June 22, 1943. H. C. SMITH 2,322,398

WINDING DRUM

Filed June 3, 1940 2 Sheets-Sheet 1

Fig. 1.

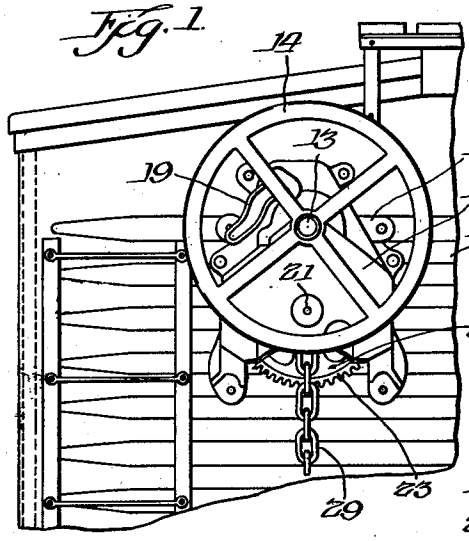


Fig. 2.

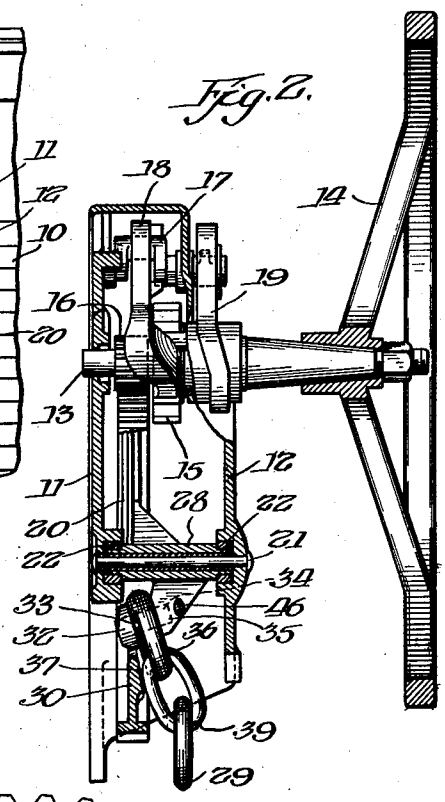
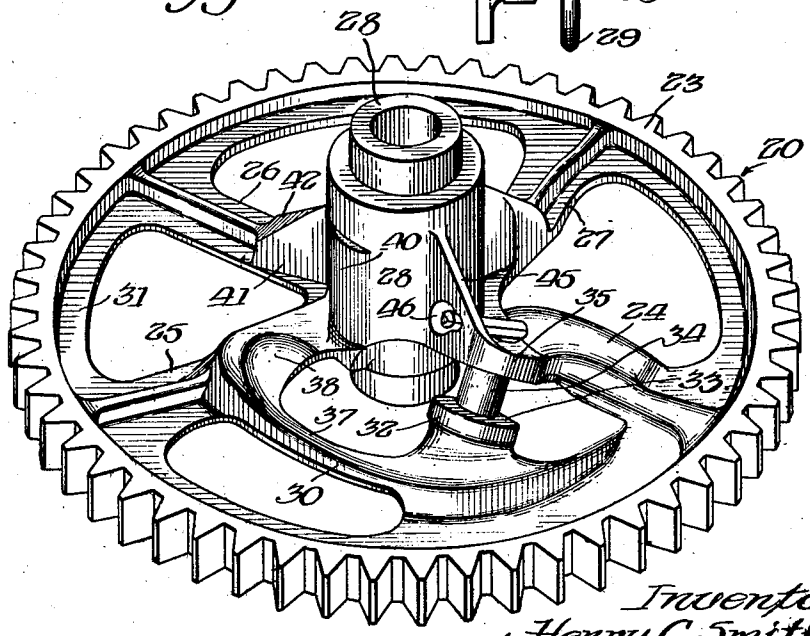


Fig. 3.



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Fig. 4.

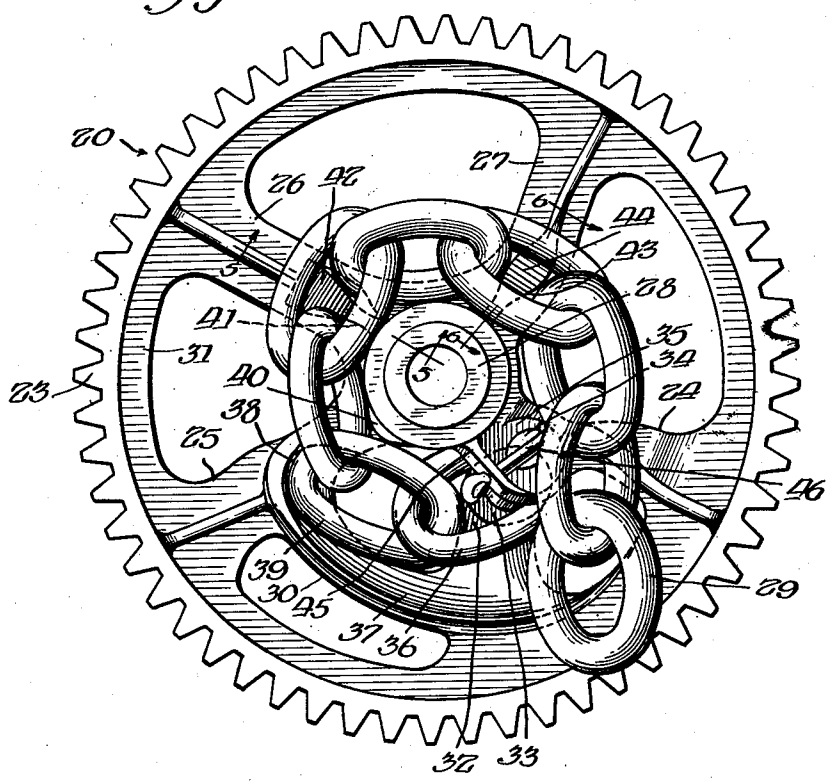


Fig. 5.

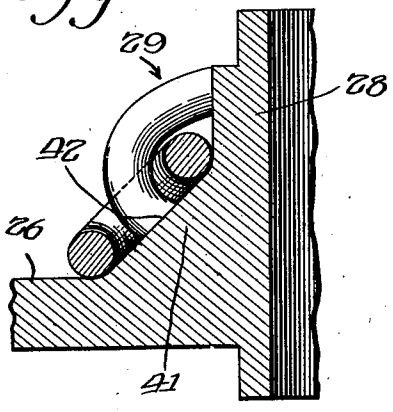
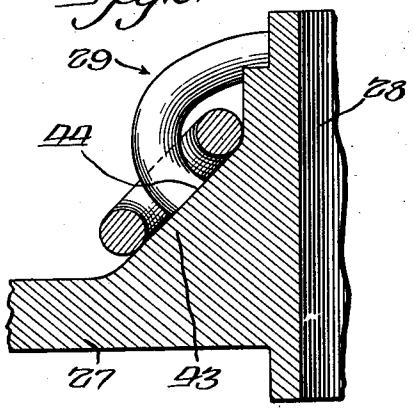


Fig. 6.



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Patented June 22, 1943

2,322,398

UNITED STATES PATENT OFFICE

2,322,398

WINDING DRUM

Henry C. Smith, Chicago, Ill., assignor to Superior Hand Brake Company, Chicago, Ill., a corporation of Illinois

Application June 3, 1940, Serial No. 338,484

6 Claims. (Cl. 254—149)

My invention relates to a winding drum and is adapted particularly for use in a brake assembly designed to be secured in vertical position to the ends of railway cars of various types and kinds.

The primary object of my invention is the provision of a winding drum which provides means upon which the brake chain can be wound so that fouling or kinking of the chain is prevented, likewise cross stresses on the chain links are prevented so that a high amount of force can be applied through the brake chain without danger of the chain breaking, fouling or slipping, thereby resulting in injury to trainmen in applying the brakes to the car.

Another and further object of my invention is the provision of a winding drum having a winding surface which is comparatively small in diameter and which provides a winding surface adequate for the normal chain takeup in the operation of hand brakes for railway cars sufficient to apply the brakes, with a slight addition of chain length for emergencies and above the normal requirements of the chain takeup mechanism for this purpose.

Another and further object of my invention is the provision of a winding drum which provides means for winding the chain thereon with the links at an angle of approximately 45° to the vertical plane of the winding drum, thereby allowing the chain to be wound thereon in a natural position of the chain without danger of fouling or kinking or slipping, thereby creating liability of injury to the trainmen operating the brake, and providing a positive surface for holding the chain links on the drum so that the drum is positive in its action.

Another and further object of my invention is the provision of a winding drum which is sufficiently small in diameter to enable the application of a considerable increase in power to the brakes over what is normally expected of brakes of this type and is normally expected in the operation of the brakes, so that the toothed gear drum can be made somewhat smaller than is the usual practice, thereby better fitting the drum into the limited space facilities available for drums of this type.

These and other objects of my invention will be more fully and better understood by reference to the accompanying sheets of drawings, in which—

Figure 1 is a partial view in elevation of the end of a box car having a brake embodying my invention applied thereto;

Figure 2 is a sectional view of the brake mechanism shown in Figure 1;

Figure 3 is a perspective view of the drum itself showing the winding surface;

Figure 4 is an elevational view of the brake drum showing the chain wound thereon;

Figure 5 is a sectional view on line 5—5 of Figure 4; and

Figure 6 is a sectional view on line 6—6 of Figure 4.

Referring specifically to the drawings and in which like reference characters refer to like parts throughout, a car 10 is shown having a rear frame 11 attached thereto in any approved manner, with a front cover plate 12 secured either to the rear frame 11 or to the car directly, as may be desired. A shaft 13 has its rear end mounted in the rear frame 11, with suitable bearing in the cover plate 12 through which the shaft extends, with a brake wheel 14 mounted on the outer end thereof. The shaft 13 has a ratchet wheel 15 and a small gear wheel 16 mounted thereon, with a crank shaft 17 being provided upon which a ratchet member 18 is mounted which engages with the ratchet wheel 15. A hand lever 19 is mounted on the outer end of the crank shaft 17 and affords means for bringing the ratchet member 18 into engagement with the ratchet wheel 15 and releasing it therefrom, this mechanism being shown in detail and described in my copending application Serial No. 265,067, filed March 31, 1939, now Patent No. 2,272,437, dated February 10, 1942. The winding drum designated as a whole as 20 is mounted upon an axle 21, the rear end of which is mounted in the frame 11 and the front end carried by the cover 12, bearings 22, 22 being mounted in each of these members within which the ends of the hub of the winding drum 20 are mounted.

The winding drum comprises an outer rim portion 23 having gear teeth thereon adapted to engage with the gear wheel 16, and a plurality of spokes 24, 25, 26 and 27 connecting the rim portion 23 with the hub 28 of the winding drum, which affords a winding surface for the chain 29. A rib 30 is provided, formed integrally with the gear wheel and merging with the spoke 24 at one of its ends and with the spoke 25 at its opposite end, and is connected to the flange 31 extending around the inner periphery of the rim 23. This flange 31 merges with each of the spokes connecting the rim 23 with the hub portion 28, and is of the usual type and structure of ordinary cast gear wheels.

A lug 32 is cast on the inner side of the rib 30

having a bearing surface 33 formed thereon, with a pin 34 extending through the lug 32 and through a web 35 formed integrally with the spoke 24 and the hub 28. The web 35 has a bearing surface for the first link of the chain which is parallel with and in oppositely disposed relation to the bearing surface 33, these bearing surfaces extending at an angle of approximately 45° to the vertical plane of the winding drum 20. The pin 34 forms the means by which the first link 36 of the brake chain is anchored to the winding drum 20. The holes within which the pin 34 is mounted in the lug 32 and web 35 are also angularly disposed with respect to the horizontal axis of the hub portion 28, so that the pin 34 is at an approximate angle of 45° to the axis of the hub. The first link 36 in its normal position is thus angularly disposed with respect to a vertical plane of the gear wheel portion of the winding drum 20 and a substantially straight pull is exerted upon the brake chain and in the natural position of the brake chain with the links lying at an angle of approximately 45° to the radial plane of the gear wheel so there is no twisting or kinking of the brake chain as it is wound on the drum. It is adapted to wind upon the drum in a natural, normal position with the links at an approximate angle of 45° to a vertical plane of the gear wheel portion of the winding drum.

The rib 30 has its face 37 inclined inwardly and in an increasing degree until a point 38 is reached where the angularity of the face is decreased so that adjacent the hub 28 the face 37 is almost parallel with the transverse plane of the hub 28, and which, in effect, provides a slight pocket within which one side of the second link 39 of the winding chain is received. The hub 28 has a slightly enlarged portion 40 thereon against which the opposite side of the link 39 rests, so that this link 39 always is automatically positioned at an angle of approximately 45° to the radial plane of the gear wheel as the chain is wound upon the hub 28. The spoke 26 has a web portion 41 connecting it with the hub 28 with an outer inclined surface 42, this surface extending at approximately 45° to the vertical plane through the winding drum 20 and adapted to receive one link of the chain as shown particularly in Figure 5.

The spoke 27 also has a web 43 connecting the spoke with the hub 28, and has an outer surface 44 extending at an angle of approximately 45° to the vertical plane of the winding drum 20, this web being slightly higher and wider than the web 41 on spoke 26, so that as the chain is wound thereon it follows a spiral around the hub 28.

The spoke 24 has a web 35 integrally formed therewith near the base thereof, this web being carried laterally from the spoke 24 a slight distance, and merges into the hub 28, with an outer surface 45 in the same angular position as the surfaces 42 and 44. This web likewise is wider at its base portion than either of the other webs and extends out close to the end of the hub portion 28 so that if desired the chain may be wound on the hub 28 so the last two or three links of the chain overlap alongside the first link 36 and rest partially upon the second link 39, this overlapping taking place possibly to the extent of the last two links of the chain.

A cotter pin 46 is provided extending angularly through the web 45 and into the spoke 24, providing means for holding the pin 34 in position in the lug 32 and web 35. The opening in the lug 32 is only partially cored at its outer end so that a slug of metal is left at this point which prevents the pin 34 from passing entirely through the lug 32, and which with the cotter pin 46 provides means for holding the pin 34 in position when placed in the winding drum and the chain mounted thereon.

In operation the device is normally positioned as shown in Figure 2, with the chain hanging loosely downward from the pin 34. As the brakes are applied the hand wheel 14 is turned in a clockwise direction, with a rotary movement being applied to the winding drum 20 in a counter-clockwise direction. As the slack in the chain is taken up the second link 39 of the chain slides along the inclined surface of the rib 30, which acts as a cam, and the link is slightly rotated until it engages the pocket 38 on one side and the projection 40 on the other, thereby being forced into an angle of approximately 45°. As the chain continues winding about the drum there is a slight roll of the chain until the links automatically are positioned in a progressive direction first upon the rib 41, then upon the rib 43 in an outward direction until the brakes are in set position, which normally will occur when the drum is in approximately the position shown in Figure 4. The drum is made to accommodate the standard takeup chain for brakes of this type, which is made up of links three inches in length of material normally ⅜ of an inch in diameter, although the winding surface can be made for links of varying sizes and lengths as desired.

The ribs and spokes are designed to accommodate links of the standard size, so that as they are wound on the drum each alternate link lies against one of the webs while the intermediate link drops into the spaces between the angularly positioned webs on the spokes of the wheel. In this manner it will be understood that the winding action is positive, that there is no slippage of the chain when the brakes are partially applied to the car, and that there can be no fouling of the chain on the drum, which is apt to occur with some of the other types of drums now in use, and that from a safety factor alone the winding is accomplished in a secure and positive manner. When it is desired to release the mechanism after the brakes have been applied, the reverse operation takes place until the chain is hanging vertically from the winding drum, as shown in Figure 2 of the drawings.

While I have described more or less precisely the details of construction, I do not wish to be understood as limiting myself thereto, as I contemplate changes in form and the proportion of parts and the substitution of equivalents as circumstances may suggest or render expedient as do not depart from the spirit or scope of the invention.

What is claimed is:

1. A brake chain winding drum comprising a wheel mounted for rotation about an axis, said wheel having a toothed rim portion and a hub concentrically disposed with respect to said axis and extending from the side of said wheel, and said wheel also having connecting portions between said rim and hub, means for securing the end link of a brake chain to said wheel substantially within the plane thereof in inclined relation with respect to the plane of said wheel and said axis to correspondingly position the end link of the chain in an inclined position, said connecting portions comprising webs formed integrally with said hub and provided with faces extending angularly with respect to said rotary

axis and the plane of said wheel, said faces and hub forming the winding surface of said drum for the links of said chain, with said faces adapted to support alternate links of the chain flatwise when the chain is in wound position.

2. A brake chain winding drum comprising a wheel for vertical mounting for rotation about a horizontal axis, said wheel having a toothed rim portion and a hub concentrically disposed with respect to said axis and extending from the side of said wheel, and said wheel also having connecting portions between said rim and hub, means for securing the end link of a brake chain to said wheel substantially within the plane thereof in inclined relation with respect to the plane of said wheel and said axis to correspondingly position the end link of the chain in an inclined position, said connecting portions comprising webs formed integrally with said hub and provided with faces extending at an approximately 45° angle with respect to said horizontal rotary axis and the vertical plane of said wheel, said faces and hub forming the winding surface of said drum for the links of said chain, with said faces adapted to support alternate links of the chain flatwise when the chain is in wound position.

3. A brake chain winding drum comprising a wheel for vertical mounting for rotation about a horizontal axis, said wheel having a toothed rim portion and a hub concentrically disposed with respect to said axis and extending from the side of said wheel, and said wheel also having a plurality of radially disposed spokes between said rim and hub, means for securing the end link of a brake chain to said wheel substantially within the plane thereof in inclined relation with respect to the plane of said wheel and said axis to correspondingly position the end link of the chain in an inclined position, and webs formed integrally with at least some of said spokes and said hub and provided with faces extending angularly with respect to said horizontal rotary axis and the vertical plane of said wheel, said faces and hub forming the winding surface of said drum for the links of said chain, with said faces adapted to support alternate links of the chain flatwise when the chain is in wound position.

4. A brake chain winding drum comprising a wheel for vertical mounting for rotation about a horizontal axis, said wheel having a toothed rim portion and a hub concentrically disposed with respect to said axis and extending from the side of said wheel, and said wheel also having a plurality of radially disposed spokes between said rim and hub, means for securing the end link of a brake chain to said wheel substantially within the plane thereof in inclined relation with respect to the plane of said wheel and said axis to correspondingly position the end link of the chain in an inclined position of approximately 45° with respect to the plane of said wheel, and webs formed integrally with some of said spokes and said hub and provided with faces extending at an approximately 45° angle with respect to said horizontal rotary axis and the vertical plane of said wheel, said faces and hub forming the winding surface of said drum for the links of said chain, with said faces adapted to support alternate links of the chain flatwise when the chain is in wound position and with the face immediately preceding said securing means being of greater spanning extent between its spoke and hub to effect a shifting of the chain laterally onto the hub.

5. A brake chain winding drum comprising a wheel for vertical mounting for rotation about a horizontal axis, said wheel having a toothed rim portion and a hub concentrically disposed with respect to said axis and extending from the side of said wheel, and said wheel also having a plurality of radially disposed spokes between said rim and hub, means for securing the end link of a brake chain to said wheel substantially within the plane thereof in inclined relation with respect to the plane of said wheel and said axis to correspondingly position the end link of the chain in an inclined position, a camming surface connected with the spoke following said securing means for positively positioning the link next to the end link adjacent to said hub at an inclination with respect to the plane of said wheel, and webs formed integrally with some of said spokes and said hub and provided with faces extending angularly with respect to said horizontal rotary axis and the vertical plane of said wheel, said faces and hub forming the winding surface of said drum for the links of said chain, with said faces adapted to support alternate links of the chain flatwise when the chain is in wound position.

6. A brake chain winding drum comprising a wheel for vertical mounting for rotation about a horizontal axis, said wheel having a toothed rim portion and a hub concentrically disposed with respect to said axis and extending from the side of said wheel, and said wheel also having a plurality of radially disposed spokes between said rim and hub, means for securing the end link of a brake chain to said wheel substantially within the plane thereof in inclined relation with respect to the plane of said wheel and said axis to correspondingly position the end link of the chain in an inclined position of approximately 45° with respect to the plane of said wheel, a camming surface connected with the spoke following said securing means for positively positioning the link next to the end link adjacent to said hub at an inclination with respect to the plane of said wheel, and webs formed integrally with some of said spokes and said hub and provided with faces extending at an approximately 45° angle with respect to said horizontal rotary axis and the vertical plane of said wheel, said faces and hub forming the winding surface of said drum for the links of said chain, with said faces adapted to support alternate links of the chain flatwise when the chain is in wound position and with the face immediately preceding said securing means being of greater spanning extent between its spoke and hub to effect a shifting of the chain laterally onto the hub.

HENRY C. SMITH.