 is provided at each end with recesses 34 and 35, Fig. 11, in which suitable bearings such as bronze or the like 36 and 37 are inserted. The bearings are adapted to receive the trunnion journal or hub 24 on the back plate 13 and a trunnion journal 38 extending inwardly from the outer wall of the casing 12. A bolt 39 extends axially through the brake drum 32 and is adapted to extend through an opening axially of the hub or trunnion journal 38. The hub or trunnion 38 is provided with an angular recess for receiving a nut 41 for preventing turning of the same. A nut 42 on the outer end of the bolt 39 is adapted to secure the bolt 39 and with it the drum 32 to the casing 12 so that when the casing is removed, the drum is removed therewith. The nuts 41 and 42 are so adjusted that when the casing 12 is clamped between the nuts 41 and 42, the drum will be free to rotate without binding. The bolt 39 merely serves to hold the parts in assembled relation when the casing is removed from the plate. The drum 32 is provided with suitable recesses 43 spirally arranged about the drum for receiving the links of the brake chain when it is wound thereon. The drum is also provided with suitable means 44 for attaching the end link of the brake chain to the drum.

In order to prevent the teeth of the gear 33 from fouling the chain, the web of the gear, except for the portion where the chain is attached, is provided with an outwardly bulging portion 45 which is adapted to engage the chain and guide it into the groove and prevent its coming in contact with the teeth of the gear. The gear 33 is adapted to mesh with a pinion 46 which is rigidly mounted on a winding shaft 47 to the outer end of which the brake operating hand wheel 48 is rigidly connected. The shaft 47 extends through the outer wall of the casing 12 and is provided with a journal 49 for engaging a bearing 51 which is secured in an opening in the wall as clearly shown in Fig. 11 of the drawings. The pinion 46 has integral therewith a ratchet wheel 52. The shaft 47 is preferably a steel forging and the gear 46 and the ratchet 52, which are integral, may be of cast metal secured to the shaft 47 in any suitable manner. As shown, the ratchet 52 and pinion 46 are provided with an axial opening 53 through which the shaft 47 extends, and the shaft is upset at its inner end as indicated in Fig. 11, for holding the parts in assembled relation. The outer end of the axial opening 53 is provided with a recessed locking face 54, preferably square when viewed from the right in Fig. 11 (see Fig. 5), that is, the ratchet 52 is shown as being provided with a square opening for receiving a correspondingly shaped portion 55 on the shaft 47. By means of this arrangement, the parts will be locked against relative rotational movement. The outer end of the pinion 53 constitutes a journal for engaging the bearing 20 in the plate 13, Fig. 11.

It will be seen by an inspection of Figs. 5 and 11 that this bearing shrouds the outer ends of the teeth thereby reinforcing said teeth. The mechanism for holding the ratchet in adjusted position comprises a holding pawl 56, Figs. 6 and 7, which is slidably mounted on the webs 57 which extend between the casing 12 and a flange or web 58 extending parallel with the outer face of the casing 12, Figs. 3 and 6, and spaced therefrom. Flanges 59 and 61 on the web or partition wall 58 and the outer wall of the casing 12, Figs. 3 and 6, constitute a guide and a stop for the holding pawl 56. The pawl 56 is adapted to be held in ratchet holding position by a holding pawl stop 62 which comprises a sleeve portion 63 loosely mounted on a hub 64 extending inwardly from the front wall of the casing 12, Fig. 11. The lower end of the holding pawl stop is provided with an extension 65, Fig. 1, which is adapted to be turned into a position in close proximity to, or in contact with, the rear edge of the pawl member 56 as clearly shown in Fig. 5 of the drawings. In this position of the holding pawl stop, the pawl is free to move longitudinally but is prevented by the extension 65 from rotary movement. In the position shown in Fig. 5, when the ratchet wheel 52 is rotated counterclockwise, as viewed in Fig. 5, the teeth 66 of the ratchet wheel will engage the inclined surface 67 of the pawl and cause the same to move in a direction parallel with its axis and when the tooth has passed the pawl, the pawl will drop downwardly behind the tooth for holding the ratchet from moving in a reverse direction.

It is desirable that means be provided for causing the pawl to move downwardly in the space between the teeth when a tooth has passed be-

neath the pawl. In the form of the construction shown, a pawl actuating shaft 68 having a depending finger 69 is provided for this purpose. The pawl actuating shaft 68 is mounted in a recessed bearing 71 in the back plate 13 and in a corresponding recess bearing 72 in the front plate 12, Fig. 11. The finger 69 is provided with a lower reduced portion 73 which is adapted to engage in a corresponding recess 74 provided in the pawl 56, Figs. 6, 7 and 8. The pawl actuating shaft 68 is provided with a ledge or shoulder 75 which is adapted to be engaged by a projection 76 rigidly mounted on the shaft 77 of a release handle 78. The shaft 77 extends axially through the hub 64 on which the sleeve 63 is mounted and the projection 76 is adapted to engage beneath the shoulder 75 on the pawl actuating shaft 68.

The release handle 78 may be enlarged as at 79 to form a weight for holding the projection 76 in engagement with the shoulder 75. By means of this arrangement, when the pawl 56, Fig. 5, is forced upwardly and to the left, in said figure, by a tooth of the ratchet when the ratchet is rotated, the upward movement of the pawl will rotate the shaft 68 clockwise, as viewed in Fig. 5, and this in turn will cause the shoulder 75 which engages the projection 76 to rotate the shaft 77 counterclockwise, as viewed in said figure, thus raising the weight 79 a short distance. When the tooth has passed beneath the pawl, the weight of the release handle, together with the weight of the pawl, will tend to move the pawl positively to its lowermost position as the teeth are moved beneath the same.

It is desirable that means be provided for positively releasing the pawl 56 for permitting a free release of the ratchet wheel and incidentally winding drum for releasing the brakes. In the form of the device selected to illustrate one embodiment of the invention, the release handle and mechanism associated therewith are employed for this purpose. The sleeve 63 is provided with a pair of shoulders 81 and 82 which are adapted to be engaged by a shoulder 70 on the projection 76 and by a shoulder 83 on the projection 76, respectively, on the inner end of the shaft 77. When the pawl is in ratchet holding position, the release handle member 78 is in the position shown in Fig. 5 and in this position, the shoulder 70 is in engagement with the shoulder 81 for holding the pawl stop projection 65 in engagement, or in close proximity to, the pawl 56, as shown in said figure.

When it is desired to release the pawl, the release handle 78 is turned to the position shown in Fig. 6 and in this position, the shoulder 83 of the projection 76 is brought into contact with the shoulder 82 of the pawl stop 62 for turning the stop counter-clockwise, as viewed in said figure, out of engagement with the pawl. In this position, the tooth engaging end of the pawl is free to partially rotate or move in a vertical position so that the ratchet wheel may turn clockwise, as shown in Fig. 6, for releasing the brake.

The projection 76 is also provided with a shoulder 84 which is adapted to engage a stop 85 integral with the casing 12 for limiting the turning movement of the release handle 78.

In the operation of the device, when it is desired to apply the brake, the release handle is moved to the position shown in Fig. 5 after which the drum is rotated by means of the hand wheel 48 and the ratchet 52 will be held in adjusted position by the pawl 56. When it is desired to release the brakes, this may be done by moving the release handle 78 clockwise, as shown in Fig. 1, for releasing the pawl 56 after which the wheel 48 is free to turn in a reverse direction. When it is desired to remove the brake actuating mechanism from the car and take it to a distant place, it is only necessary to disconnect the brake chain from the winding drum after which the casing 12 and mechanism may be removed as an assembled unit by first removing the bolts 27 and 28. By reversing the operation, the parts may be assembled. If it is only desired to inspect or replace parts in situ, the brake chain need not be disconnected.

In Figs. 12 and 13 is shown a modified form of the drive shaft. In this form of construction, the drive shaft 86 is in the form of a forging having the pinion 87 on its inner end integral therewith. The intermediate portion of the forged shaft 86 is provided with an attaching portion 88 having a plurality of teeth-like projections 89 extending outwardly therefrom which are adapted to engage in corresponding recesses 91 formed in a ratchet wheel 92 which is mounted on the intermediate portion of the shaft. The ratchet wheel 92 is a cast wheel and is provided with reinforcing ribs 93 extending about the angular opening 91 of the ratchet. The shaft 86 is a forging and is finished with a journal 94 and with the milled pinion 87 and a reduced journal 95.

In Figs. 14 and 15 is shown a further modified form of the drive shaft, pinion and ratchet wheel. In this form of construction, the drive shaft 96 is provided with an integral ratchet wheel 97, the blank of which is forged with the shaft 96. The teeth 98 are cut or milled after the forging is completed. The pinion 99 for operating the brake drum gear is cast separately and is secured to the shaft in any approved manner as by being provided with an angular opening 101 which is adapted to receive a corresponding angular portion 102 on the shaft 96 or the parts may be welded together. The outer end of the shaft 103 is formed to constitute a journal for the inner end of the shaft.

In Figs. 16 to 27 is shown a modified form of a brake casing and brake operating mechanism. In this form of construction, the housing 104 is somewhat similar to the corresponding housing 11 of the previously described construction and also in this form of the device, the housing comprises an inner plate or attaching member 105 and a casing 106. The plate 105 has its upper end 107 reduced in width and off-set outwardly from the car end as in the previous construction.

The ledge formed by the connection portion of the offset is provided with an opening 108 through which lubricant may be inserted for oiling the driving shaft as in the previous construction. The plate is provided with upper attaching, laterally extending, perforated wings 109 and 110 and with the lower downwardly and outwardly attaching wings 111 and 112 by means of which the plate it attached to the end 113 of the car as by means of the bolts or rivets 114 in a manner similar to that already described.

The casing 106 is detachably connected to the plate 105 and cooperates with the said plate to form a housing for containing the brake operating mechanism. The mechanism is so mounted in the casing that when the casing is removed, the brake operating mechanism will be removed therewith as in the previous construction. The casing 106 has its upper end reduced to correspond with the reduced end 107 of the plate 105. The

casing is open on its inner side and the inner edge is provided with a laterally extending web 115 which extends only partially across the reduced end portion. The reduced portion of the casing is also provided with a vertical partition 116 which extends across the reduced portion from side to side thereof for forming an inner bearing for the release handle shaft, as will presently appear, and is integral with the top wall of said portion. The casing 106 is adapted to be held to the back plate by bolts 117, 118, 119 and 121, Fig. 16, in a manner similar to that already described.

The plate 105 and the outer wall of the casing 106 are provided with inwardly extending hubs 122 and 123, respectively, Fig. 20, which form journals for the brake drum 124. The brake drum 124 has an enlarged counterbore in each end thereof within which is mounted the bearings 125 and 126 which engage the hub journals 122 and 123 when the parts are assembled. In order to attach the drum 124 to the casing 106 so that when the casing is removed, the drum will be removed therewith, the drum is provided with an axial opening through which a bolt 127 extends. The hub 123 in the casing 106 is also provided with an axial opening 128 for receiving the outer end of the bolt 127. The opening 128 is provided with a counterbore 129 which is made angular for receiving a nut 131 on the bolt 127. A nut 132 on the outer end of the bolt is adapted to clamp the casing between the two nuts for holding the drum on the hub 123 when the casing is removed. By means of the two nuts, the bolt 127 may be adjusted so that the brake drum is free to rotate on the hub 123. The drum 124 is provided with an integral gear 133 on its inner end which has integral therewith a brake chain attaching portion 134 to which the brake chain 135 is attached. In order to prevent the chain from fouling the teeth of the gear 133 when the brake is applied, the web portion 136 thereof is bulged outwardly, as shown more clearly in Fig. 20 of the drawings.

The gear 133 meshes with a pinion 137, Fig. 20, which is integral with a ratchet wheel 138 having the ratchet teeth 139 on its periphery. The pinion 137 and ratchet 138 are rotatably mounted on the inner reduced end 141, Figs. 20 and 21, of the drive shaft 142. The shaft 142 is adapted to be rotated by a lever or hand wheel 140 on the outer end of said shaft for applying the brakes. The inner ends of the teeth of the pinion 137 are shrouded as at 143, Fig. 21, which materially strengthens said teeth.

It is desirable that means be provided for releasing the brakes without spinning the hand wheel 140. This is accomplished by means of a clutch arrangement which will now be described. The gear 138 has its axial opening counterbored and the hub around the counterbore is provided with clutch teeth 144 extending parallel with the axis of the gear to form one element of a clutch. A sleeve clutch member 145, Figs. 20 and 21, is slidably keyed to the shaft 142 and is provided with inwardly extending teeth 146 which are adapted to interengage or mesh with the gears or teeth 144 on the ratchet gear 138. The adjacent ends of the clutch teeth 144 and 146 have their end surfaces cut at a slight angle, as shown at 147 and 148, Figs. 20 and 21, for facilitating the engagement of the teeth when the clutch is thrown in. By means of this arrangement, the sides of the clutch teeth may be made parallel, as shown, so that positive engagement of the clutch members is provided for both directions of rotation thus eliminating any danger of camming the clutch member 145 outward while the brake is being applied as might be the case were the clutch teeth tapered.

Suitable means are provided for moving the clutch member 145 into and out of engagement with the clutch teeth on the ratchet wheel 138. This mechanism comprises a radial flange 149 integral with the clutch member 145, Figs. 20 and 21, which is adapted to be engaged by a grooved cam or clutch operating member 151 mounted on the shaft 152 to the outer end of which the release handle 153 is attached. The member 151 is loosely mounted on a shaft 152 to which the release handle 153 is rigidly attached and is located between the front wall of the casing 106 and the vertical partition 116. The handle 153 is provided with a hub 150 which has an interlocking or toothed engagement with the clutch operating member 151 for turning the latter by the handle 153. The cam member or clutch operating member 151 is so constructed that the shaft 152 may turn through a considerable portion of its movement without moving the clutch member 145, as will presently appear.

Suitable means are provided for holding the brake drum in adjusted position for permitting a gradual release of the brake drum and for disengaging the same from the wheel 140 for a gradual release of the brakes.

In the form of the construction selected to illustrate one embodiment of the invention, the release handle 153 and cooperating mechanism are provided for this purpose. The release handle or lever 153 is adapted to be placed in three different positions. In the first position, as shown in Fig. 22, the parts are so arranged that the clutch is in engagement and the parts are held in adjusted position by the pawl when the lever or wheel 140 is turned to apply the brakes. In the second position, which is shown in Fig. 23, the hand wheel 140 may be advanced slightly for automatically releasing the pawl or causing the same to be released, so that the brake drum may be reversed while the operator is still holding the wheel. When the handle is moved still further to the dotted line position shown at the right in Fig. 16, the clutch will be disengaged or released thus permitting the brake drum to rotate freely in the reverse direction without moving the hand wheel.

The pawl 155 for holding the ratchet wheel in adjusted position is slidably mounted on the web members 156 and 157 between the partition 116 and the flange 115, Figs. 18 and 23. The pawl 155 is provided at each end on each side thereof with flanges 158 and 159, Fig. 24, between which ribs 161 and 162 on the flange 115 and partition 116, respectively, extend to limit the movements of the pawl. The pawl is also provided with an opening 163 which is adapted to be engaged by a finger 164 of a pawl actuating member 165, Figs. 23 and 25, for positively operating the pawl under certain conditions, as will presently appear. The pawl actuating member 165 is rotatably mounted on a headed pin 160 which extends through the web 115, the actuating member 165 and into the partition 116. It is held in position by the back section or plate 105 so that when the casing 106 is removed, the pin 160 may be readily removed preparatory to removing the pawl actuating member 165.

The pawl actuating member 165 is provided with a counterweight 166 which is curved so as to economize space as will be evident from an

inspection of Figs. 22 and 23. The counterweight 166 is provided with a shoulder 167 which is adapted to be engaged by a finger 168 of an arm 169 which is rigidly connected to the inner end of the shaft 152, Fig. 26, to which the release handle 153 is rigidly connected.

Suitable means are provided for preventing rotation of the pawl and for confining it to a movement longitudinally of its axis when the brake drum is rotated. A holding pawl stop 172 in Fig. 27 is employed for this purpose. This stop comprises a sleeve portion 173 and a pawl engaging arm 174. The sleeve 173 is rotatably mounted on a hub 175 extending inwardly from the partition 116, Figs. 18, 22 and 23. The sleeve 173 is provided with a pair of shoulders 176 and 177 which, in the form of the construction shown, are about 180° apart to provide considerable lost motion for permitting movement of the release handle 153 from its normal to very nearly its extreme position without positively operating the pawl engaging member 173, as will presently appear.

The shaft 152 is provided with an arm 178 which may be integral with the arm 169 but offset inwardly from the finger 168. This arm is provided with a shoulder 179 on one side for engaging the shoulder 177 on the sleeve 173 when the release handle 153 is turned to the normal brake operating position for moving the projection 174 into pawl engaging position, as shown in Fig. 22.

Suitable means are provided for positively releasing the pawl holding member when it is desired to release the brake. In the form of the construction shown, a shoulder 181 on the opposite side of the arm 178 is adapted to engage the shoulder 176 on the sleeve 172 for positively moving the projection 174 out of engagement with the pawl 155 when the handle 153 is moved beyond clutch disengaging position.

The parts are so constructed that when the release handle 153 is in the position shown in Fig. 22, the shoulder 179 on the arm 178 engaging the shoulder 177 on the sleeve 173 will hold the pawl stop in the position shown in said figure and in this position, the pawl will be held against partial rotation which in turn will therefore hold the ratchet wheel from rotating in a reverse direction but when the ratchet wheel is moved clockwise, that is counterclockwise, as viewed in Fig. 22, the inclined surface of the teeth of said gear will engage the inclined surface 182 of the pawl thereby causing the pawl to slide upwardly along its axis and when the tooth has passed the pawl, the same will be caused to drop into the space between the teeth for holding the ratchet wheel from reverse movement. During the upward movement of the pawl, the finger 164 will be moved by the pawl upwardly and this will rotate the pawl actuating member 165 counterclockwise, Fig. 22, thus slightly lowering the counterweight 166 and since the shoulder 167 on the pawl actuating member is in engagement with the finger 168, it would tend to rotate the shaft 171 which extends axially through the hub 175 in a clockwise direction thus slightly elevating the handle 153 and consequently, when the pawl has passed over the tooth, the weight of this handle member 153 will, by the force of gravity, tend to positively force the pawl downward between the teeth.

If it is desired to gradually or partially release the brake, the release handle 153 is moved into the position shown in full lines in Fig. 23, that is, it is moved into such position that the shoulders 179 and 177 no longer are engaged. The brake wheel 140 is now rotated forwardly for releasing the pawl and when the pawl is released, the weight of the projection 174 on the sleeve 173 will cause the same to move downwardly by gravity out of engagement with the pawl so that the pawl may rotate sufficiently to pass over the tooth when the ratchet is moved in reverse direction. When the brake has been released to the desired amount, the operator will move the handle 153 back to the position shown in Fig. 22 thereby causing the pawl to hold the ratchet in its adjusted position.

When it is desired to release the clutch and permit a free release of the brakes, the release handle 153 is turned to the dotted line position shown in Figs. 16 and 23 which is substantially 180° from its normal operating position. The parts are so constructed that the groove 154 in the cam member 151 does not move the clutch until the handle 153 passes the full line position shown in Fig. 23. Simultaneously with the release of the clutch, pawl engaging member 174 is rotated by the engagement of the shoulders 181 and 176 as described above.

In order that the release handle 153 shall not remain in its declutching position, after the handle is released, a spring 183 is employed. This spring has one end rigidly attached to the casing as at 184 and has its opposite end extending downwardly and around the driving shaft and is provided at its end with a hook 185 which is adapted to be engaged by a pin 186 rigidly mounted on the cam member 149, Fig. 23. It will thus be seen that when the handle 153, Fig. 22, is moved to its intermediate position, as shown in Fig. 23, the pin 186 is in engagement with the hook 185 and that when the handle is moved to the dotted line position shown in Fig. 23, it will tension the spring so that when the handle is released, the spring will move the same to clutch engaging position. If released suddenly, the spring will throw the handle to its normal operating position, as shown in Fig. 22.

The brake actuating mechanism in both forms of construction is retained in position in the outer casing principally by the brake drum gear and walls of the partition and reduced portion of the outer casing and that by removing the drum retaining bolt, the parts may be readily disassembled for inspection or substitution or for repairs. If desired or expedient, the entire mechanism may be removed and another outer casing and mechanism assembly substituted therefor and the removed structure returned to the factory for repairs.

It is thought from the foregoing, taken in connection with the accompanying drawings, that the operation and construction of my device, will be apparent to those skilled in the art and that changes in size, shape, proportion and details may be made without departing from the scope and spirit of the appended claims.

We claim as our invention:

1. In a railway brake, a sectional brake housing comprising an inner section and an outer section, said inner section being adapted to be rigidly attached to a railway car, attaching elements for detachably connecting said outer section to said inner section, brake operating mechanism mounted substantially entirely within said housing and forming with said housing a replaceable unit, said mechanism comprising a winding drum, an operating shaft, means for

rotating said drum from said shaft, holding means for said drum, means for controlling the operation of said holding means, cooperating journals and bearings on said mechanism and sections, means for holding said entire brake operating mechanism and holding means assembled as a unitary structure on said outer section when the latter is removed from said inner section whereby when any portion of said unit becomes injured or broken a new unit may be readily substituted therefor, and means exterior of said housing and carried by said outer section for operating said mechanism.

2. In a railway brake, a sectional brake housing comprising an inner section and an outer section, means for rigidly attaching said inner section to a railway car, means for detachably connecting said outer section to said inner section, brake operating mechanism mounted within said housing and constituting therewith a replaceable unit, said mechanism comprising a winding drum, an operating shaft, gearing for rotating said drum from said shaft, pawl and ratchet means for holding said drum in brake holding position, means for releasing said pawl, cooperating journals and bearings on said mechanism and said sections, means for holding said entire brake operating and drum holding means assembled as a unitary structure on said outer section when the latter is removed from said inner section whereby when any portion of said unit becomes broken said unit may be replaced by a new unit, and means exterior of said housing for operating said mechanism.

3. In a railway brake, a sectional brake housing comprising an inner section and an outer section, said inner section being adapted to be rigidly attached to a railway car, attaching elements for detachably connecting said outer section to said inner section, brake operating mechanism mounted within said housing and constituting therewith a replaceable unit, said mechanism comprising a winding drum, an operating shaft, means for rotating said drum from said shaft, a partition within said outer section, drum holding means including a pawl slidably mounted on said partition for retaining said drum in brake holding position, means carried by said outer section for controlling the operation of said pawl, cooperating journals and bearings on said mechanism and sections, means for holding said entire brake operating mechanism and holding means assembled as a unitary structure on said outer section when the latter is removed from said inner section whereby when any portion of said unit becomes broken said unit may be replaced by a new unit, and means exterior of said housing and carried by said outer section for operating said mechanism.

4. In a railway brake, a sectional brake housing comprising an inner section and an outer section, said inner section being adapted to be rigidly attached to a railway car, attaching elements for detachably connecting said outer section to said inner section, brake operating mechanism mounted within said housing and forming therewith a removable unitary structure, said mechanism comprising a brake drum rotatably mounted on said sections, a gear rigid with said drum, an operating shaft rotatably mounted on said sections, a pinion rigid with said shaft and for rotating said gear and drum, brake holding mechanism within said housing, said mechanism comprising a slidable pawl, means extending to the exterior of said housing for controlling the operation of said pawl, cooperating journals and bearings on said mechanisms and both of said sections, means exterior of said housing for operating said brake shaft, and means including an element extending axially through said drum and rigidly connected to said outer section for holding said entire brake operating mechanism and said brake holding mechanism assembled as a unitary structure on said outer section when the latter is removed from said inner section whereby said unitary structure may be replaced as a unit.

5. In a railway brake, a sectional brake housing comprising an inner section and an outer section, means for rigidly attaching said inner section to a railway car, means for detachably connecting said outer section to said inner section, brake operating mechanism mounted within said housing and forming therewith a removable unitary structure, said mechanism comprising a winding drum, an operating shaft, a clutch member slidably mounted on said shaft and rotatable therewith, a cooperating clutch member rotatably mounted on said shaft and having a pinion integral therewith, said brake drum having a gear fixed thereon meshing with said pinion, said cooperating clutch member having a ratchet integral therewith, brake holding means including a pawl for engaging said ratchet, means extending to the exterior of said housing for controlling the operation of said pawl, means including a cam member and a control for said cam member for clutching and declutching said clutch members, lever means on the outer end of said shaft exterior of said housing for rotating said shaft and drum, and means including a bolt extending axially of said drum through said outer casing for holding said entire brake operating mechanism and brake holding means assembled as a unitary structure on said outer section when the latter is removed from said inner section whereby said unitary structure may be replaced as a unit.

6. In a railway brake, a sectional brake housing comprising an inner section and an outer section, said inner section being adapted to be rigidly attached to a railway car, brake operating and brake holding mechanism mounted in and carried by said outer section, said mechanism having parts journaled in both of said sections when said sections are assembled, means for holding said mechanism completely assembled in said outer section and removable as a unit with said outer section from said inner section, and means for holding the sections of said housing together.

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