April 19, 1932. R. J. OLANDER 1,854,804

HAND BRAKE

Filed April 26, 1930

Fig. 1

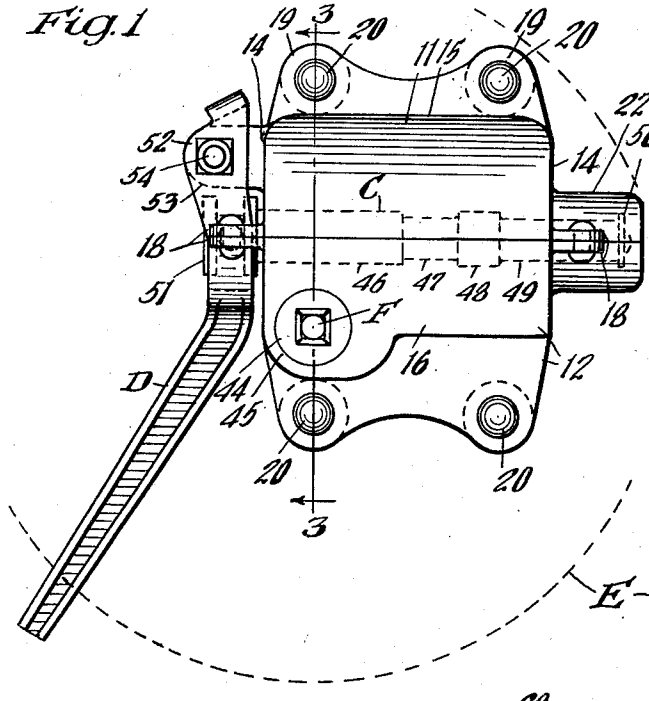


Fig. 3

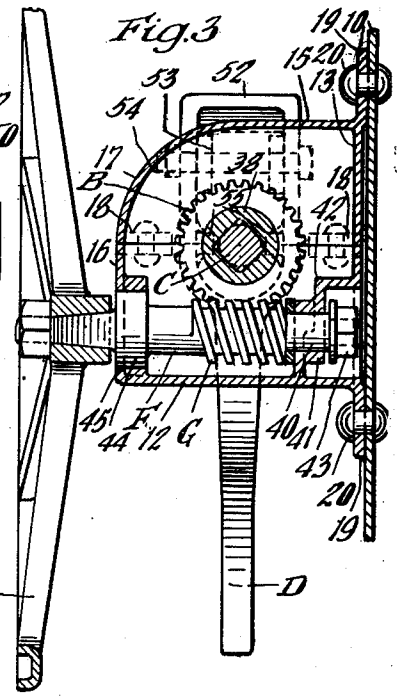


Fig. 2

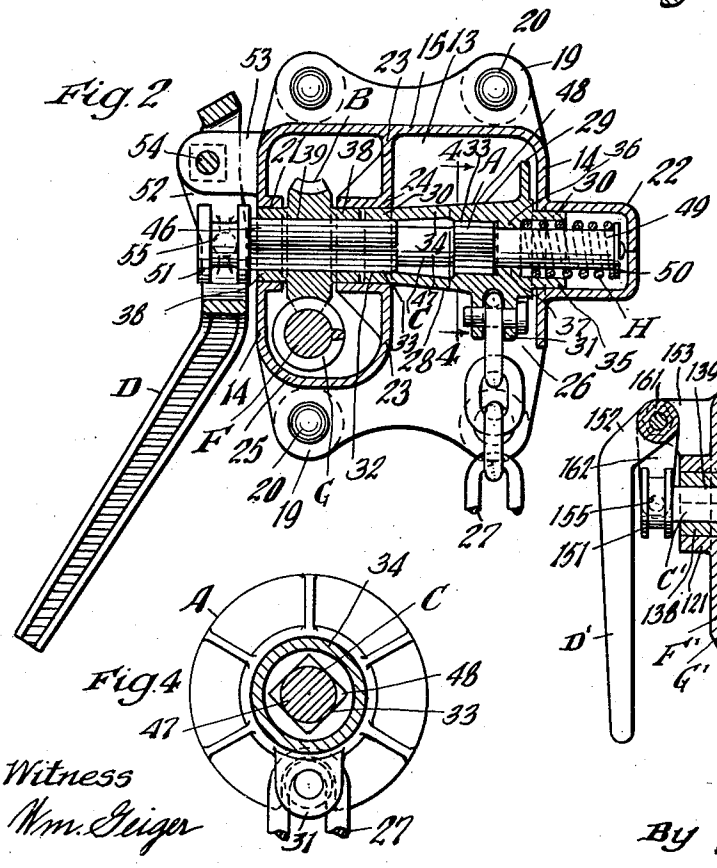
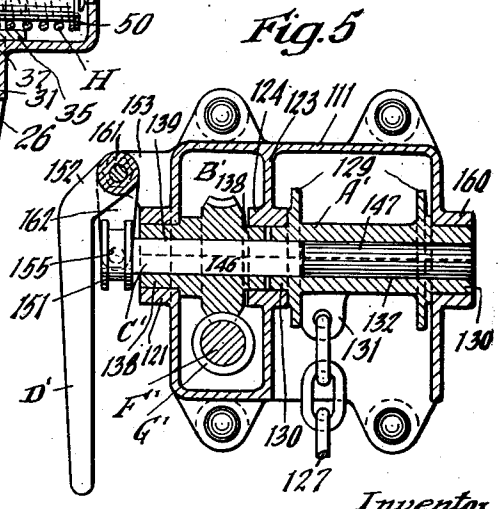


Fig. 4

Fig. 5



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UNITED STATES PATENT OFFICE

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HAND BRAKE

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This invention relates to improvements in hand brakes.

One object of the invention is to provide a hand brake mechanism particularly adapted to be mounted on the vertical end wall of a car, wherein the mechanism includes a chain winding drum and operating means for rotating the drum to tighten the brakes, so arranged as to provide for disconnection of the operating means to permit free running of the chain winding drum, thereby effecting quick release of the brakes.

A more specific object of the invention is to provide a hand brake mechanism for railway cars, including a chain winding drum and means for rotating the drum, comprising power multiplying gearing, wherein simple and efficient means is employed for operatively connecting the power multiplying means to the drum to effect winding of the chain and for disconnecting the same to permit free running of the drum to allow unwinding of the chain and quick and complete release of the brakes.

A still further object of the invention is to provide a hand brake mechanism of the character indicated in the preceding paragraph, wherein the power multiplying driving means for the drum member includes a worm on a rotary operating shaft and a cooperating worm wheel meshing therewith, and wherein the means for connecting and disconnecting the power multiplying means and drum comprises a reciprocating manually actuated shaft slidably engaged with the drum member and worm wheel member, rotatable in unison with one of said members and adapted to be slid into operative engagement with the other member to clutch said members to each other for rotation in unison and adapted to be moved out of engagement to permit free running of the chain winding drum member with respect to the cooperating driving worm wheel member, thereby effecting quick and complete release of the brakes.

Other objects of the invention will more clearly appear from the description and claims hereinafter following.

In the drawings, forming a part of this specification, Figure 1 is a front elevational view of my improved hand brake mechanism illustrating the same as applied to the vertical end wall of a railway car, the hand wheel member of the brakes being indicated in dotted lines so as to more clearly disclose the brake mechanism. Figure 2 is a vertical, sectional view of my improved hand brake mechanism, as illustrated in Figure 1, the view being in a plane parallel to the plane of the end wall of the car. Figure 3 is a vertical, sectional view corresponding substantially to the line 3—3 of Figure 2. Figure 4 is a vertical, sectional view through the chain winding drum and clutch shaft, corresponding substantially to the line 4—4 of Figure 2. And Figure 5 is a view similar to Figure 2, illustrating another embodiment of the invention.

In carrying out my invention, I preferably enclose the operating parts of the hand brake mechanism in a housing secured to the vertical end wall of the railway car, said end wall being designated by 10 in the drawings. The housing is preferably formed in sections, so as to facilitate the assembling of the parts of the brake mechanism.

Referring first to the embodiment of the invention illustrated in Figures 1 to 4 inclusive, the housing is composed of a top section 11 and a bottom section 12, the sections being divided along a horizontal plane. As shown most clearly in Figures 2 and 3, the housing has a vertical back wall 13 and spaced side walls 14—14 formed by partial wall members on each section, a horizontal top wall 15 formed on the top section, and a front wall formed by a vertical wall member 16 on the bottom section and a curved wall member 17 on the top section. The top and bottom sections of the housing have flanges 18—18 laterally projecting from the side walls 14 at their meeting edges, the flanges being riveted to each other to secure the sections of the housing together. The top and bottom sections of the housing have the back wall members thereof extended above and below the housing proper, thereby providing securing flanges 19—19 by which the housing is fixed to the end wall 10 of the car, rivets 20—20

being preferably employed, which extend through the flanges and said end wall.

As most clearly shown in Figure 2, the side wall 14 at the lefthand end of the housing is provided with a bearing opening 21 surrounded by an interior annular flange forming a split bearing, the two parts of which are carried by the top and bottom sections of the housing, respectively. The opposite side wall 14 is provided with an outwardly projecting cylindrical hollow boss 22, alined with the opening 21, the inner end section of the boss providing a sleeve-like bearing member. The boss 22 is horizontally divided, one half being formed on the top section and the other half on the bottom section of the housing. The top and bottom sections of the housing are also provided with vertically alined web-like, transverse partition walls 23—23 between the walls 14, each having a half bearing member formed thereon, together providing a complete bearing 24 in axial alinement with the bearing opening 21 and the opening of the boss 22. The partition wall formed by the wall members 23 divides the housing into two chambers, the chamber at the lefthand side, as viewed in Figure 2, being closed by a bottom wall 25 formed on the bottom section 12. The other chamber contains the brake chain winding drum and is open at the bottom, as indicated at 26, to accommodate the brake chain 27 for movement. As will be evident, the brake chain, which is shown broken away, is connected to the brake mechanism proper of the railway car in the usual manner.

My improved hand brake mechanism proper, as illustrated in Figures 1 to 4 inclusive, comprises broadly the following elements, which are disposed within the sectional housing: A chain winding drum A; a worm wheel B; a reciprocating shaft C; an operating lever D; a hand wheel E; a rotary operating shaft F; a worm G; and a spring H.

The chain winding drum A, which is rotatably supported within the housing, has a tapered portion 28 on which the chain 27 is adapted to be wound. The winding portion of the drum is of greatest diameter at the righthand end, as viewed in Figure 2, and has an annular guide flange member 29 at said end. At opposite ends, the drum has cylindrical journal portions 30—30 by which it is rotatably supported, the journal portion at one end of the drum being rotatably supported in the hollow boss 22 and the member 30 at the other end being supported in the bearing member 24 of the partition wall 23. The winding portion of the drum A, adjacent the flange 29, is provided with an outstanding lug 31 to which the end link of the chain 27 is secured in the usual manner. The drum A has a central opening 32 extending lengthwise therethrough, as clearly illustrated in Figures 2 and 4, which opening has portions 33—33 of square cross section at opposite ends and is centrally enlarged between said square portions, as indicated at 34, said enlarged portion 34 being of circular cross section.

As most clearly illustrated in Figure 2, the enlarged circular portion 34 of the opening is preferably tapered, being of largest diameter at the righthand end. At the extreme right-hand end of the drum, as viewed in said figure, that is at the trunnion portion 30, the opening 32 is of circular cross section, as indicated at 35, said circular portion being separated from the adjacent square portion 33 of the opening by an annular rib 36 defining an opening 37 of smaller diameter. The portion 35 of the opening is of such a size as to accommodate one end of the spring H and the rib 36 serves as abutment means for said spring.

The worm wheel B has the upper section at opposite sides thereof provided with trunnion members 38—38 which are journaled respectively in the bearings 21 and 24. The worm wheel B is provided with an opening 39 extending therethrough, the opening 39 being in alinement with the opening 32 of the drum and of square cross section, corresponding in size to the square portions 33 thereof.

The worm wheel B is driven by the worm member G which is formed on the horizontally disposed operating shaft F. The shaft F has its inner and outer portions rotatably journaled in bearing openings in the front and rear walls of the lower section of the housing, the worm of said shaft being disposed in the lefthand chamber of the housing, as seen in Figure 2. At the rear end, the shaft is reduced in diameter, as indicated at 40, said reduced portion being journaled in a bearing opening 41 provided in an inwardly offset portion 42 of the back wall 13 of the bottom section 12 of the housing. The shaft F projects through said wall and has a retaining nut 43 secured thereto, the nut being accommodated in the pocket formed by the offset wall portion and holding said shaft assembled with the housing, a washer being interposed between the nut and said wall. The outer end portion of the shaft F is provided with an enlarged collar section 44 forming a journal member, which is rotatably supported in a bearing opening 45 in the front wall 16 of the bottom section of the housing. The shaft F projects outwardly of the front wall of the housing and the hand wheel E is fixed to said projecting end. The hand wheel E may be fixed to the shaft in any suitable manner, and as herein shown the outer end portion of the shaft is provided with a tapered portion of square cross section fitting within a similar opening provided in the hub of the hand wheel E. The usual securing nut is mounted on the outer end of the shaft F for holding the hand wheel in position.

By providing the opening 45 in the front wall which is of larger diameter than the opening 41, and providing the journal portions of corresponding diameter on the shaft F, the worm shaft, which has the worm member formed integral therewith, may be readily and quickly assembled with the housing by inserting the shaft through the opening 45, the portion of smaller diameter of the shaft and the worm member readily passing through said opening. After the shaft F has been assembled in the manner described, the same is locked in assembled relation by the securing nut 43. As shown in Figure 3, a shim or washer is preferably interposed between the worm portion of the shaft and the bearing on the rear wall of the lower section of the housing.

The shaft C is disposed within the alined openings 39 and 32 of the worm wheel B and the chain winding drum A respectively, and has a section 46 of square cross section slidably fitting within the square opening of the worm wheel and normally projecting within the portion of square cross section 33 at the outer end of the opening 32 of the drum. Inwardly of the square portion 46, the shaft C is provided with a portion of circular cross section 47, normally disposed in the enlarged portion 34 of the opening of the hub of the drum. Spaced from the square portion 46 of the shaft and inwardly of the round portion 47 thereof, the same has a portion of square cross section 48 corresponding in cross sectional size to the square portion 46 and normally fitting within the square part 33 of the opening of the drum at the righthand end thereof, as viewed in Figure 2. Inwardly beyond the square portion 48, the shaft is round, as indicated at 49, and corresponds in diameter to the portion 47. This portion of the shaft extends through the opening 37 defined by the rib 36 and is surrounded by the spring H, which has its opposite ends bearing respectively on the rib 36 and a fixed collar 50 at the extremity of the shaft. The portion 49 of the shaft is accommodated in the hollow boss 22 of the housing. As will be evident, when the shaft C is in the position shown in Figure 2, the worm wheel and drum will be clutched or coupled together for rotation in unison. The square portions of the shaft F and the square parts of the opening in the drum form a cooperating clutch means. The shaft C projects outwardly beyond the left side wall 14 of the housing, as seen in Figure 2, and has a grooved collar member 51 at the outer end thereof. As will be evident, by providing the spaced square clutch sections on the shaft, which cooperate with similarly spaced square portions of the opening in the hub of the drum, a strong driving connection is provided between the shaft and the drum and the strain between the clutching sections is distributed at opposite ends of the drum. It is further pointed out that by providing the two spaced clutch sections on the shaft and drum, double the clutching area is obtained without any increase in the necessary throw of the reciprocating shaft C. Another important feature of the drum construction is that the chain 27 is connected to the righthand end of the drum, as viewed in Figure 2, thereby causing the chain to be wound at that end of the drum first, during the chain tightening operation, and effecting the final winding on the lefthand end portion of the drum. The portion of the chain which is wound during the final tightening operation of the brakes, while heavy pressure is being applied, is on that section of the drum nearest to the connection with the square portion of the shaft C and also closely adjacent the central bearing member, thereby reducing the strain on the drum.

The operating handle lever D has a yoke-like upper end portion 52 and an outwardly offset hand grip portion at the lower end. The yoke portion of the lever D is pivotally hung on the housing between a pair of spaced outstanding lugs 53—53 formed integral with the corresponding side wall of the housing, a pivot bolt 54 being employed which extends through the lugs and the upper parts of the side arms of the yoke 52. The yoke portion of the lever embraces the groove collar 51 and has cylindrical pin-like projecting members 55—55 on the inner faces of the side arms, which engage within the annular groove of the collar. As will be evident, the lever D forms a shipper member for shifting the shaft C lengthwise of the openings in the worm wheel B and the chain winding drum A. In the normal position of the parts, when the shaft C is so disposed as to clutch the worm wheel B to the drum A, the lever D is in the pendent position illustrated in Figures 1 and 2. When it is desired to uncouple the worm wheel B from the drum A, the lever D is swung to the left, as viewed in Figures 1 and 2, thereby pulling the shaft C outwardly to the left and disengaging the square portions thereof from the drum A, thereby permitting rotation of the drum A with respect to the worm wheel. In order to limit the outward movement of the shaft, stop means is provided for limiting the movement of the lever D, the yoke member of the lever D being extended above the pivot thereof for this purpose and being engageable with the housing wall when the lever handle is swung outwardly. When the shaft is in the last named position, the righthand end portion thereof, as viewed in Figure 2, is supported by the chain winding drum, the cylindrical section 49 of the shaft having bearing in the opening 37 at the rib 36. As will be evident, due to the influence of gravity on the lever D, the same is urged to swing downwardly when released by the operator,

thereby automatically reengaging the square portions of the shaft C with the square portions of the opening of the drum A. In order to assist in the restoring operation of the shaft C, the spring H is also employed. When the shaft C is shifted to the left, as viewed in Figure 2, the spring H will be compressed between the collar 50 on the shaft and the rib 36 and will urge the shaft C to the right when the lever D is released. In case the square portions of the shaft C are not in alinement with the square portions 33—33 of the opening 32 of the drum A so as to register with the same, a slight rotation of the hand wheel E will effect rotation of the worm wheel B and the shaft C to the necessary extent to bring the square portions of the shaft C into registering relation with the square portions of the openings of the drum. When the shaft C is shifted so as to disengage the clutching portions thereof, the square section 48 of the shaft is accommodated in the enlarged portion 34 of the opening of the drum A, thereby permitting the drum to freely rotate on said shaft.

Although the spring H has been shown and described as used in conjunction with the lever D to return the shaft C automatically to clutching position, it will be evident that the spring is not absolutely necessary to effect returning movement of the shaft and that the same may be omitted, the action of gravity of the lever D, when displaced, being all that is necessary to effect return of the shaft C. The spring H is employed merely to assure the quick return of the shaft.

In the operation of my improved hand brake mechanism, as illustrated in Figures 1 to 4 inclusive, assuming that the brakes are being applied, the hand wheel E is rotated in a righthand or clockwise direction, as viewed in Figure 1. Inasmuch as the shaft C is in clutching engagement with the chain winding drum, as shown in Figure 2, rotation of the worm member G through the hand wheel will effect rotation of the worm wheel B and through the shaft C rotation of the chain winding drum in a direction to wind the chain 21 thereon. When the brakes have been tightened to the desired extent, the same will be maintained in said tightened condition due to the enormous friction existing between the teeth of the worm gear B and the worm G. When it is desired to release the brakes, the operator swings the lever D to the left, as viewed in Figures 1 and 2, thereby disengaging the square portions of the shaft C from the drum A, as hereinbefore pointed out. Free rotation of the chain winding drum A is thus permitted, thereby effecting instantaneous and full release of the brakes.

When it is desired to ease off the brakes, the hand wheel E is rotated in a contra-clockwise direction while the shaft C is in clutching engagement with the drum A, as shown in Figure 2. As will be obvious, this operation of the hand wheel effects rotation of the chain winding drum in a proper direction to unwind the chain.

Referring next to the embodiment of the invention illustrated in Figure 5, the same comprises broadly the following elements, which are disposed within a sectional housing 111 similar to the housing 11; a chain winding drum A′; a worm wheel B′; a reciprocating shaft C′; an operating lever D′; a rotary operating shaft F′ provided with a hand wheel similar to the wheel E, but not shown; and a worm G′.

The chain winding drum A′, which is rotatably supported within the housing, has a substantially cylindrical portion on which the brake chain 127 is adapted to be wound. At opposite ends of the cylindrical portion, the drum A′ is provided with annular flange members 129—129. At opposite ends of the drum outwardly of the flanges 129, the same is provided with journal portions 130—130, the journal portion at the righthand end of the drum being rotatably supported in the two part split bearing members 160 at the corresponding side of the housing. The journal member 130 at the inner end of the drum is rotatably supported in the two part bearing member 124 on the partition walls 123. The winding portion of the drum A′ is provided with an outstanding lug 131 to which the end link of the chain 127 is secured in the usual manner. The drum A′ has a central opening 132 extending lengthwise therethrough, which opening is preferably of square cross section, as shown.

The worm wheel B′ has the hub section at the inner side thereof provided with a trunnion member 138, which is journaled in the partial bearing 124. At the outer end, the hub of the worm wheel B′ is reduced to provide a similar trunnion member 138, which is journaled in the two part bearing member 121 on the corresponding side wall of the housing. The worm wheel B′ is provided with an opening 139 extending therethrough, the opening 139 being in alinement with the opening 132 of the drum member and of square cross section, corresponding in size to the opening 132.

The worm wheel B is driven by the worm member G′, which is fixed to the horizontally disposed operating shaft F′, which corresponds to the operating shaft F, hereinbefore described, and operated in a similar manner by the usual hand wheel.

The shaft C′ is disposed within the alined openings 139 and 132 of the worm wheel B′ and the chain winding drum A respectively, and has a section 146 of square cross section slidably fitting within the square openings of the worm wheel and drum. At the inner end, the shaft C′ is provided with a portion

of circular cross section 147. In the normal position of the parts the portion 146 of square cross section of the shaft is disposed within the opening 139 of the worm wheel B′ and projects inwardly beyond said worm wheel, said square projecting portion being engaged within the square opening 147 of the drum A. As will be evident, when the shaft C is in the position shown in the drawings, the worm wheel and drum will be clutched, or coupled together for rotation in unison. The shaft C′ projects outwardly beyond the lefthand side wall of the housing and has a grooved collar member 151 at the outer end thereof formed integral therewith.

The operating handle lever D′ has a relatively long straight outer portion and a relatively shorter inner end portion 152 angularly offset with respect to the remainder thereof. The lever D′ is pivotally supported on the housing between a pair of spaced outstanding lugs 153—153 formed integral with the corresponding side wall of the housing. The inner end of the lever is secured to a relatively short sub-shaft 161 journaled in the lugs 153—153. The shaft 161 has a forked member 162 secured thereto, the outer ends of the arms of the fork portion of the member 162 being provided with cylindrical pin-like projecting members 155—155, which engage within the annular groove of the collar 151. As will be evident, the lever D′ together with the member 162 forms a shipper lever for shifting the shaft C′ lengthwise of the openings in the worm wheel B′ and the chain winding drum A′. In the normal position of the parts, when the shaft C′ is so disposed as to clutch the worm wheel B′ to the drum A′, the lever D′ is in the pendent position illustrated. When it is desired to uncouple the worm wheel B′ from the drum A′, the lever D′ is swung to the left, thereby pulling the shaft C′ outwardly to the left and disengaging the inner end of the square portion thereof from the drum A′, thereby permitting rotation of the drum A′ with respect to the worm wheel B′. When the shaft is in the last named position, the righthand end portion thereof is supported by the chain winding drum A′, the cylindrical section of the shaft bearing on the walls of the square opening 132 of the drum. As will be evident, due to the influence of gravity on the lever D′, the same will be urged to swing downwardly when released by the operator, thereby automatically reengaging the outer end of the square portion of the shaft C′ with the square opening of the drum A′.

In the operation of my improved hand brake mechanism, as illustrated in Figure 5, assuming that the brakes are being applied, and the shaft C′ is in clutching engagement with the chain winding drum, rotation of the worm member G′ through the hand wheel will effect rotation of the worm wheel B′ and through the shaft C′ rotation of the chain winding drum in a direction to wind the chain 127 thereon. When it is desired to release the brakes, the operator swings the lever D′ to the left, thereby disengaging the square portion of the shaft C′ engaged with the drum A′ from the drum, as hereinbefore pointed out. Free rotation of the chain winding drum A′ is thus permitted.

When it is desired to ease off the brakes, the shaft C′ is left in clutching engagement with the drum A′ and the worm wheel rotated in the proper direction to unwind the chain.

I have herein shown and described what I now consider the preferred manner of carrying out my invention, but the same is merely illustrative and I contemplate all changes and modifications that come within the scope of the claims appended hereto.

I claim:

1. In a hand brake mechanism, the combination with a chain winding drum member; of a worm wheel member, said members being provided with alined openings; a shaft for operatively connecting said members, said shaft being disposed within the opening of one of said members and connected to said member for rotation in unison therewith and being slidable with respect to both of said members to be engaged within and disengaged from the opening of the other member, the shape of the opening of said last named member and the cross section of the shaft being such that the shaft is clutched to said last named member when engaged therewith to effect rotation thereof in unison with the other member; worm means for rotating said worm wheel member; and manually operated means for actuating said sliding shaft.

2. In a hand brake mechanism for railway cars, the combination with a chain winding drum member; of a worm wheel member, said members being in axial alinement and having alined openings therein, the openings of said members being of non-circular cross section; a reciprocating shaft having a portion thereof corresponding in cross section to the non-circular opening of one of said members and slidable therein, said portion of non-circular cross section of the shaft fitting the opening of said member, whereby the shaft and said member are rotatable in unison, said shaft being slidable to project and engage a portion of the non-circular section thereof with the opening of the other member to connect said members for rotation in unison; a manually actuated means for reciprocating said shaft; a worm element engaged with said worm wheel member for actuating the same; and manually operated means for actuating said worm member.

3. In a hand brake mechanism for railway cars, the combination with a chain winding drum member; of a worm wheel member, said

members being in axial alinement and having alined openings therein, the openings of said members being of rectangular cross section; a reciprocating shaft having a portion thereof corresponding in cross section to the rectangular opening of one of said members and slidable therein, said portion of rectangular cross section fitting the opening of said member, whereby said member and shaft are rotatable in unison, said shaft being slidable to project a portion of the rectangular section thereof into the opening of the other member to clutch said members together for rotation in unison; manually actuated means for reciprocating said shaft; a worm element engaged with said worm wheel member for actuating the same; and manually operated means for actuating said worm member.

4. In a hand brake mechanism, the combination with a chain winding drum; of a worm wheel, said drum and worm wheel being rotatable about a common axis and having alined openings of rectangular cross section therein; a shaft slidably mounted in said openings, said shaft having a portion of circular cross section and a portion of rectangular cross section, said portion of rectangular cross section corresponding in size to the rectangular openings of said drum and worm wheel and being normally engaged with both the worm wheel and drum; a rotatable worm member meshing with the worm wheel; manually actuated means for rotating said worm member; and lever means for actuating said slidable shaft for disengaging the rectangular section thereof from said drum, thereby destroying the driving relation between the worm wheel and drum to permit free running of the drum to release the brakes.

5. In a hand brake, the combination with a sectional housing secured to the end wall of the car, said sectional housing comprising top and bottom members each having partial bearing elements formed thereon, said partial bearing elements forming complete bearing members when the sections of said housing are assembled; of a chain winding drum having journal members at opposite ends thereof; a worm wheel also having journal members at opposite ends thereof, said drum and worm wheel being in axial alinement and having alined openings therein of non-circular cross section; bearing means on said housing cooperating with the journal members at the inner ends of said drum and worm wheel, the journal members at the outer ends of said drum and worm wheel being supported in said bearing members of the housing; a shaft having a portion of non-circular cross section normally engaged within the openings of both the worm wheel and drum to effect rotation in unison thereof; an operating shifter lever pivoted to the housing and operatively connected to said shaft for reciprocating the same to disengage the non-circular portion thereof from one of said members to permit relative rotation of the drum and worm wheel; a manually actuated operating shaft journaled in the housing; and a worm element rotatable with the operating shaft and meshing with the worm wheel.

6. In a hand brake mechanism for railway cars, the combination with a support adapted to be secured to a car wall; of a chain winding drum and a driving member mounted on said support for rotation about a horizontal axis, said drum and driving member having alined openings; slidable means including a shaft extending into said openings for clutching the driving member to the drum and disengaging the same therefrom; a manually operated pivoted lever for actuating said shaft, said lever holding said slidable means in clutching engagement through the action of gravity; and means for rotating said driving member.

7. In a hand brake mechanism, the combination with a chain winding drum member; of a drive member, said members being rotatable about a common axis and having alined openings therein, each opening having a portion of rectangular cross section; sliding clutch means having locking sections of angular cross section cooperating with said angular portions of said openings of both members, said clutch means when shifted in one direction operatively engaging the drive member and winding member, and when shifted in a reverse direction disconnecting the same to permit free running of the winding member; and gravity influenced means for automatically shifting the clutch to operatively engage said driving member and winding member, said gravity influenced means being manually operable to actuate said clutch means; and means for rotating said drive member.

8. In a hand brake mechanism, the combination with a chain winding member; of a drive member, said members being rotatable about a common axis and having alined openings therethrough; a sliding clutch shaft movable lengthwise of said openings and rotatable in unison with one of said members, said shaft and the other member each having spaced cooperating clutch means thereon engageable when said shaft is shifted in one direction to operatively connect said members for rotation in unison and shiftable in a reverse direction to disengage said clutch means from the cooperating members, thereby permitting relative rotation of said members and free running of the chain winding member to release the brakes; and means for rotating said drive member.

9. In a hand brake mechanism, the combination with a chain winding drum member; of a worm wheel member, said members being provided with alined openings; a shaft for

operatively connecting said members, said shaft being disposed within the opening of one of said members and connected to said member for rotation in unison therewith and being slidable with respect to both of said members to be engaged within and disengaged from the opening of the other member, the shape of the opening of said last named member and the cross section of the shaft being such that the shaft is clutched to said last named member when engaged therewith to effect rotation thereof in unison with the other member; worm means for rotating said worm wheel member; manually operated means for actuating said sliding shaft; and spring means for yieldingly forcing said shaft into clutching engagement.

10. In a hand brake mechanism for railway cars, the combination with a chain winding drum member; of a worm wheel member, said members being in axial alinement and having alined openings therethrough, a part of the opening of each member being of non-circular cross section; a reciprocating clutch shaft having spaced clutch portions corresponding in cross section to the non-circular portions of said openings, said clutch shaft being shiftable in said openings of said members and one of the non-circular sections thereof having constant clutching engagement with the non-circular portion of the opening of one of said members, said shaft being slidable to engage the other portion of non-circular cross section thereof with the non-circular portion of the opening of the other member to connect said members for rotation in unison; manually actuated means for reciprocating said shaft; a worm element engaged with the worm wheel member for actuating the same; and manually operated means for actuating said worm member.

11. In a hand brake for railway cars, the combination with a worm wheel member; of a chain winding drum member, said members being in axial alinement and having alined openings therethrough, the opening of one of said members being of rectangular cross section and the other member having spaced portions of the opening thereof of rectangular cross section; a reciprocating shaft having a portion thereof corresponding in cross section to the rectangular opening of said first named member and fitting within the same and having a portion spaced therefrom of rectangular cross section also, said shaft being shiftable to project a portion of each of said spaced rectangular portions thereof within the spaced rectangular portions of the opening of the second named member to clutch said members together for rotation in unison; manually actuated means for reciprocating said shaft; a worm element engaged with said worm wheel; and manually operated means for actuating said worm element.

12. In a hand brake mechanism, the combination with a chain winding drum; of a worm wheel, said worm wheel and drum being rotatable about a common axis and having alined openings, the opening of said worm wheel being of rectangular cross section, and the opening of said drum being of rectangular cross section at opposite ends and of enlarged size centrally thereof; a clutch shaft slidable lengthwise of said openings, said shaft having a portion of rectangular cross section fitting said rectangular opening of the worm wheel and projecting into said drum and fitting the rectangular opening at one end thereof, and a second portion of rectangular cross section fitting the rectangular opening at the other end of the drum, the shaft intermediate said rectangular portions being of reduced thickness, said clutch shaft operatively connecting said worm wheel and drum and being shiftable to disengage the rectangular portions thereof from the rectangular openings of the drum to permit free running of the drum to release the brakes, said second named portion of rectangular cross section of the shaft being accommodated in the central enlarged portion of the opening of the drum when said shaft is shifted to disengaged position; a rotatable worm member operatively engaging the worm wheel; manually actuated means for rotating said worm member; and manually actuated means for shifting said clutch shaft.

13. In a hand brake, the combination with a chain winding drum; of a driving worm wheel, said drum and wheel having alined openings; a sliding clutch shaft extending through said openings and movable lengthwise therein; an operating lever connected to one end of the clutch shaft for shifting the same; spring means having shouldered engagement with the other end of said shaft and the drum for returning said shaft to normal position; cooperating clutch formations on said shaft, worm wheel and drum for connecting and disconnecting the same; and a manually actuated worm member for operating the said worm wheel.

14. In a hand brake mechanism, the combination with a chain-winding member; of a drive member, said members being rotatable about a common axis and having aligned axial openings, the opening of one of said members being of non-circular cross-section; a sliding clutch element movable lengthwise of said openings, said element having a portion of non-circular cross-section engaged within the opening of non-circular cross-section to connect said clutch element to said member for rotation therewith but permitting relative sliding movement thereof, said element and the other member having cooperating interengaging clutch formations thereon operatively connecting said members for rotation in unison; means for sliding said element to disengage the same from said last named

member, thereby permitting relative rotation of said members and free running of the chain-winding member to release the brakes; and means for rotating said drive member.

In witness that I claim the foregoing I have hereunto subscribed my name this 24th day of April, 1930.

ROLAND J. OLANDER.