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DIVIDER IN DRILLING DRUMS

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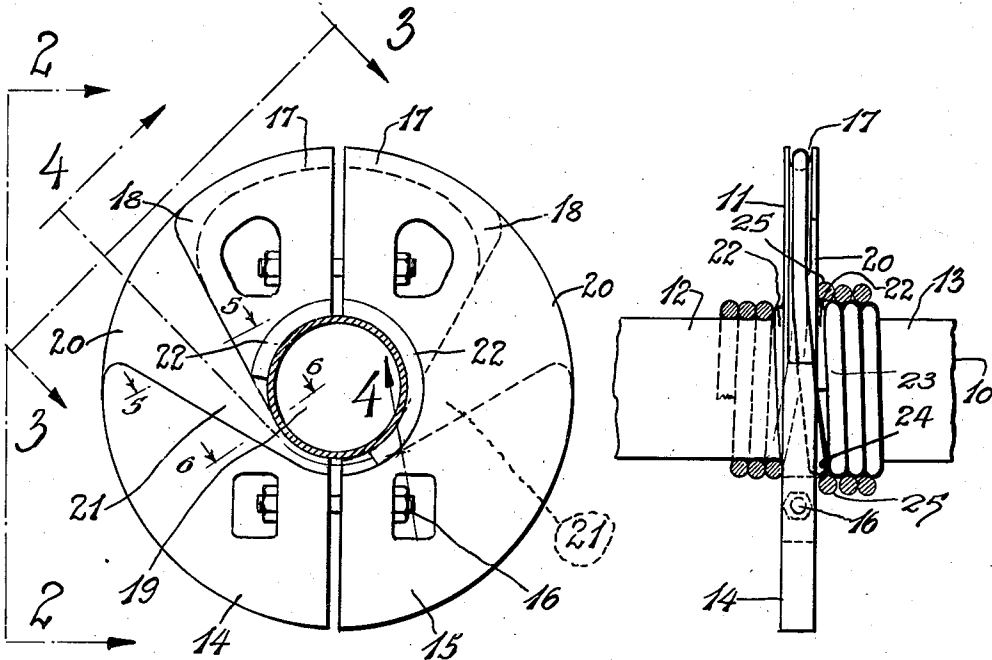


Fig. 1.

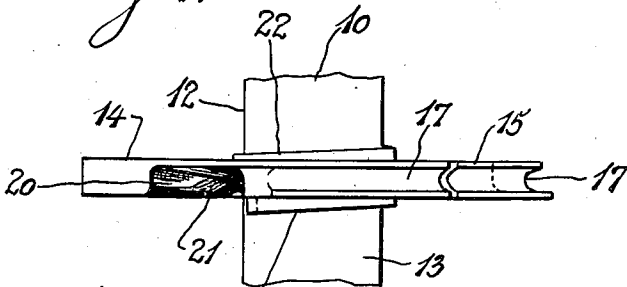


Fig. 3.

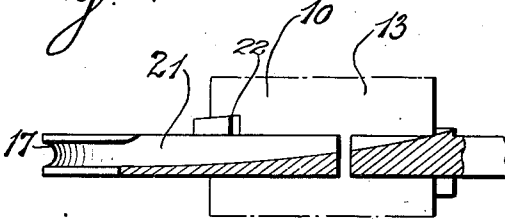


Fig. 4.

Fig. 2.

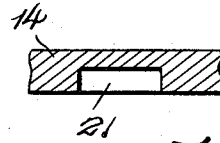


Fig. 5.

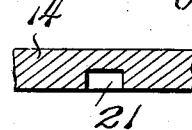


Fig. 6.

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DIVIDER IN DRILLING DRUMS

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12 Claims. (Cl. 242—117)

Our invention relates to dividers for the drums of percussion drills. In such drills it is customary to divide the drum into two parts, by means of a flange known as a divider. On one side of this divider is stored the reserve supply of drilling rope, and on the other side is wound that portion of the rope in active use.

As the drilling tools go deeper, then from time to time as the active portion of the rope becomes nearly exhausted, it is customary to rest the tools on the bottom of the hole, slacken out the rope, unreel a layer or two from the reserve side, and reel it up on the active side.

The great problem in designing dividers has always been to make provision for the rope to cross over from the reserve side to the active side.

We have found in practice four principal defects in the dividers used in the past, namely: (1) the rope would be bent too sharply at the place of cross-over, thus becoming weakened at this point, and hence likely to break when later paid out and straightened out; (2) the second lap of the first layer would bind against the first lap of the first layer, thus wearing both laps; (3) the last lap of the second layer would wedge between the face of the divider and the first lap of the first layer, thus wearing both laps; and (4) the last lap of the second layer would rub against the rope where it emerges from the divider, thus wearing both laps.

Accordingly it is the main object of our invention to provide a divider which will eliminate these four causes of rope weakening.

Dividers are usually built in two half discs, for convenient assembly on the drum. These two halves in the past have always been dissimilar, thus increasing manufacturing expense by requiring two patterns for casting, and increasing drilling cost by requiring the drill-owner to maintain a reserve stock of both kinds of halves, for replacement purposes.

Accordingly it is a secondary object of our invention to provide a divider in which the two halves are identical.

In addition to our principal objects, above stated, we have worked out a number of novel and useful details, which will be readily evident as the description progresses.

Our invention consists in the novel parts and in the combination and arrangement thereof, which are defined in the appended claims, and of which one embodiment is exemplified in the accompanying drawing, which are hereinafter particularly described and explained.

Throughout the description the same reference

number is applied to the same member or to similar members.

Figure 1 is an axial side elevation of the divider.

Figure 2 is a transverse edge elevation of the divider and drum taken along the line 2—2 of Figure 1 and showing the reeving.

Figure 3 is an edge view of the divider taken along the line 3—3 of Figure 1.

Figure 4 is a section of the divider taken along the line 4—4 of Figure 1.

Figure 5 is a section of a portion of the divider taken along the line 5—5 in Figure 1.

Figure 6 is a section of a portion of the divider taken along the line 6—6 in Figure 1.

Referring now to Figure 2, we see that the divider 11 divides the drum 10 into a storage side 12 and an active side 13.

Turning now to the other figures for a more detailed study of our divider, we see that it is built in two identical symmetrical halves, 14 and 15. Each half possesses bolt-holes 16 for securing the two halves together, to thereby clamp them to the drum.

Extending partially about the circular periphery of our divider is a groove 17, of a width to accommodate not more than one strand of rope of the size for which the device is intended. In the exemplification shown, this peripheral groove is of an angular extent substantially less than 360°, in fact less than one quadrant.

Its extreme ends 18, instead of breaking sharply, are rounded off with a radius substantially equal to the radius of the central aperture 19.

At each end 18 of this peripheral groove there is an opening 20 onto one face or the other of the divider, and from this opening 20, out onto the face of the divider, thence to tangency with the central aperture, and thence along the aperture 19 for a ways, there extends a groove 21. The portion of this groove 21 lying in the face of the divider is at least as deep as the thickness of the rope which it is designed to contain, at least up to the point where it attains tangency with the central aperture 19. Thereafter it becomes gradually shallower until it merges with the surface.

At that point there begins a spiral wedge 22, of width (in a radial direction) substantially the same as the thickness of the rope. This wedge extends around the edge of the central aperture 19 to a point just short of the groove 21, whereat it attains a thickness (in axial direction) substantially equal to its width.

Reverting now to the four principal defects of the dividers used in the past, as listed near the beginning of this specification, we find that our invention has eliminated them in the following manner:

(1) The too sharp bending at the place of crossover has been eliminated by the peripheral groove 17 with its gently rounded ends 18.

(2) On the active side 13, the binding of the second lap 23 of the first layer against the first lap 24 of the first layer, and (3) the wedging of the last lap 25 of the second layer between the face of the divider and the first lap 24 of the first layer, have been eliminated by our spiral wedge 22.

(4) The rubbing of the last lap 25 of the second layer against the rope where it emerges from the divider onto the active side 13 has been eliminated by the depth of that portion of the groove 21 which lies in the face of the divider, up to the point where this groove attains tangency with the central aperture 19. This point of tangency is located at section line 6—6.

It will be noted that all these features need occur only on that face of the divider which lies toward the active side of the drum. But there are certain advantages, recited at the outset of this specification, which advantages inhere in having the two halves of the divider be identical. This we have attained by duplicating these features on the other face of our divider; but this is not at all essential to any of our inventive concepts, save only that of identity of the two half-discs.

Similarly as to the spread of the openings 20, which is necessary only on that face of the divider which lies toward the storage side of the drum.

Our rope is reeved as follows: It is wound up, perhaps a single layer deep, perhaps many layers deep on the storage side 12, which is the left hand side in Figure 2, and is the side which lies beyond the paper from the observer in Figure 1, of the drum. From the top layer, it leads over the edge of adjacent opening 20, i. e. that opening 20 shown dotted in Figure 1, and to the left in Figure 2, to the adjacent end 18 of the peripheral groove 17, and thence in this groove, around further end 18, and down the adjacent side of the opening 20, i. e. that opening 20 shown in full lines in Figure 1, and to the right in Figure 2, on that face of the divider which lies toward the active portion 13 of the drum.

At that part of this opening nearest to the drum, the rope passes in groove 21, to tangency with the drum, whereupon it emerges from the face of the divider and lies wholly on the drum.

Thence it coils around the drum adjacent the spiral wedge 22, being forced by the wedge further and further away from the face of the divider until it crosses over the reach which lies in the groove 21 (not rubbing against it, due to the depth of the groove at this point), and then begins its second lap alongside the first lap already described.

Thus the rope progresses, lap by lap to the further side of the drum; then back again in a second layer, the last lap of this second layer on top of the spiral wedge 22.

Having now described and illustrated one form of our invention, we wish it to be understood that our invention is not to be limited to the specific form or arrangement of parts herein described and shown, except as covered by our claims.

We claim:

1. A drum divider, consisting of a flat disc, centrally circularly apertured to embrace a winch-drum and thereby divide the drum into a storage side and an active side, characterized by having on a portion of its periphery a groove of radius nowhere substantially less than the radius of the central aperture, and of width to accommodate one strand of rope of the size for which the device is intended, and of angular extent substantially less than 360°; and, on each face of the disc: an opening leading into the peripheral groove; a groove in extension of the peripheral groove, and extending to tangency with the central aperture, and of sufficient depth clear to the point of such tangency to contain a rope of the size for which the device is intended, thence extending along said aperture with depth gradually decreasing to zero; and a spiral wedge on each face of the disc, extending along said extension aperture, from substantially the point of emergence of said extension groove to a point just short of the point of tangency of said groove, and of a constant radial width substantially the same as the thickness of the rope for which the device is intended, and of an axial thickness gradually increasing from zero up to substantial equality with its width; said divider being separated into two identical halves, and having means to secure the two halves together and thereby clamp them to the drum.

2. A drum divider, consisting of a flat disc, applicable to a winch-drum to thereby divide the drum into a storage side and an active side, characterized by having on a portion of its periphery a groove of radius nowhere substantially less than the radius of the drum, and of width to accommodate one strand of rope of the size for which the device is intended; and, on each face of the disc, an opening leading into the peripheral groove; and, on that face of the disc intended to adjoin the active side of the drum: a groove in extension of the peripheral groove, and extending to tangency with the drum, and of sufficient depth clear to the point of such tangency to contain a rope of the size for which the device is intended, thence extending along the drum with depth gradually decreasing to zero; and a spiral wedge on the face of the disc, extending along the drum, from substantially the point of emergence of said extension groove to a point just short of the point of tangency of said extension groove, and of a constant radial width substantially the same as the thickness of the rope for which the device is intended, and of an axial thickness gradually increasing from zero up to substantial equality with its width.

3. A drum divider, consisting of a flat disc, applicable to a winch-drum to thereby divide the drum into a storage side and an active side, characterized by having on a portion of its periphery a groove of radius nowhere substantially less than the radius of the drum, and of width to accommodate one strand of rope of the size for which the device is intended; and, on each face of the disc, an opening leading into the peripheral groove; and, on that face of the disc intended to adjoin the active side of the drum: a groove in extension of the peripheral groove, and extending toward tangency with the drum; and a spiral wedge on the face of the disc, extending along the drum, from substantially the point of emergence of said extension groove to a point

just short of the point of tangency of said extension groove, and of a constant radial width substantially the same as the thickness of the rope for which the device is intended, and of an axial thickness gradually increasing from zero up to substantial equality with its width.

4. A drum divider, consisting of a flat disc, applicable to a winch-drum to thereby divide the drum into a storage side and an active side, characterized by having on a portion of its periphery a groove of radius nowhere substantially less than the radius of the drum, and of width to accommodate one strand of rope of the size for which the device is intended; and, on each face of the disc, an opening leading into the peripheral groove; and, on that face of the disc intended to adjoin the active side of the drum, a spiral wedge on the face of the disc, extending along the drum, from substantially said opening to a point just short of said opening, and of a constant radial width substantially the same as the thickness of the rope for which the device is intended, and of an axial thickness gradually increasing from zero up to substantial equality with its width.

5. A drum divider, consisting of a flat disc, applicable to winch-drum to thereby divide the drum into a storage side and an active side, characterized by having on a portion of its periphery a groove of radius nowhere substantially less than the radius of the drum, and of width to accommodate one strand of rope of the size for which the device is intended; and, on each face of the disc, an opening leading into the peripheral groove; and, on that face of the disc intended to adjoin the active side of the drum, a groove in extension of the peripheral groove, and extending to tangency with the drum, and of sufficient depth clear to the point of such tangency to contain a rope of the size for which the device is intended, thence extending along the drum with depth gradually decreasing to zero.

6. One-half of a drum divider, consisting of a flat half disc, semi-circularly apertured along its straight edge to embrace a winch-drum and thereby divide the drum into a storage side and an active side, characterized by having on a portion of its periphery a groove of radius nowhere substantially less than the radius of the central aperture, and of width to accommodate one strand of rope of the size for which the device is intended, and extending from the straight edge along a portion of the curved edge; and, on one face of the half disc: an opening leading into the peripheral groove; a groove in extension of the peripheral groove, and extending to tangency with the semi-circular aperture, and of sufficient depth clear to the point of such tangency to contain a rope of the size for which the device is intended, thence extending along said aperture with depth gradually decreasing; and a portion of a spiral wedge on the face of the disc, extending along said aperture, from the straight edge to a point just short of the point of tangency of said extension groove, and of a constant radial width substantially the same as the thickness of the rope for which the device is intended, and of an axial thickness gradually increasing up to substantial equality with its width.

7. One-half of a drum divider, consisting of a flat half disc, semi-circularly apertured along its straight edge to embrace a winch-drum and thereby divide the drum into a storage side and an active side, characterized by having on a

portion of its periphery a groove of radius nowhere substantially less than the radius of the central aperture, and of width to accommodate one strand of rope of the size for which the device is intended, and extending from the straight edge along a portion of the curved edge; and, on one face of the half disc: an opening leading into the peripheral groove; a portion of a spiral wedge on the face of the disc, extending along said aperture, from the straight edge to a point just short of said opening, and of a constant radial width substantially the same as the thickness of the rope for which the device is intended, and of an axial thickness gradually increasing up to substantial equality with its width.

8. One-half of a drum divider, consisting of a flat half disc, semi-circularly apertured along its straight edge to embrace a winch-drum and thereby divide the drum into a storage side and an active side, characterized by having on a portion of its periphery groove of radius nowhere substantially less than the radius of the central aperture, and of width to accommodate one strand of rope of the size for which the device is intended, and extending from the straight edge along a portion of the curved edge; and, on one face of the half disc: an opening leading into the peripheral groove; a groove in extension of the peripheral groove, and extending to tangency with the semicircular aperture, and of sufficient depth clear to the point of such tangency to contain a rope of the size for which the device is intended, thence extending along said aperture with depth gradually decreasing.

9. A drum divider, consisting of a flat disc, centrally circularly apertured to embrace a winch-drum and thereby divide the drum into a storage side and an active side, characterized by having on a portion of its periphery a groove; and, on at least one face of the disc: an opening leading into the peripheral groove; a groove in extension of the peripheral groove, and extending toward tangency with the central aperture; and a spiral wedge on the face of the disc, extending along said aperture, and of a constant radial width substantially the same as the thickness of the rope for which the device is intended, and of an axial thickness gradually increasing up to substantial equality with its width.

10. A drum divider, consisting of a flat disc, centrally circularly apertured to embrace a winch-drum and thereby divide the drum into a storage side and an active side, characterized by having on a portion of its periphery a groove of radius nowhere substantially less than the radius of the central aperture, and of width to accommodate one strand of rope of the size for which the device is intended, and of angular extent substantially less than 360°; and, on each face of the disc: an opening leading into the peripheral groove; a groove in extension of the peripheral groove, and extending to tangency with the central aperture, and of sufficient depth clear to the point of such tangency to contain a rope of the size for which the device is intended, thence extending along said aperture with depth gradually decreasing to zero; and a spiral wedge on each face of the disc, extending along said aperture, from substantially the point of emergence of said extension groove to a point just short of the point of tangency of said extension groove, and of a constant radial width substantially the same as the thickness of the rope for which the device is intended, and of an axial

thickness gradually increasing from zero up to substantial equality with its width.

11. One-half of a drum divider, consisting of a flat half disc, semi-circularly apertured along its straight edge to embrace a winch-drum and thereby divide the drum into a storage side and an active side, characterized by having on a portion of its periphery a groove of radius nowhere substantially less than the radius of the central aperture, and of width to accommodate one strand of rope of the size for which the device is intended, and extending from the straight edge along a portion of the curved edge; and, on one face of the half disc: an opening leading into the peripheral groove; and a groove in extension of the peripheral groove, and extending to tangency with the semi-circular aperture, and of sufficient depth clear to the point of such tangency to contain a rope of the size for which the device is intended, thence extending along said aperture with depth gradually decreasing; and, on the opposite face of the half disc, a portion of

a spiral wedge, extending along said aperture, from a point approximately at the straight edge to the straight edge again.

12. One-half of a drum divider, consisting of a flat half disc, semi-circularly apertured along its straight edge to embrace a winch-drum and thereby divide the drum into a storage side and an active side, characterized by having on a portion of its periphery a groove of radius nowhere substantially less than the radius of the central aperture, and of width to accommodate one strand of rope of the size for which the device is intended, and extending from the straight edge along a portion of the curved edge; and, on one face of the half disc, an opening leading into the peripheral groove; and, on the opposite face of the half disc, a portion of a spiral wedge, extending along said aperture, from a point approximately at the straight edge to the straight edge again.

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