Sept. 12, 1933. W. F. RICHARDS 1,926,175

HAND BRAKE

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Fig. 1

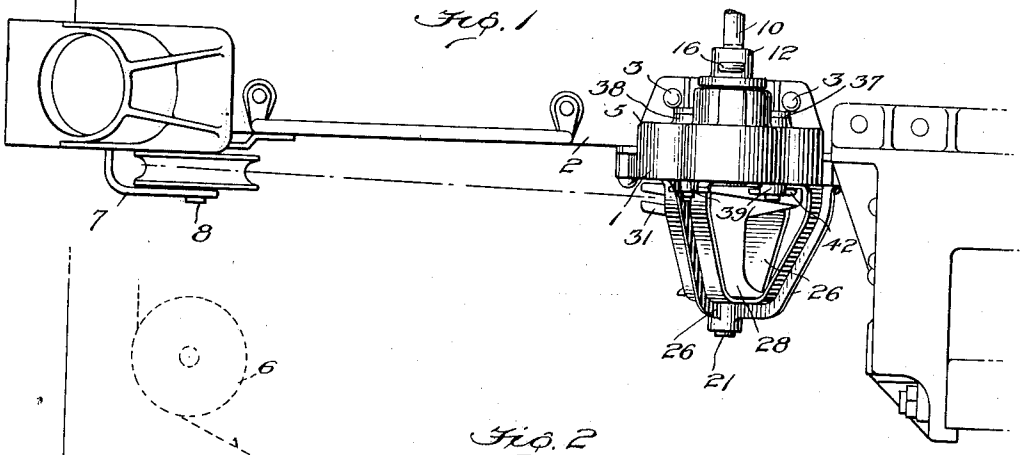


Fig. 2

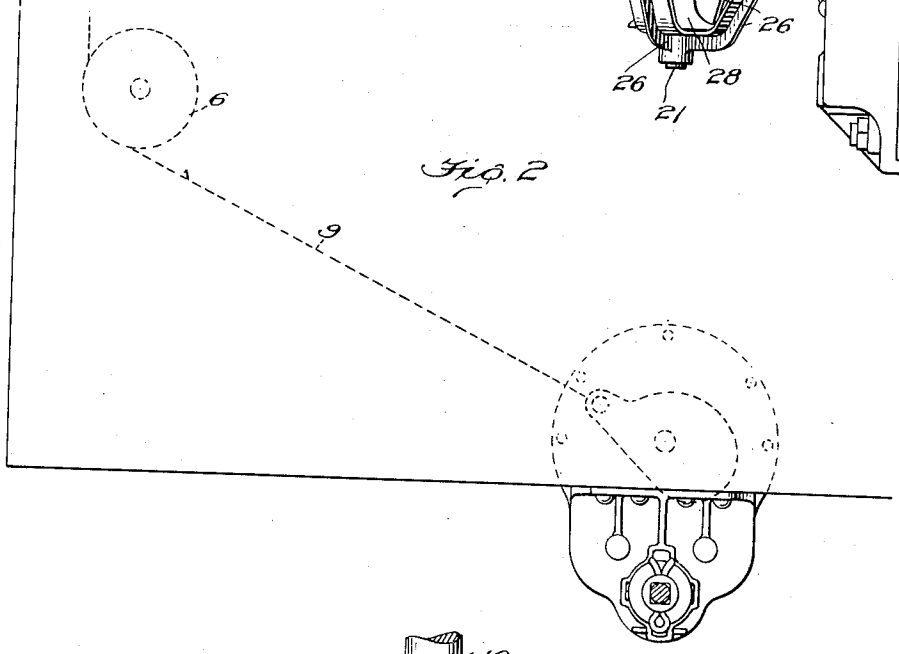
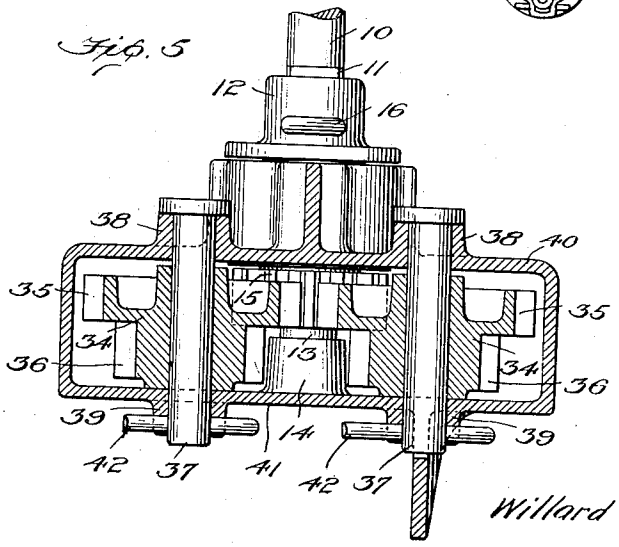


Fig. 5



Inventor

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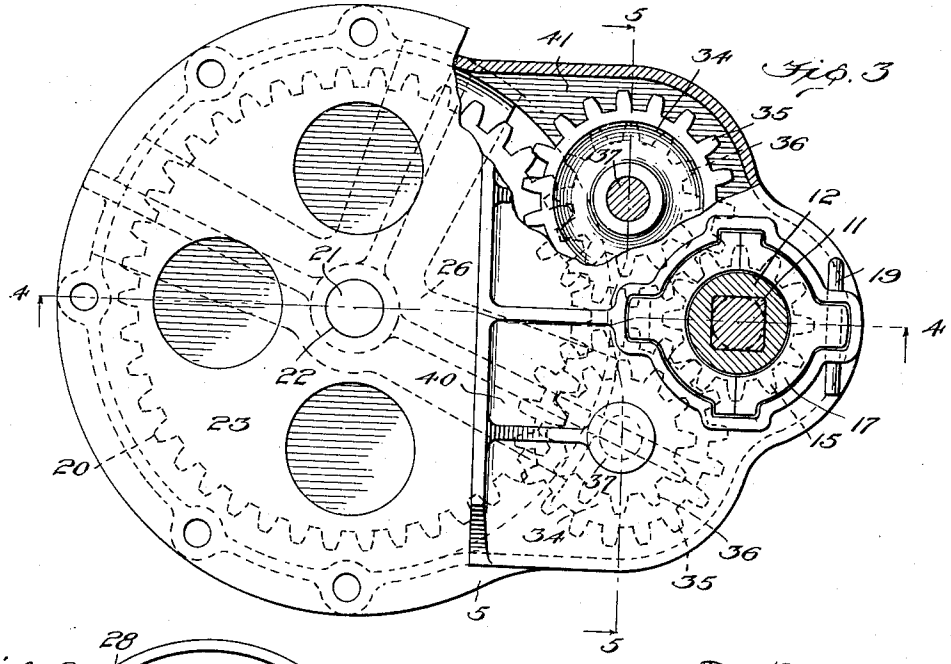
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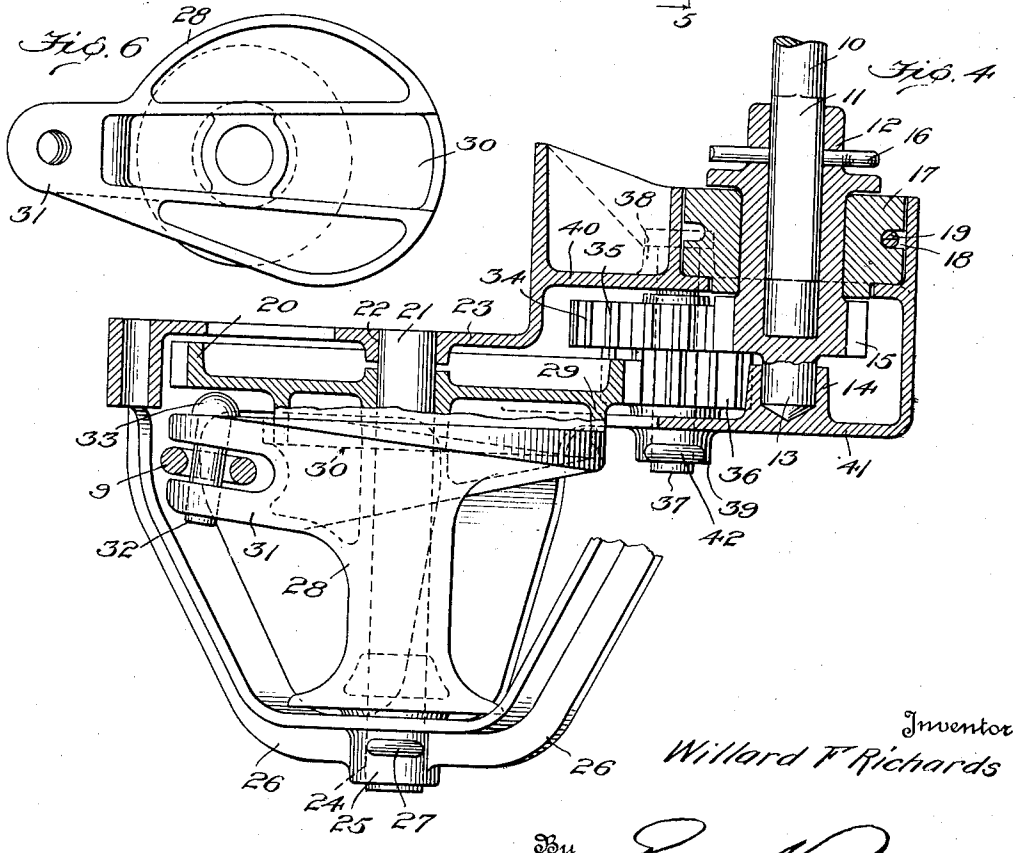
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Sept. 12, 1933. W. F. RICHARDS 1,926,175

HAND BRAKE

Filed Nov. 18, 1927 2 Sheets-Sheet 2





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Patented Sept. 12, 1933 1,926,175

UNITED STATES PATENT OFFICE

1,926,175

HAND BRAKE

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Application November 18, 1927
Serial No. 234,238

5 Claims. (Cl. 74—112)

This invention relates to hand brakes and, more particularly, to a geared brake with a high gear ratio whereby a large amount of force may be readily applied to the brake rigging of a car.

The principal object of my invention, generally considered, is to provide a geared hand brake in which all the pinions and gears are enclosed in a single housing and in which a double reduction in the gearing together with a decrease in the size of the gears is effected by providing a plurality of double intermediate pinions which are engaged by the driving pinion simultaneously with their operation on the main gear which acts directly on the winding drum for the brake chain.

An object of my invention is to provide a geared hand brake in which the brake staff or shaft has a driving pinion thereon, which pinion, instead of directly engaging the main gear, acts on intermediate pinions which, in turn, operate the main gear whereby a double drive for said main gear is effected permitting the use of a relatively light gear.

Another object of my invention is to provide a geared hand brake in which a double gear reduction is provided between the driving pinion and main gear whereby all gears and pinions may be made small permitting the employment of a compact gear assembly.

A further object of my invention is the provision of a geared hand brake mechanism in which all the gears and pinions are enclosed in a unitary housing, which housing is provided with angular braces extending from below and serving to support the lower end of the drum pivot and preferably formed integral with the gear housing.

A still further object of my invention is the provision of brake mechanism in which the main gear and brake winding drum are formed in two pieces and the head of the chain retaining pin is held in place therebetween, thereby obviating the necessity of a pin retaining cotter.

Other objects and advantages of the invention relating to the particular arrangement and construction of the various parts will become apparent as the description proceeds.

Referring to the drawings illustrating my invention, the scope whereof is defined by the appended claims:

Figure 1 is a fragmentary end elevation of a railway car to which an embodiment of my invention has been applied.

Figure 2 is a fragmentary plan, partly in section, of the arrangement shown in Figure 1.

Figure 3 is a plan of the brake gearing housing showing the pinions and gear enclosed therein, a portion of said housing being broken away to more clearly show the gearing.

Figure 4 is a vertical sectional view on the line 4—4 of Figure 3 looking in the direction of the arrows, the brake chain winding drum being shown in side elevation.

Figure 5 is a vertical sectional view on the line 5—5 of Figure 3 looking in the direction of the arrows.

Figure 6 is a plan of the brake chain winding drum detached from the associated mechanism.

Referring to the drawings in detail, like parts being designated by like reference characters, there is illustrated the brake gearing assembly 1 connected to the end of a car 2 as by means of rivets or other connecting means 3 applied through flange portions of the housing 5 of the gear mechanism. A guiding sheave 6 is pivotally mounted underneath the car on a bracket 7 by means of a pivot pin 8 and serves for guiding the brake chain 9 diagonally toward the side of the car and, from there, to the brake rigging, as will be understood by those skilled in the art.

The brake mechanism, in accordance with the present embodiment of my invention, involves a brake shaft or staff 10, the upper end of which may have any suitable manual operating means (not shown) such as a wheel or lever and the lower end of said shaft is preferably formed with an angular portion 11 fitting in a hub 12, the lower end of said hub being formed as a pivot 13 secured in a step bearing 14 in the brake gear housing 5. By forming the angular portion 11 on the lower part of the brake staff 10, the hub portion 12, which is provided with a toothed portion 15 forming a driving pinion for the mechanism, is properly driven by said shaft. Retainer means such as a cotter 16 is desirably provided for holding the staff 10 and drum 12 in assembled position. The intermediate portion of said drum 12 is formed circular in cross section and removable bearing members 17 are provided which are held in a correspondingly shaped pocketed portion 18 in the housing 5 by securing means such as a cotter 19.

The main gear 20 is pivotally mounted in the housing 5 by means of a pivot pin 21, the upper end of which is secured in a corresponding aperture 22 in the wall 23 of the housing which is

adapted to underlie the associated car 2. The lower end of said pin 21 is secured in a suitable aperture 24 formed in a hub or portion 25 adjacent the intersection of three angular braces 26 extending downwardly and toward each other from the main portion of the housing 5 and is secured in place after being inserted from below by means of a cotter or other desirable securing means 27. The chain winding drum 28 is mounted on the pivot pin 21 but is preferably separate from the main gear and is interlocked therewith, however, when assembled, in any desired manner as by means of the extension 29 from the lower face of said gear being received in a corresponding pocket or notch 30 in the upper face of the drum 28. Said drum is preferably provided with an arm 31 to the end of which the brake chain 9 is secured as by means of a pin 32 inserted from above and prevented from loss or removal after assembly with the gear 20 by having the head 33 thereof held between the lower face of the gear and the upper face of the drum as most clearly shown in Figure 4. The drum 28 is preferably formed so that the chain 9 is rapidly wound up at first, the rate of winding of said chain gradually decreasing with an increase in the available force in a manner well known to those skilled in the art.

Instead of providing for the direct engagement between the driving pinion 15 and the main gear 20, a plurality or pair of intermediate pinions 34 are provided. Said pinions, in the present embodiment, are of the integral or unitary double variety with an upper toothed portion 35 of relatively large diameter engaged by the driving pinion 15 and a lower toothed portion 36 engaging the main gear. Said pinions are pivotally mounted on pins 37 extending through bosses 38 and 39 in the walls 40 and 41 of the housing 5 and secured in position by any desired means such as the cotters 42 extending through the lower ends of the pins 37 and the lower bosses 39, thereby not only preventing undesired removal of said pins but preventing rotation thereof with respect to the housing.

From the foregoing disclosure of my invention, it will be apparent that I have devised a geared hand brake in which the main gear may be made with a narrow tooth face and thereby formed relatively light in weight. In order to have a sufficient area of engagement between the gear and pinion teeth, two intermediate pinions are provided which simultaneously engage the gear, thus making double the number of teeth engaged than if a single intermediate pinion were employed.

By using double intermediate pinions with the upper toothed portions formed relatively large and engaged by the driving pinion and the lower toothed portions relatively small and engaging the driven gear, a double reduction in gear ratio is obtained, thereby making it possible to use relatively small gears and pinions with a more compact mechanical arrangement. The gearing is housed within the main bracket housing and thus protected. The brake mast or driving pinion is removable from the top of the housing at its bearing which is preferably made in two pieces having projections for the purpose or resting on the ledge of the housing to sustain the weight of the brake mast and its parts, providing the collar above the bearing comes in contact with the bearing, which it is liable to do owing to the variations in the castings. The three angular braces cast integral with and depending from the housing securely hold the pivot pin of the chain winding drum and main gear at its lower end and thereby firmly sustain the pull of the brake chain. The angular arrangement of these braces, as shown by the drawings, is occasioned by the particular application of the brake to the car involving a diagonal pull on the brake chain.

The chain winding drum is a separate part from the main driving gear and operated thereby and interlocked therewith, the construction shown being for the purpose of ease in removing or assembling the parts and to make a strong driving connection between the gear and the chain drum. By virtue of having the drum and gear in separate pieces, the chain retaining pin in the extended arm of the drum does not require a cotter or other means to hold it in place. The pivot pin of the chain drum is removable from the bottom and held from rotating in the bracket housing to prevent wear of the pin holes, thus causing all the wear to occur on the pivot pin and in the bearing hole of the chain drum and gear. These parts can be easily replaced whereas the main housing bracket may, in most cases, be riveted to the car structure through the connecting apertures illustrated not only in the vertical wall of the housing adjacent the end of the car but also in the horizontal wall thereof which directly underlies said car. This horizontal wall, if desired, may be lightened by the provision of the relatively large circular apertures illustrated. The chain drum arm is given the particular configuration disclosed and is so connected to the drum that it efficiently guides the chain therearound, it being apparent that this type of brake mechanism provides for quickly picking up the slack in the chain at the start and eventually provides for applying a large amount of force thereto.

Having now described my invention I claim:

1. A brake mechanism comprising a driving pinion, a chain winding drum, gearing therebetween providing a multiple reduction in driving ratio, and a housing for said pinion, drum and gearing, said pinion comprising a hub portion between a supporting flange and the toothed portion of the pinion, and removable bearing members embracing said hub portion and received in a pocket in the housing.

2. A brake mechanism comprising a driving pinion, a chain winding drum, a main gear connected to said drum, a plurality of intermediate pinions engaged by the driving pinion and engaging the main gear for furnishing a multiple drive therebetween, and a housing for said pinions, drum and gear, said housing being pocketed and removable bearing members held in said pocket and, in turn, serving to mount the driving pinion in place.

3. A brake mechanism comprising a main gear, a housing enclosing said gear, means pivotally mounting said main gear in the housing, a chain winding drum mounted on said pivotal means, means extending between said gear and drum for operatively connecting the same for simultaneous rotation in both directions, and means for connecting an associated brake chain to said drum comprising a pin extending through apertured portions of the drum with the head thereof normally disposed between the gear and drum, whereby undesired removal of the pin is prevented.

4. In a brake mechanism, in combination, a

housing with a pocket, a driving pinion, formed by a toothed portion and having a supporting flange rotatably mounted therein and comprising a hub portion disposed between said flange and the toothed portion thereof, and removable bearing members embracing said hub portion and received in the pocket of the housing.

5. A brake mechanism comprising a pivotally mounted main gear, a chain winding drum pivotally mounted therebeneath, means extending between said drum and gear for operatively connecting the same for simultaneous rotation, and means for connecting an associated brake chain to said drum comprising a pin extending through apertured portions of the drum with a head normally disposed between the gear and drum whereby undesired removal of the pin is prevented by said gear without auxiliary retaining means.

WILLARD F. RICHARDS.