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Erith et al.

[11] **3,875,815**

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[54] **LEVER-OPERATED RATCHET DEVICES**

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[30] **Foreign Application Priority Data**

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[52] **U.S. Cl.** **74/230.01**; 74/230.3

[51] **Int. Cl.** **F16h 55/36**

[58] **Field of Search** 74/142, 230.3, 230.01, 74/230.11; 254/164

[56] **References Cited**

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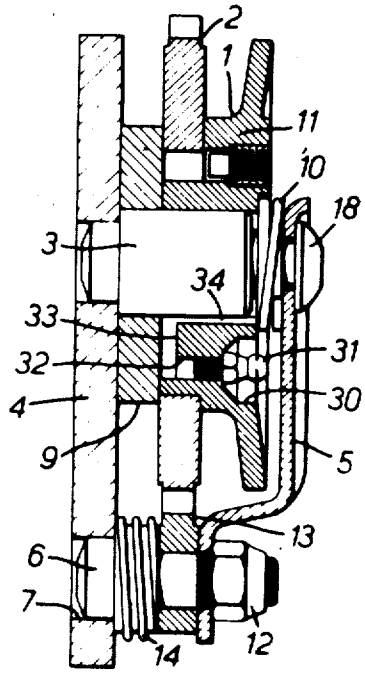
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Assistant Examiner—F. D. Shoemaker
Attorney, Agent, or Firm—Young & Thompson

[57] **ABSTRACT**

A cable drum of a lever-operated ratchet device is fabricated from two sintered components, one of which forms the ratchet wheel and the other of which provides a combined side plate and core section. The two sintered components are fused or otherwise fixed together to provide the complete drum and the use of a sintering process enables the components to be accurately formed using accurate dies with a minimum or even no machining being necessary before assembly of the drum.

7 Claims, 8 Drawing Figures



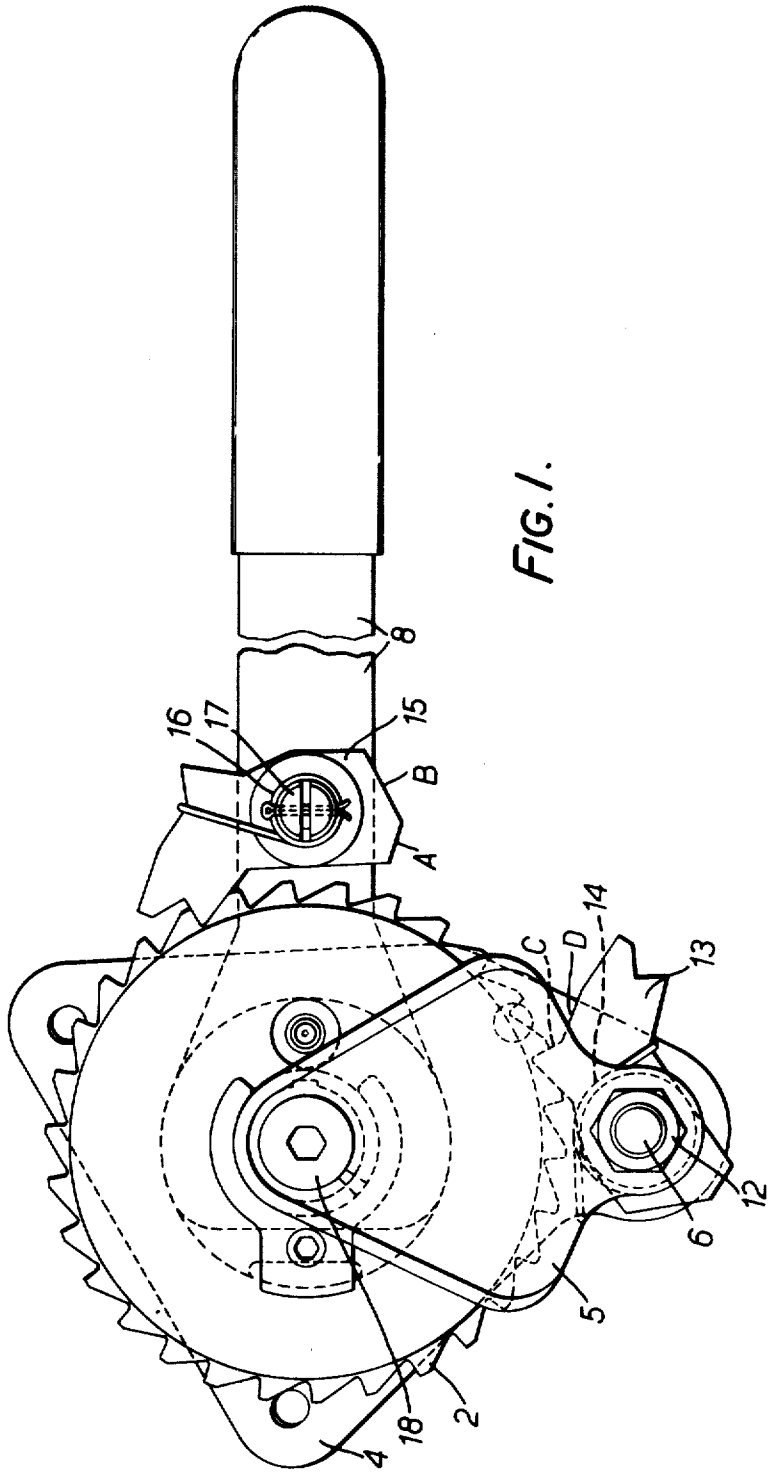


FIG. 1.

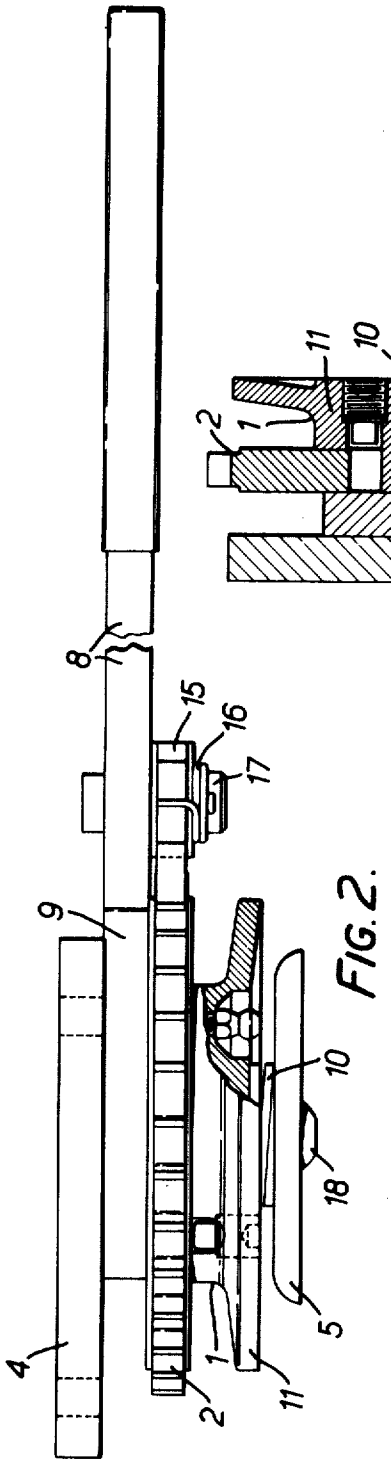


FIG. 2.

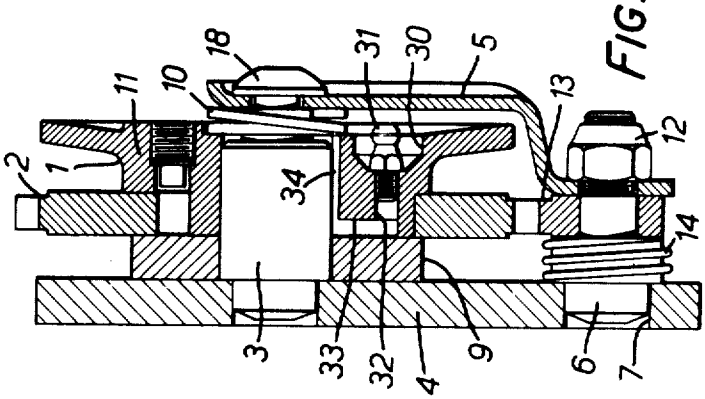


FIG. 3.

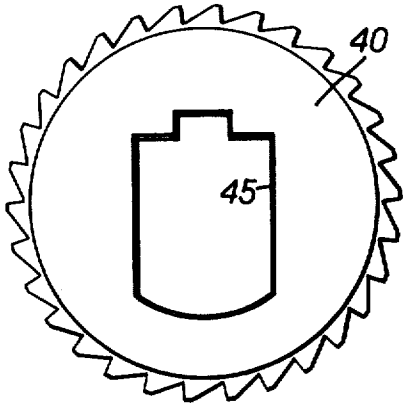


FIG. 4.

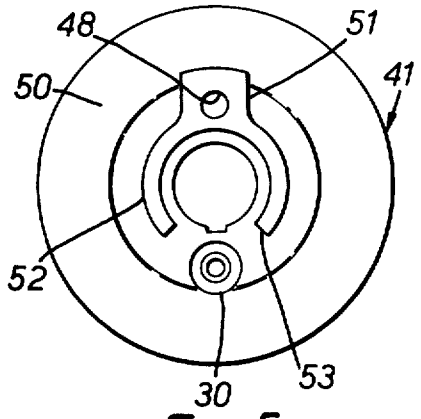


FIG. 5.

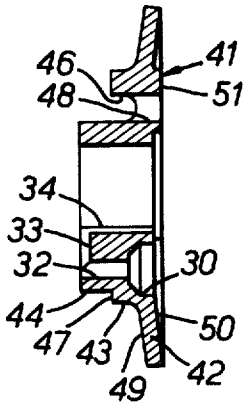


FIG. 6.

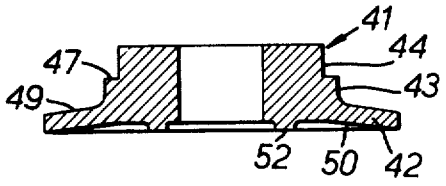


FIG. 7.

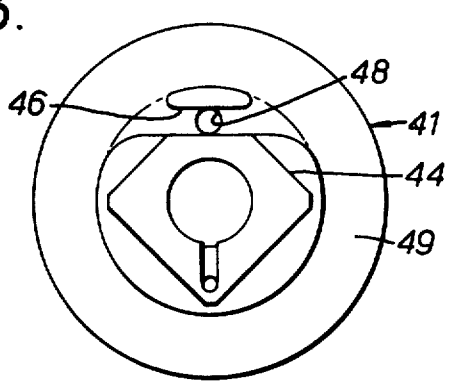


FIG. 8.

LEVER-OPERATED RATCHET DEVICES

This invention relates to lever-operated ratchet devices of the type in which reciprocation or "stroking" of the lever operates to turn a cable drum or the like associated with the ratchet wheel. Devices of this character are commonly used to tension the brake cables of parking brakes on commercial vehicles, particularly the brakes of semi and independent goods trailers, and the invention is of more particular application to a so-called "multi-stroke handbrake" of this type. It will be appreciated that although devices of the type concerned normally act through cables these can be replaced by any suitable flexible members, for example, by chains, and reference herein to a cable drum is to be construed accordingly.

Multi-stroke handbrake control devices normally have a fabricated cable drum one side of which provides a ratchet wheel and the opposite side of which is formed by a circular side plate, with a central core section extending between the ratchet wheel and the side plate. The inner end of the cable is attached to the core section and the ratchet wheel is engaged by a spring-loaded holding pawl and actuated by a spring-loaded application pawl mounted on a control lever which shares a common pivot axis with the drum and is mounted alongside the ratchet wheel. The object of the invention is to provide a fabricated cable drum of improved construction offering considerable manufacturing advantages.

According to the invention a cable drum of or for a lever-operated ratchet device is fabricated from two sintered components, one of which forms a ratchet wheel and the other of which combines a side plate and core section, the two components being fused or otherwise fixed together to provide the complete drum.

The use of a sintering process for production of the drum components enables them to be accurately formed using accurate dies, a minimum or even no machining being necessary before assembly.

The core section may be extended as a spigot portion which is an interference fit in a central aperture of the ratchet wheel. This spigot portion may be of generally square cross-section, with one corner cut away in the region of a chordal groove in the end face of the core which abuts the ratchet wheel. The end of the cable is retained in the groove, preferably by a grub screw threaded into the side plate.

In producing the ratchet wheel a specified grade of material may be used equivalent to the hardened steel from which such ratchet wheels have previously been machined. As such an exacting specification is not required for the side plate component a lower grade material may in this case be used.

The toothed periphery of the ratchet wheel may be relieved, at least on the side facing the side plate, to avoid snagging of the cable on the teeth. On its inner surface the side plate may be tapered radially outwardly to provide a throat of increaseing width in the radial direction of the drum to assist in smooth guidance of the cable and prevent wear of the latter on the edge of the side plate.

This particularly enables the device to be used with the cable approaching the drum at an angle and guided by running in contact with the inner side face of the side plate.

In a preferred embodiment the device has a cranked cover plate, covering a sector of the side plate with the cranked portion fixed to a backplate of the device. The overall diameter of the side plate is approximately equal to the root diameter of the ratchet teeth, and the clearance between the drum and the cover plate is less than the cable diameter to prevent the cable jumping off the drum when released. To this end the cranked portion extends closely around the side plate and also close up to the ratchet teeth.

A ratchet device in the form of a multi-stroke handbrake control embodying the invention will now be described by way of example and with reference to the accompanying drawings, in which:

FIG. 1 is a front view of the device,

FIG. 2 is a plan view, partly in section, corresponding to FIG. 1,

FIG. 3 is a corresponding vertical sectional view through the ratchet wheel axis,

FIG. 4 shows a ratchet-wheel component of a cable drum,

FIG. 5 is a face view of another component of a cable drum,

FIGS. 6 and 7 are sectional views at right angles of the component of FIG. 5, and

FIG. 8 is a rear face view of the component of FIG. 5.

Referring firstly to FIGS. 1 to 3, a cable drum 1, one side of which provides a ratchet wheel 2, is rotatably mounted on an axle 3 which extends between a flat generally triangular backplate 4, in which it is fixed, and a triangular cranked cover plate 5 which is fixed to the backplate 4 by a stud 6 clear of the drum and fixed in a bore 7 in the backplate. An operating lever 8 of rectangular section and with a generally circular flat inner end portion 9 is freely pivotable on the axle 3 and sandwiched between the backplate 4 and the ratchet wheel 2. A spring washer 10 between the other side 11 of the drum and the cover plate 5, which covers a sector of the drum, presses the drum towards the backplate and against the lever 9, and also provides a braking torque operative on the drum. A button-headed socket screw 18 passes through the cover plate 5 into the end of the axle 3.

A stud 6, on which the cover plate 5 is fixed by a nut 12, is stepped to provide a pivot bearing for a holding pawl 13 and, between this pawl 13 and the backplate 4, is surrounded by a torsion spring 14 urging the holding pawl 13 into engagement with the ratchet wheel 2. An application pawl 15 pivotally mounted on the lever 8 adjacent the ratchet wheel 2 is spring loaded into engagement with the latter by a torsion spring 16 which surrounds a pivot 17 on which that pawl is mounted.

Referring to FIGS. 4 to 8, the drum is fabricated from two sintered components 40 and 41 fused together. One component 40 is a flat circular plate with a toothed periphery to provide the ratchet wheel, and the other component 41 comprises the opposite side plate 42 and core section 43 of the drum. The cylindrical core section 43 is extended by a reduced-section spigot portion 44 which is an interference fit in a central chamfered aperture 45 in the ratchet wheel component 40. The spigot portion 44 is of square cross-section with slightly relieved corners, except for one corner which is cut away in alignment with the inner edge of chordal groove 46 across the adjacent end of the core section 43 which presents an otherwise flat annular sur-

face 47 abutting the inner side face of the ratchet wheel.

Said chordal groove 46 is provided for anchorage of the inner end of the cable. This is achieved by a grub screw in a threaded bore 48 in the side plate 42. The periphery of the ratchet wheel component 40 is relieved, to the depth of the teeth, on both sides. On the one hand this prevents snagging of the cable on the teeth, and on the other hand prevents "rough" engagement of the stroking lever with the teeth.

The side plate 42 is inclined so that the inner face 49 is substantially frusto-conical to provide a guide for the cable when led on to the drum at an angle as is usual with the parking brakes of vehicle trailers. The side plate 42 is of constant thickness, thus providing for the drum a dished outside face 50 with a central section which is recessed apart from a raised projection 51 flush with the drum periphery. This projection provides a boss for the bore 48 in which said grub screw is threaded, and it extends either side of that boss in the form of an arcuate rib 52 with a gap 53 diametrically opposite to the boss and within which said spring washer 10 (FIG. 3) seats.

In the angular gap 53 in the arcuate rib a grease nipple 31 is fitted in a recess 30. This provides for simultaneous greasing of the rubbing side faces of the lever and the drum, and the drum axle, by way of grease channels 32, 33 and 34.

The cranked section of the cover plate 5 (FIG. 3) extends around and has a close clearance with respect to the adjacent side 11 of the drum, i.e. the side opposite to the ratchet wheel 2, and the adjacent side edge of the ratchet wheel. In each case the clearance is less than the diameter of the cable used so that the latter cannot jump off the drum. The cover plate 5 performs the dual function of preventing the cable jumping off the drum 1 and of "tying together" the axle 3 and the holding pawl pivot stud 6, while also providing a seating for the spring washer 10.

Movement of the lever 8 in the freewheeling non-drive direction is limited by interengagement of the pawls 13 and 15 at faces A and B, C and D, such engagement serving to release both pawls from the ratchet wheel 2 and hence relieve the cable tension as the drum is now unrestrained apart from the braking torque produced by said spring washer. To this end a tail portion, with faces A and B, of the application pawl engages with a toothed portion, with faces C and D, of the holding pawl, the formation of the pawls being such that they interengage with a mutual camming action whereby to turn them to the release position.

The circular inner end 9 of the lever 8, which may be a stamping or pressing, provides a thrust bearing face for the drum, this face being in bearing contact with the adjacent side face of the ratchet wheel and the end face of the spigot portion 44 (FIG. 6) of the side plate component 41.

What is claimed is:

1. A cable drum in or for a lever-operated ratchet device, the cable drum being fabricated from two sintered components, one of which forms a ratchet wheel and the other of which combines a side plate and core section, the two components being fused or otherwise fixed together to provide the complete drum.

2. A cable drum according to claim 1, wherein the core section is extended as a spigot portion which is an interference fit in a central aperture of the ratchet wheel.

3. A cable drum according to claim 2, wherein the spigot portion is of generally square cross-section, with one corner cut away in the region of a cable-anchoring chordal groove in the end face of the core which abuts the ratchet wheel.

4. A cable drum according to claim 1, wherein the ratchet wheel is sintered of material chosen for the formation of ratchet-wheel teeth and the side plate and core component is sintered of lower grade material.

5. A cable drum according to claim 1, wherein the toothed periphery of the ratchet wheel is relieved, at least on the side facing the side plate, to avoid snagging of the cable on the teeth.

6. A cable drum according to claim 1, wherein the side plate is shaped to provide a throat of width increasing radially outwardly of the drum to assist in smooth guidance of the cable and prevent cable wear on the edge of the side plate.

7. A cable drum according to claim 1, rotatable on an axle fixed to a backplate, a cranked cover plate covering a sector of the drum side plate with the cranked portion thereof fixed to the backplate, the clearance between the drum and the cover plate being less than the cable diameter to prevent the cable when slack jumping off the drum.

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