Dec. 31, 1929. P. B. CAMP 1,741,148

BRAKE MECHANISM FOR RAILWAY CARS

Filed Feb. 10, 1927 3 Sheets-Sheet 1

Fig. 1

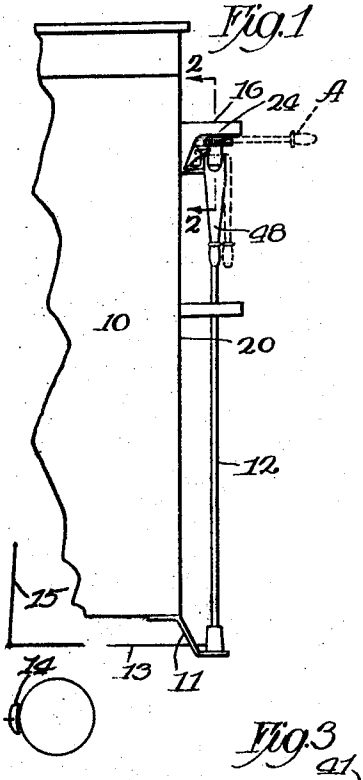


Fig. 2

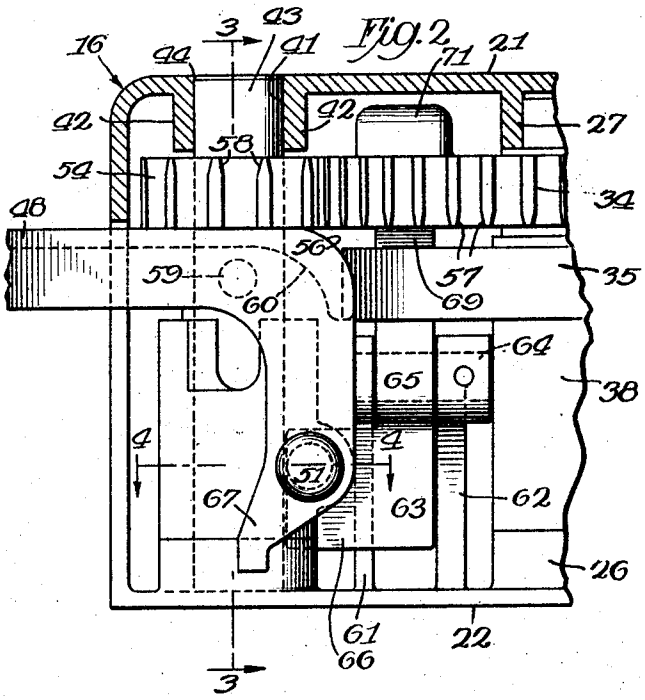


Fig. 3

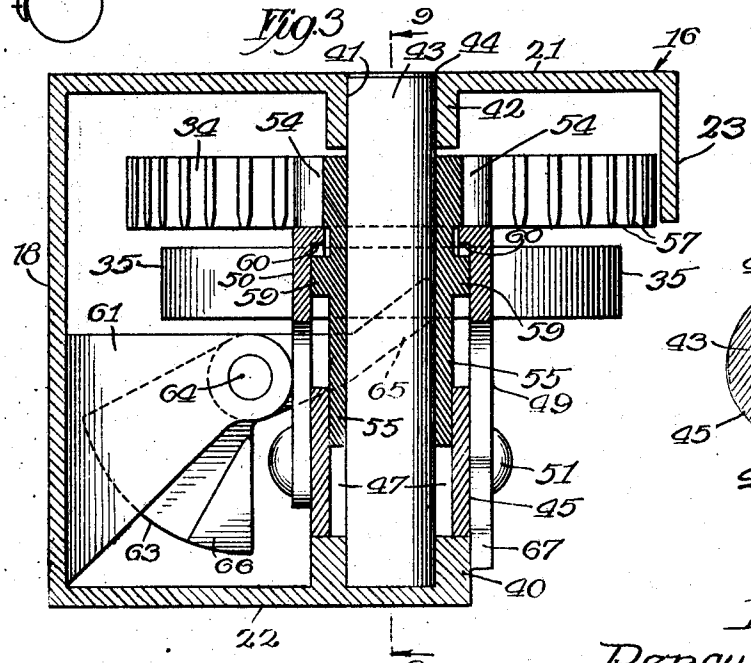
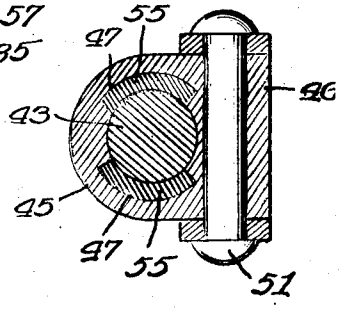


Fig. 4



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BRAKE MECHANISM FOR RAILWAY CARS

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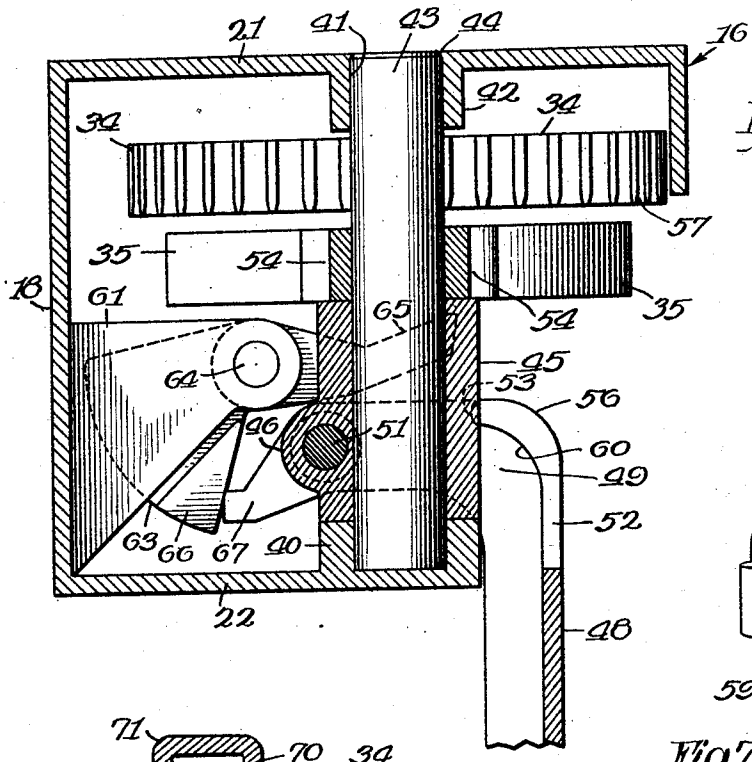


Fig.5

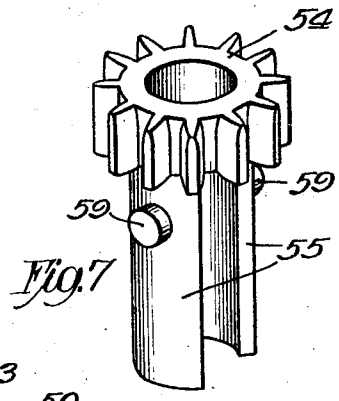


Fig.7

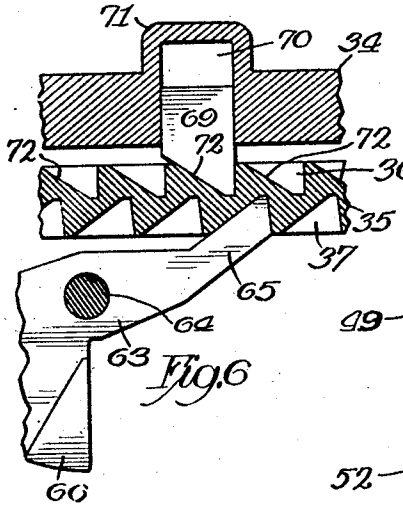


Fig.6

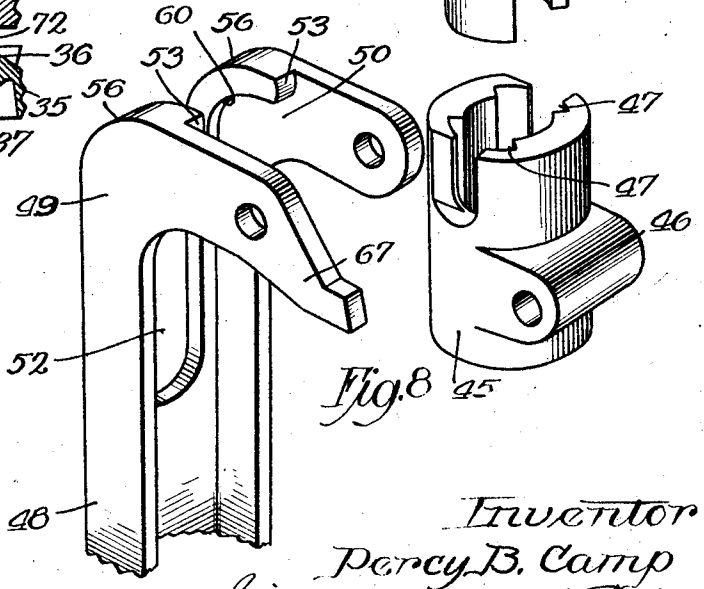


Fig.8

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BRAKE MECHANISM FOR RAILWAY CARS

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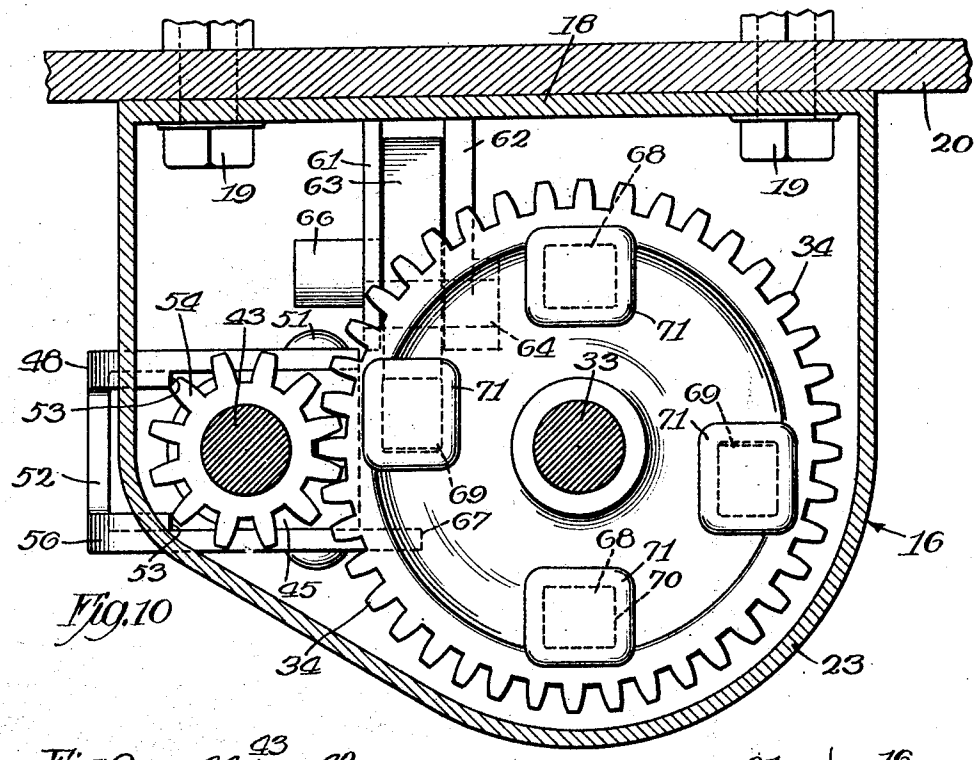
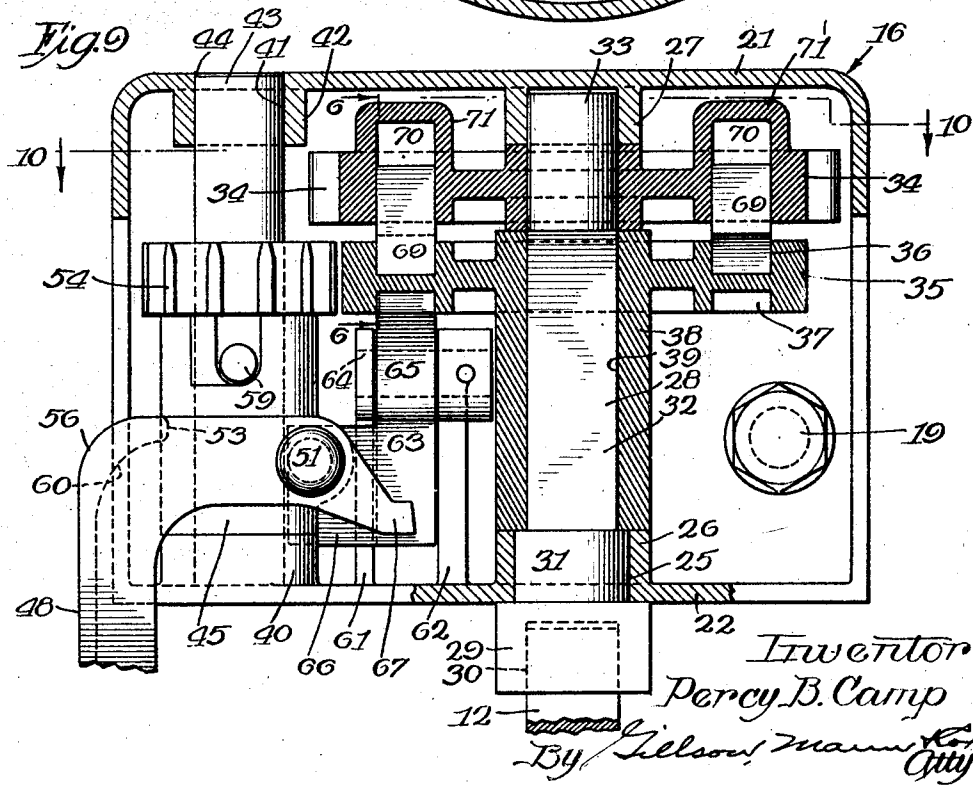


Fig. 10

Fig. 9



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UNITED STATES PATENT OFFICE

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BRAKE MECHANISM FOR RAILWAY CARS

Application filed February 10, 1927. Serial No. 167,148.

In recent years hand brakes have been provided with a variety of power-multiplying devices to enable the brakeman to apply the brakes by hand with pressure comparable to an application by air. The mechanical advantage of these power-multiplying devices, however, presents a corresponding disadvantage in releasing the brakes, and as a result it has been found that the brakes cannot be depended upon to release automatically. An effort has been made to overcome this objection by providing means with which the brakeman can positively release the brakes, but experience indicates that brakemen cannot be relied upon to operate such means.

The principal object of this invention is to provide a hand brake with power-multiplying means capable of developing the desired brake pressure, and that will assume a neutral or disengaged condition when the brakes are to be released.

In the preferred embodiment here illustrated it is the object to provide the hand brake with gearing affording the desired mechanical advantage and automatically assuming a neutral or disengaged position when the handle is placed in position to release the brakes.

Further objects and advantages of the invention will appear as the disclosure proceeds and the description is read in connection with accompanying drawings, in which

Fig. 1 is a side elevation of a fragment of a railway car equipped with a brake mechanism embodying the invention;

Fig. 2 is a vertical transverse section taken on the line 2—2 of Fig. 1;

Fig. 3 is a vertical longitudinal section taken on the line 3—3 of Fig. 2;

Fig. 4 is a horizontal transverse section taken on the line 4—4 of Fig. 2;

Fig. 5 is a vertical longitudinal section similar to Fig. 3, but with the drop handle shown in position to release the holding pawl;

Fig. 6 is a vertical transverse section taken on the line 6—6 of Fig. 9;

Fig. 7 is a perspective view of a driving gear or pinion operated by the drop handle;

Fig. 8 is a perspective view of a fulcrumed sleeve and the drop handle slightly displaced;

Fig. 9 is a vertical transverse section taken on the line 9—9 of Fig. 3; and

Fig. 10 is a horizontal transverse section taken on the line 10—10 of Fig. 9.

The general organization is shown in Fig. 1, where 10 indicates the end portion of a railway car equipped with a brake shaft step 11, in which the lower end of a brake shaft 12 is journaled to cooperate with a brake chain 13, by which the hand power is transmitted to the brakes 14 through the foundation brake gear, diagrammatically indicated by the cylinder lever 15. All these parts are conventionally shown and may be of any form desired.

The new parts comprise a commercial unit assembled in a frame or housing, generally indicated in Fig. 1 at 16, and capable of ready application to either new cars or existing cars. The frame or housing is a box-like casting including a rear wall 18, perforated to receive bolts 19 for securing it to the car end 20. Projecting forwardly from this rear wall is a top 21, a bottom 22, and a curving wall 23 (Fig. 10), which is cut away at the front and sides along the line 24, as best illustrated in Fig. 1.

The bottom 22 (Fig. 9) has an opening 25 adapted to align with the brake shaft 12, and surrounded by an upwardly projecting cylindrical boss 26. A similar boss 27 projects downwardly from the top 21, and is also in alignment with the brake shaft. Mounted in these bosses is a stub shaft, generally indicated by 28. Its lower end is enlarged at 29 and provided with a square pocket 30 to receive the upper end of the brake shaft 12. Just above the enlargement 29 is a cylindrical portion 31, received within the boss 26. Above the cylindrical portion is a relatively long square portion 32, and above that is a cylindrical portion 33 journaled in the boss 27 and extending a short distance below it.

A driven gear 34 is journaled on the cylindrical portion 33 below the boss 27, and rests upon a ratchet wheel 35, having upper and lower sets of teeth 36 and 37, and an elongated hub portion 38 provided with a square bore 39 receiving the square portion 32 of the stub

shaft, and serving to make the ratchet wheel turn with the stub shaft and with the brake shaft.

The bottom 22 is also provided with an upwardly projecting cylindrical boss 40, in alignment with an opening 41 in the top, which is surrounded by a downwardly extending cylindrical boss 42. The bosses 40 and 42 form bearings for a countershaft 43 parallel to the stub shaft 28. It may be inserted within the casing from above, and the top may be peened, as indicated at 44, to secure the countershaft in place.

Journaled on the countershaft 43 just above the boss 40 is a fulcrum sleeve 45, equipped at one side with a perforated boss 46, and provided with longitudinally extending grooves 47. A forked drop handle 48 has its arms 49 and 50 mounted astride the sleeve 45, and pivoted upon a pin 51 passing through the arms and the boss 46. In this preferred construction the handle is of channel shaped cross-section, and the fork is formed by cutting away the web, as indicated at 52 in Fig. 8, the arms 49, 50, then being bent substantially at a right angle to the body of the handle and the remaining portions of the web being cut away, as indicated at 53, beyond the bend.

Above the sleeve 45 is a driving gear or pinion 54, freely journaled on the countershaft 43 and provided with downwardly extending fingers 55 mounted in the grooves 47 of the sleeve 45.

The curved portion 56 of the arms 49 and 50 form cam surfaces cooperating with the lower portion of the driving gear 54 (when the drop handle is swung from its normal inoperative position, shown in solid lines, in Fig. 1, to the dotted line position A in that figure) to slide the driving gear along the countershaft and engage it with the driven gear 34. Corresponding edges of the teeth of these gears are sharpened, as indicated at 57 and 58 (Fig. 2) to facilitate their engagement.

Ordinarily the driving gear 54 may be depended upon to drop out of engagement with the driven gear 34 when the drop handle is allowed to take its normal position, but to insure the disengagement the fingers 55 are provided with pins 59, which will be engaged by the curved surfaces 60 on the bent arms 49 and 50, thereby forcing the driven gear downwardly to its normal neutral position.

The back 18 of the frame or housing is provided with forwardly projecting flanges 61 and 62, between which the holding pawl 63 is pivoted on a pin 64. One end 65 of the pawl 63 cooperates with the teeth 37 to hold the brake shaft 12 against reverse rotation, or rotation in the direction necessary to release the brakes. The other end of the pawl 66 is weighted to normally hold the end 65 in engagement with the teeth 37, and the weighted end is laterally extended to provide a broad surface for cooperation with a finger 67 on the arm 49 of the drop handle.

From the connection between the drop handle and the driving gear 54 it is obvious that when the handle is raised to the dotted line position A in Fig. 1 and oscillated about the axis of the shaft 12, it will communicate a like motion to the driving gear 54, which will in turn cause the driven gear 34 to oscillate about the stub shaft 28. A clutch is provided between the gear 34 and the ratchet 35 to convert this oscillation into intermittent rotation in the direction necessary to apply the brakes. The preferred clutch here illustrated is formed by the teeth 36 of the ratchet and two sets of pawls 68 and 69, mounted in openings 70 in the gear 34, which openings extend upwardly into bosses 71. The lower ends of the pawls 68 and 69 are inclined, as indicated at 72, and in consequence they will clatter over the teeth 36 when the gear rotates in one direction, and effect a driving engagement of those teeth when the gear rotates in the opposite direction.

The pawls 68, as will be clear from Fig. 10, are located on a diameter of the gear 34, while the pawls 69 are located at opposite sides of the diameter that is at right angles to the first-mentioned diameter. The arrangement is such that when the pawls 68 have engaged corresponding teeth 36 the pawls 69 will be out of engagement and substantially half way between corresponding pairs of teeth. A reverse motion of the gear 34 through a distance corresponding approximately to half the tooth spacing will bring the pawls 69 into engagement with corresponding teeth, and leave the pawls 68 out of engagement.

The ratio between the driving gear 54 and the driven gear 34 is relatively high, and therefore the angle represented by the distance between adjacent teeth 36 represents a considerably larger angle in the movement of the drop handle 48. The arrangement of the pawls just described permits the brakeman to advance the gear 34 a half tooth at a time, which is a result of considerable importance as the braking pressure approaches the limit of the device. If the angular space between adjacent pawls 68 and 69 was an even multiple of the space between the teeth 36, it would always be necessary to swing the handle 48 through a relatively wide angle in order to get a new hold.

When it is desired to apply the brakes the brakeman lifts the handle 48 to the position A in Fig. 1, which movement automatically engages the driving gear 54 with the driven gear 34. He then oscillates the handle about a substantially vertical axis, producing a similar movement of the driving and driven gears and causing the pawls 68 and 69 to drive the ratchet 35 in the desired direction, the

holding pawl 63 automatically preventing reverse rotation.

When the necessary pressure has been applied and it is desired to leave the brakes in that condition, the drop handle is moved to take the weighted end 66 out of the path of the finger 67 and merely allowed to assume its normal inoperative position. The downward movement of the handle either permits or requires the driving gear 54 to slide downwardly on the countershaft 43 out of engagement with the driven gear 34. When it is desired to release the brakes the handle is put in position to engage the finger 67 against the weighted end 66 of the holding pawl, when downward pressure on the handle will cause the end 65 of the holding pawl to be pried out of engagement with the teeth 37. The gearing being in neutral the shaft 12, with the stub shaft 28 and the ratchet 35, can rotate freely and permit the brakes to assume their normal released position.

The relation between the parts is such that the driving gear will always be out of engagement with the driven gear before the holding pawl is released. The force of gravity will cause the lowering of the driving gear when the hand lever is allowed to move toward its normal inoperative position. The use of pins 59 and the curved surfaces 60, however, insure this result, regardless of frictional conditions.

Use has been made of specific description and illustration to give a full and clear disclosure, but it is not intended to thereby limit the patent or require the claims to be more narrowly construed than is made necessary by the prior art.

I claim as my invention—

1. In a brake mechanism, a hand lever adapted for oscillating movement, a driving gear oscillated by the hand lever, a relatively large driven gear adapted to be oscillated by the driving gear, a rotatable shaft, and a clutch between the driven gear and the shaft including a ratchet having uniformly spaced teeth and a plurality of pawls spaced apart a distance other than a multiple of the distance between the teeth.

2. In a brake mechanism, a rotatable shaft adapted to communicate power to the brakes, and means for operating the shaft including a driven gear, a driving gear, means for giving the driving gear an oscillating movement, and a ratchet clutch between the driven gear and the shaft and including a ratchet wheel having uniformly spaced teeth, a plurality of pawls, two of which are arranged on a diameter and others of which are arranged at one side of a diameter.

3. In a brake mechanism, the combination of a rotatable shaft, a hand lever for driving the shaft, gearing between the hand lever and the shaft, a pawl for holding the shaft against reverse rotation, and means operated by the hand lever for successively disengaging the gearing and releasing the pawl.

4. In a brake mechanism, the combination of a rotatable shaft, a driven gear associated with the shaft, a clutch between the gear and the shaft, a pinion adapted to drive the gear and shiftable into and out of engagement therewith, and a hand lever operatively connected with the pinion to give it an oscillating rotary movement and to shift it into and out of engagement with the gear.

5. In a brake mechanism, a rotatable shaft, a driven gear associated with the shaft, a clutch connecting the gear and the shaft, a countershaft, a drop lever mounted on the countershaft, a driving pinion mounted on the countershaft, and a connection between the drop lever and the pinion whereby the latter may be shifted into and out of engagement with the gear and may be given an oscillating rotary movement.

6. In a brake mechanism, a rotatable shaft, a driven gear associated with the shaft, a clutch connecting the gear and the shaft, a countershaft, a sleeve rotatably mounted on the countershaft, a drop lever pivoted to the sleeve, a pinion slidably mounted on the countershaft and interlocked with the sleeve, and a connection between the lever and the pinion permitting it to be shifted by the lever into and out of engagement with the gear.

7. In a brake mechanism, a rotatable shaft, a driven gear, a clutch connecting the gear and the shaft, a countershaft, a sleeve rotatably mounted on the countershaft, a pinion slidably mounted on the countershaft and interlocked with the sleeve, a bent lever fulcrumed on the sleeve, and a cam on the lever cooperating with the pinion to shift it into and out of engagement with the gear.

8. In a brake mechanism, a rotatable shaft, a ratchet wheel fixed to rotate with the shaft, a driven gear, a plurality of pawls carried by the gear and spaced apart a distance other than a multiple of the distance between the teeth of the ratchet, a pinion cooperating with the gear, and a handle for oscillating the pinion.

9. In a brake mechanism, a rotatable shaft, a driven gear, a clutch connecting the driven gear and the shaft, a driving pinion mounted to shift from a position in engagement with the gear to a neutral position out of engagement with the gear, a hand lever, a connection between the hand lever and the pinion for giving the pinion an oscillating rotary movement, a pawl for holding the shaft against rotation in one direction, and means carried by the lever for shifting the pinion into and out of engagement with the gear and for releasing the holding pawl.

10. In a brake mechanism, a commercial article including a frame, a stub shaft journaled in the frame and adapted to be connected with a brake shaft, a driven gear on the

stub-shaft, an overrunning clutch between the driven gear and the stub shaft, a hand lever, a driving gear operated by the hand lever to drive the driven gear, said gears being disengageable to permit the brakes to be released.

11. In a brake mechanism, a shaft adapted to rotate in opposite directions during the application and release of the brakes respectively, a driven gear, a clutch for making a driving connection between the shaft and gear, a hand lever adapted to rotate about one axis in moving from a normal inoperative position to a brake applying position and to rotate about another axis to apply the brakes, an axially movable driving gear and operative connections causing the driving gear to move axially into driving relation to the driven gear when the hand lever moves from inoperative to brake applying position and to rotate with the hand lever to apply the brakes.

12. In a brake mechanism, a shaft adapted to rotate in opposite directions during the application and release of the brake respectively, a hand lever movable between a normal unobstructive position alongside the shaft and an operative position at a considerable angle to the shaft, normally neutral gearing including a driven gear associated with the shaft, and a driving gear associated with the lever and means operated by the lever in moving into operative position for effecting a driving relation between the gears.

13. In a brake mechanism, a shaft adapted to rotate in opposite directions during the application and release of the brake respectively, holding means to prevent the release of the brakes, a hand lever movable between a normal unobstructive position alongside the shaft and an operative position at a considerable angle to the shaft, normally neutral gearing including a driven gear associated with the shaft, and a driving gear associated with the lever, means operated by the lever in moving into operative position for effecting a driving relation between the gears, and means operable by the lever in moving to its unobstructive position for releasing the holding means.

14. In a brake mechanism, a power transmitting device for applying the brakes, a hand power device, a power multiplying device between the hand power device and the power transmitting device, holding means to prevent the release of the brakes and means for rendering the power multiplying device inoperative when the brakes are to be released, and thereafter releasing the holding means.

15. In a brake mechanism, a shaft adapted to rotate in opposite directions during the application and release of brakes respectively, a hand lever mounted to normally assume an inoperative position and adapted to be moved to operative position for applying the brakes, gearing between the hand lever and the shaft, means controlled by the movement of the hand lever to operative position for changing the gearing from neutral to driving relation, and means operated by the hand lever for releasing the brake while the gearing is in neutral relation.

16. In a brake mechanism, a shaft adapted to rotate in opposite directions during the application and release of the brakes respectively, a hand lever adapted to rotate about one axis to apply the brakes and about another axis in moving from the normal traveling position to the brake applying position, normally neutral gearing between the hand lever and the shaft and means operated by the hand lever for putting the gearing in driving relation as the lever is moved to brake applying position, and means operated by the hand lever for releasing the brakes while the gearing is in neutral relation.

17. In a brake mechanism, a shaft adapted to rotate in opposite directions during the application and release of brakes respectively, a hand lever mounted to normally assume an inoperative position and adapted to be moved to an operative position for applying the brakes, a driven gear associated with the shaft, a driving gear normally in neutral relation to the driven gear, means for bringing the gear into driving relation as the lever is moved to operative position, and means operated by the hand lever for releasing the brakes while the driving gear is in neutral relation to the driven gear.

In testimony whereof I affix my signature.

PERCY B. CAMP.