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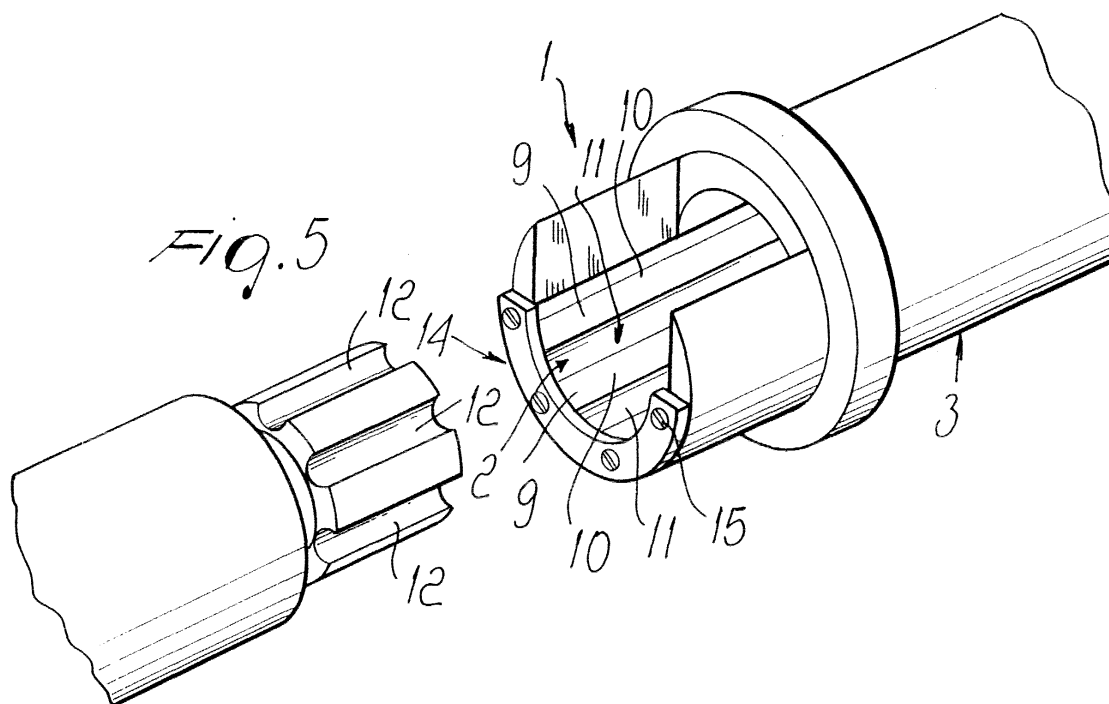
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(54) Support for reel shafts

(57) A support for reel supporting shafts comprises a seat which is open upward and is adapted to receive one end of the reel supporting shaft. The seat has a semicylindrical surface with a plurality of discontinuity channels shaped so as to accommodate at least one

portion of respective rod-like members forming, together with the semicylindrical surface of the seat, a splined profile which is adapted to transmit torque to the end of the reel supporting shaft, whose cross-section is provided with a plurality of hollows which are complementary to the profile.



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Description

[0001] The present invention relates to a support for reel supporting shafts, particularly for paper reels.

[0002] It is known that each support accommodates in its spindle one end of a shaft which in turn supports and keeps self-centered a reel during unwinding or winding. These supports are generally motorized with self-braking motors and also allow a slight axial movement, so as to achieve the alignment of the reels, which are usually unwound, more than one at a time, on supports which are arranged in a column and are mutually aligned.

[0003] Conventional structures in this field relate to supports which are constituted by a flanged tubular outer part which is connected to a footing. A thread is provided in the rear region and an annular member screws thereon. The annular member is internally provided with an annular groove which accommodates the protruding part of a pin which is rigidly coupled to an internal supporting ring. A slot between the outer part and the inner ring allows the pin to advance or move back when the annular member is turned on the thread. All the mechanical parts that constitute the actual support of the reel supporting shaft are located on the inner ring; therefore the rotation of the annular member clearly allows the axial adjustment of the internal parts of the support in order to achieve alignment between reels which unwind together. Radial bearings keyed inside the ring accommodate the outer surface of the rotating member, which coaxially contains in a cavity a shaft which can slide freely. A pin which is rigidly coupled to the shaft enters, by means of a slot of a ring arranged between the bearings, a cavity formed in the rotating member only when it is in the vertical position, allowing in practice the sliding of the shaft only as a consequence of the particular arrangement of the pin. A seat is formed in one end of the rotating member and receives the protrusions of the reel supporting shaft. The seat is such that the shaft is inserted from above, and contains the lower half of the shaft along the horizontal plane that passes through the axis of the support. The seat has two cavities arranged side by side: a semicylindrical outer one and a slightly further inward one which is constituted by two inclined surfaces arranged in a V-like shape. Necessarily, the end part of the shaft that supports the reel is complementary to the cavities and has a ground cylindrical end part and a prism-shaped adjacent part which is constituted by four faces so as to provide the coupling of the parts. The block for closing the end of the shaft that rests in the two cavities is constituted by a semiannular member which has the same diameter as the lower semicylindrical seat and is rigidly connected to a cylindrical member which is in contact with the sliding shaft. The semiannular member can retract with respect to the rotating member, allowing the easy insertion of the reel supporting shaft from above. The motion of the semiannular member moves the cylindrical member, which in

turn moves the sliding shaft, which moves only when the pin that is connected thereto is in the vertical position with the seating cavities in the lowermost position of the support, allowing the exit of the reel supporting shaft only upward, for obvious safety reasons. Transmission between the support and the reel supporting shaft is achieved by virtue of the coupling between the prism-like surfaces, while centering is achieved on the cylindrical part. The dimensional difference between the diameter of the cylindrical end part and the prism-like sector allows the axial sliding of the internal parts under the action of the annular member.

[0004] The above-described devices have the drawback that the head of the support requires expensive machining due to the presence of flat surfaces with narrow tolerances for side-fit coupling.

[0005] Another drawback is the fact that the operation for grinding the semicylindrical cavity of the head is difficult.

[0006] The aim of the present invention is to overcome the drawbacks of the cited prior art.

[0007] An important object of the invention is to provide a supporting head for reel supporting shafts which can be manufactured by means of a more simple and rapid process.

[0008] Another object of the invention is to provide a head for supporting reel supporting shafts which is capable of transmitting more torque than conventional models.

[0009] This aim and these and other objects which will become better apparent hereinafter are achieved by a support for reel supporting shafts comprising a seat which is open upward and is adapted to receive one end of a reel supporting shaft, characterized in that the seat has a semicylindrical surface with at least one discontinuity channel which is adapted to accommodate at least one portion of at least one rod member which has a protruding portion which, together with the semicylindrical surface of the seat, forms a splined profile of the seat which cooperates with a splined section formed in the end of the reel supporting shaft and is complementary to the splined profile, so as to transmit a driving torque.

[0010] Further characteristics and advantages will become better apparent from the following detailed description of a preferred but not exclusive embodiment of the invention, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

Figure 1 is a sectional side view, taken along the line I-I of Figure 3, of the support for reel supporting shafts according to the invention;

Figure 2 is a sectional plan view, taken along the line II-II of Figure 3, of the support for reel supporting shafts according to the invention;

Figure 3 is a partially sectional front view of the support according to the invention, illustrating the seat of the protrusion of the reel supporting shaft, surmounted by the closure block;

Figure 4 is a sectional side view, taken along the line IV-IV of Figure 3, of a detail of the front ring for locking the shaft-support coupling;

Figure 5 is a perspective view of the seat on the spindle of the support which is adapted to receive the protrusion of the reel supporting shaft;

Figure 6 is an enlarged-scale side elevation view of the protrusion of the reel supporting shaft;

Figure 7 is an enlarged-scale front view of the protrusion of the reel supporting shaft;

Figure 8 is an enlarged-scale front view of the seat according to the invention.

[0011] With reference to the above-cited figures, the support for reel supporting shafts, generally designated by the reference numeral 1, comprises a tubular outer part 30 which is fixed to a footing (not shown in the figure) inside which all the mechanical parts that constitute the actual support are arranged in a per se known manner. Such parts comprise an internal supporting ring 31 which can slide with respect to the tubular part 30, by virtue of an outer annular member 32, ensuring the axial adjustment of the support. Bearings 33, keyed inside the supporting ring 31, accommodate, in a per se known manner, a hollow rotating member 34 which provides the torque required to unwind or wind the reel. A connecting shaft 36 can slide inside the cavity 35, allowing in practice the advancement and retraction of the block 17 that closes a seat 2 of the end 4 of the reel supporting shaft 5 only when the opening of the seat 2 is directed upward, so that for safety reasons the end 4 of the reel supporting shaft 5 can be inserted or extracted exclusively from above. The mechanisms that allow this sliding and the connection among the various members are per se known.

[0012] The actual support is constituted by a cavity which is open upward and is formed in an end of the rotating member 3 and which constitutes the seat 2 for an end 4 of the reel supporting shaft 5. With particular reference to Figure 8, the seat 2 is a semicylindrical surface 6 on which there are axial grooves which form a corresponding number of channels 8 for the insertion of rod members 9. The rod members 9 protrude partially from the semicylindrical surface 6, forming protruding portions 10 which, together with the semicylindrical surface 6, form a splined profile 11. In particular, the protruding portions 10 constitute the teeth that enter the complementarily shaped hollows 12, three in the illustrated case, which are formed in the end 4 of the reel supporting shaft 5. By virtue of this gear, the rotating member 3 transfers the rotary motion to the shaft 5 and ensures their mutual centering. The end 4 of the shaft 5, as shown in Figure 7, has, over this entire cross-section 13, a profile which is adapted to receive, regardless of its rotation, the protrusions 10 of the seat 2.

[0013] Preferably, the rod members 9 are cylindrical and their dimensions are such that they can be inserted in, and removed from, the channels 8 of the head of the

seat 2; they are also identical and interchangeable. The cylinders 9 are locked in the channels 8 by a locking member 14 which when applied to the lower part of the seat 2 closes, as shown in Figure 5, the inlets of the channels 8. The locking member 14 is constituted by a semicircular ring which is fixed by means of screws 15 and is also adapted to ensure axial contact between the seat 2 and the end 4 of the reel supporting shaft 5. The semicircular ring 14 enters a smaller-diameter region 16 of the end 4 of the reel supporting shaft 5 when the shaft is inserted from above, so that the shaft can follow the support during axial movement for adjustment. The closure block 17 comprises a semicylindrical dome 18 having a diameter equal to the lower part and operates, in a per se known manner.

[0014] In practice it has been observed that the invention achieves the intended aim and objects, a support for reel supporting shafts having been provided which requires simpler processes and shorter execution times due to the absence of flat surfaces with narrow tolerances.

[0015] Another advantage according to the invention is that the interchangeable cylindrical members, owing to their length, transmit a higher torque than conventional couplings between the support and the shaft.

[0016] Another advantage according to the invention is that this type of coupling, by eliminating plays, allows quieter rotation of the support.

[0017] The support for reel supporting shafts according to the invention is susceptible of numerous modifications and variations, within the scope of the appended claims. All the details may be replaced with technically equivalent elements. The materials and the dimensions may be any according to requirements and to the state of the art.

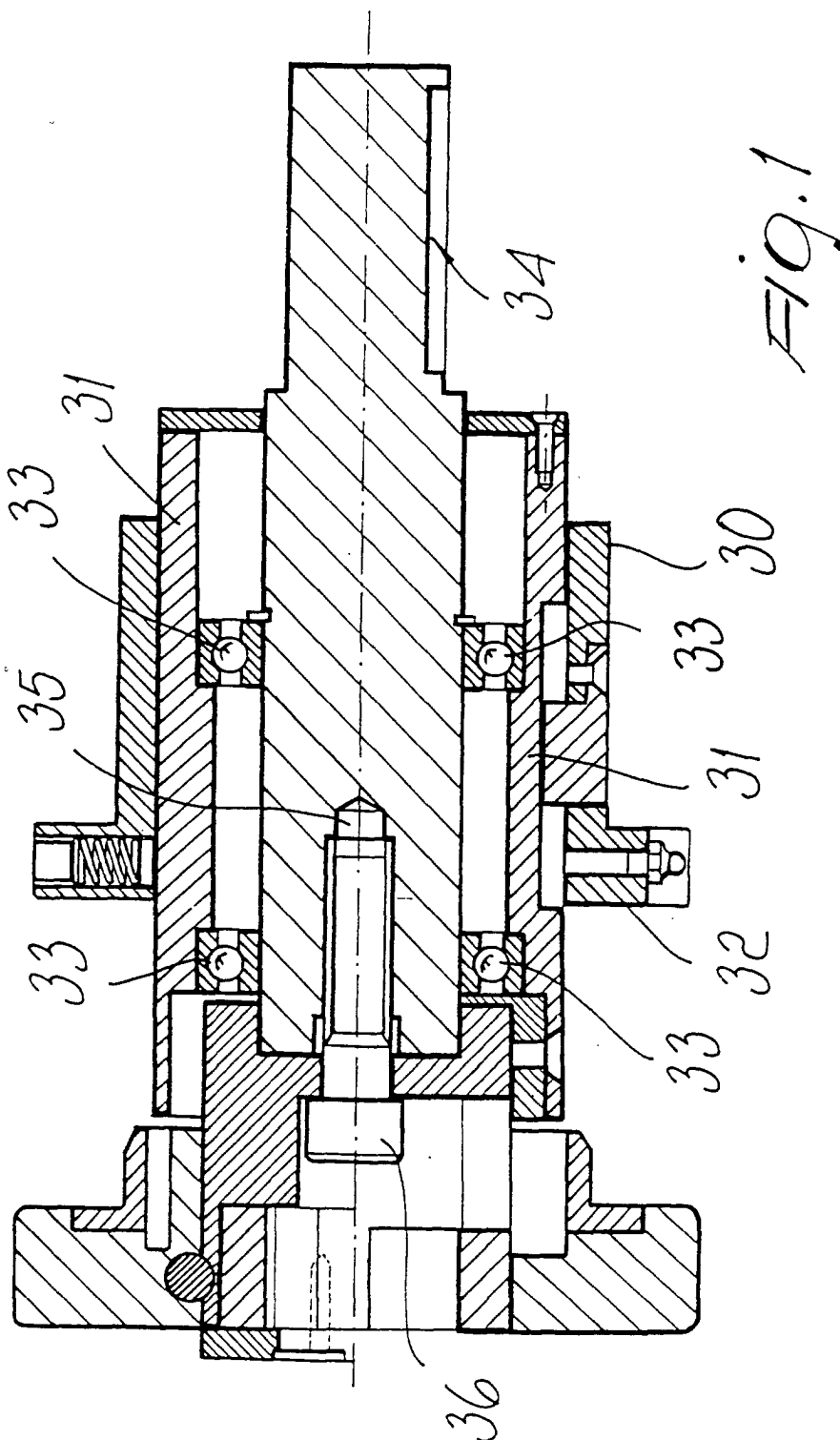
Claims

1. A support for reel supporting shafts, comprising a seat which is open upward and is adapted to receive one end of a reel supporting shaft, **characterized in that** said seat has a semicylindrical surface with at least one discontinuity channel which is adapted to accommodate at least one portion of at least one rod member which has a protruding portion which, together with the semicylindrical surface of said seat, forms a splined profile of said seat which co-operates with a splined section formed in said end of said reel supporting shaft and is complementary to said splined profile, so as to transmit a driving torque.
2. The support for reel supporting shafts according to claim 1, **characterized in that** at least three discontinuity channels are formed in said semicylindrical surface of said seat and contain at least three identical and interchangeable members of said rod

member, forming a splined profile with three teeth.

3. The support for reel supporting shafts according to claim 1, **characterized in that** said end of said reel supporting shaft has a cross-section with at least three hollows which are shaped complementarily to said profile and is adapted to be moved by said seat. 5
4. The support for reel supporting shafts according to one or more of the preceding claims, **characterized in that** said three rod members are constituted by a corresponding number of identical and interchangeable cylindrical bodies. 10
5. The support for reel supporting shafts according to one or more of the preceding claims, **characterized in that** said cylindrical bodies are inserted at their head in the lower part of said seat, so that they are completely contained within said discontinuity channels. 15 20
6. The support for reel supporting shafts according to one or more of the preceding claims, **characterized in that** said cylindrical members are locked in said discontinuity channels by a semicircular member which can be fixed on the head in the lower part of said seat, closing the openings of said channels. 25
7. The support for reel supporting shafts according to one or more of the preceding claims, **characterized in that** the closure of the upper part of said seat is ensured by a semicylindrical dome having the same diameter, which is adapted to retract in order to allow the insertion of said end of said reel supporting shaft only when said insertion is performed from above. 30 35
8. The support for reel supporting shafts according to one or more of the preceding claims, **characterized in that** said circular member, by entering a groove of said end of said reel supporting shafts, ensures that any axial adjustment movement of said support is followed by said shaft. 40
9. The support for reel supporting shafts according to one or more of the preceding claims, **characterized in that** said protrusion of said reel supporting shaft has, on the entire perimeter of the cross-section, a profile with hollows which are complementarily shaped with respect to said profile. 45 50

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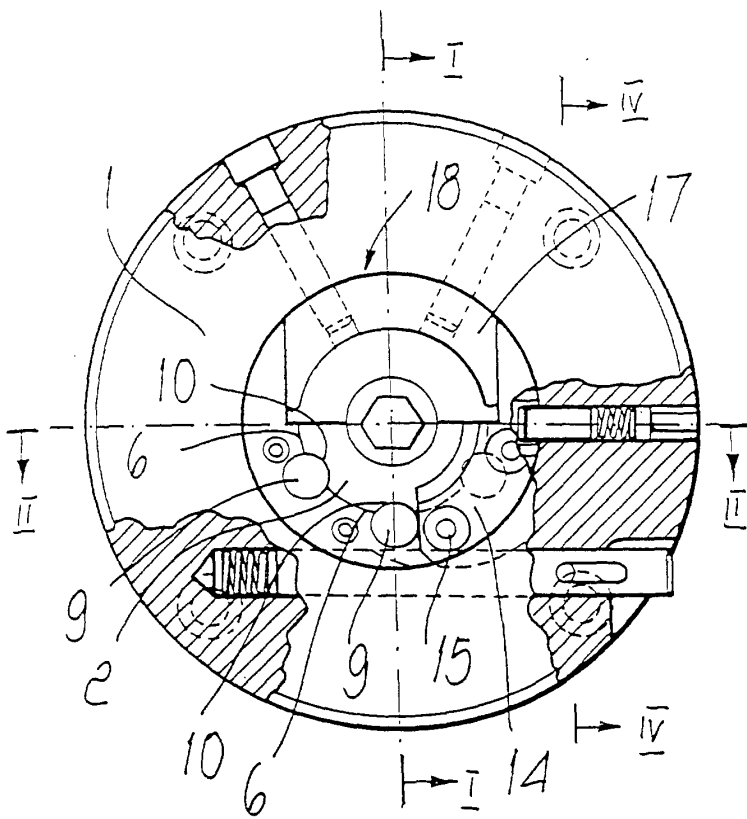


Fig. 3

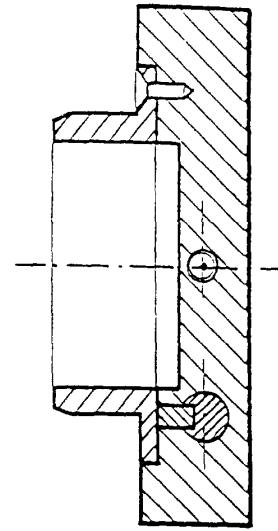


Fig. 4

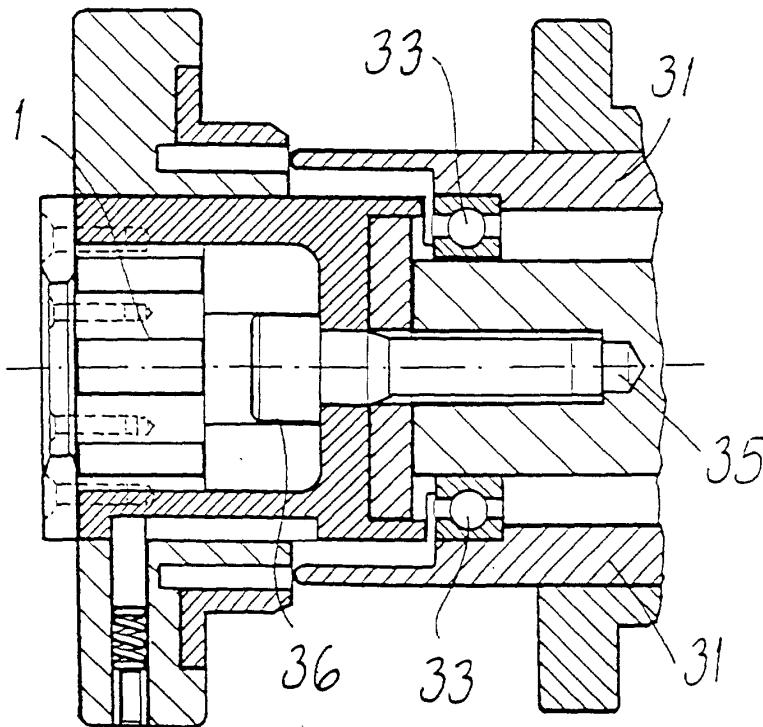


Fig. 2

