Feb. 23 , 1926. 1,574,724

H. ZAHN

WARP BEAM FOR KNITTING MACHINES

Filed March 22, 1924 2 Sheets-Sheet 1

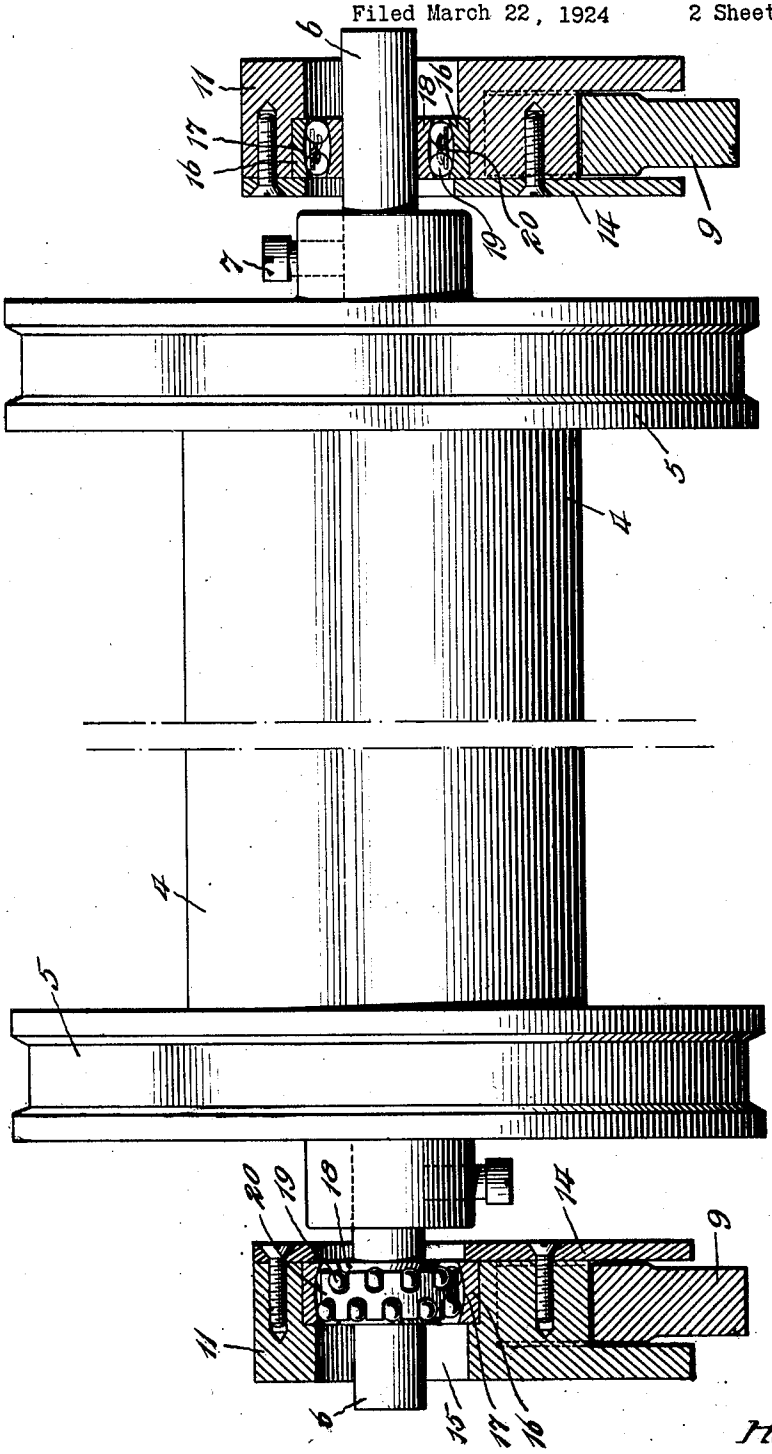

Fig. 1.

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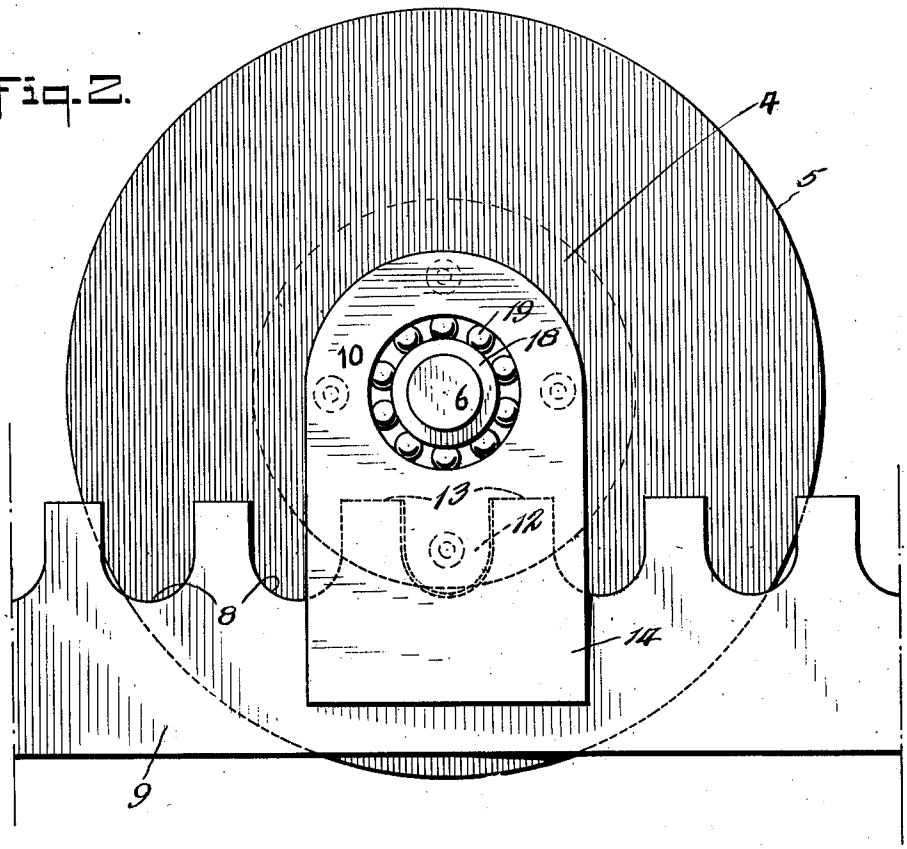
Fig. 2.



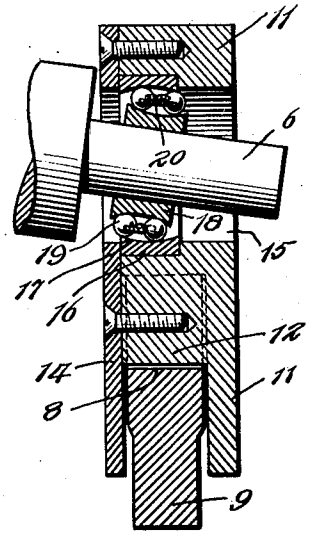


Fig. 3.

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UNITED STATES PATENT OFFICE.

HANS ZAHN, OF UNION, NEW JERSEY, ASSIGNOR TO ROBERT REINER, INCORPORATED, OF WEEHAWKEN, NEW JERSEY, A CORPORATION OF NEW JERSEY.

WARP BEAM FOR KNITTING MACHINES.

Application filed March 22, 1924. Serial No. 701,070.

To all whom it may concern:

Be it known that I, HANS ZAHN, a citizen of the German Republic, residing in the town of Union, county of Hudson, and State of New Jersey, have invented a new and useful Improvement in Warp Beams for Knitting Machines, of which the following is a specification.

My invention relates to warp beams for knitting machines and more particularly to the mounting of said warp beams. One object of my invention is to provide a mounting which permits the beam to turn freely and easily when pulled by a single thread, and another object of my invention is to provide an adjustable bearing which will operate freely in spite of inaccuracy in alignment of the bearings.

In the drawings—

Fig. 1 is a side elevation of the ends of a warp beam mounted in bearings made according to my invention, one of the bearings being shown in vertical section and the other partially in section;

Fig. 2 is an elevation showing a warp beam rack and my bearing mounted thereon; while

Fig. 3 is a vertical section through one of my bearings taken on the line 3—3 of Figure 2, showing how my bearing automatically adjusts itself to inequalities in alignment.

In warp knitting machines the threads are wound on warp beams preferably made of metal, which lie longitudinally of the machine and revolve as the threads are pulled off them by the knitting elements. These beams are generally mounted in notches in horizontal racks so that each can be shifted from one position to another to suit the needs of the occasion, or removed with ease when the threads have all been unwound from that particular beam. In making certain patterns of cloth, such as those involving spots, some of the beams carry very few threads and are frequently known as "spot" beams. In view of the very slight tension caused by the small number of threads in a spot warp, it is necessary that the spot beams turn with absolutely no friction and yet at the same time they must be easily removed or inserted in position. Heretofore warp beams have simply been inserted in the usual notches in the racks and even when the racks are accurately aligned with each other both vertically and horizontally, the beams have required a greater pull to make them turn than can be obtained from the tension by the knitting elements on the few fine threads such as are wound on a spot beam.

I have discovered a bearing which can be moved from one notch to the next with great ease, and one which at the same time gives an absolutely frictionless bearing, no matter how bad the alignment between the notches in the two racks.

Referring to the drawings, the warp beam 4 with its brake flanges 5 has a short axial pin 6 removably attached at each end by a screw 7.

These axial pins in the prior art were set directly in notches 8 in the beam rack 9. I substitute a removable bearing 10 having a body member 11 with a lug 12 to rest in one of the notches 8 the member also resting on the flat surfaces 13 on each side of the notch (see Fig. 2). As will be seen from the double dotted line in the center notch in Fig. 2, there is only one lug 12 in each removable bearing 10. There is a face plate 14 fastened to one side of the body and forming with the body plate which extends down on the other side of the rack, a pair of jaws fitting over the rack and preventing the lug 12 of the bearing from coming out of the notch 8 of the rack. In an opening 15 passing horizontally through this bearing is a ball bearing mounting which will now be described. In this opening 15 a collar 16 having a concave internal face 17 is partially recessed. In this collar is a ring 18, and a series of small balls 19 outside the ring held in position by a frame 20. In the drawings I have illustrated this bearing as having two circles of balls placed alternately, that is to say, in staggered position with relation to each other, the surface of the ring 18 being concave. The size of the concave collar 16 and the ring 18 and the balls 19 are such that while the ring and balls can revolve in any direction provided the pivot center remains inside the concave collar 16, the ring and balls can not be removed,—the curved edges of the bearing collar preventing this.

It will be evident upon examination of Figure 3 that this permits the notches in the two racks to be vertically out of alignment and still obtain a frictionless bearing for

the beam. As explained above, it is also possible for the axial pin 6 to turn in a horizontal plane and since it can slide freely in and out of the sleeve, this bearing will be frictionless even if the notches in the racks are not in horizontal line with each other.

Thus it will be seen that not only have I produced a bearing which can be moved from one slot to another, but I have also produced a bearing which is frictionless under all conditions of alignment and one which owing to the nature of its attachment to the rack can be easily shifted and yet at the same time sits rigidly in place.

What I claim is:

1. A removable self-aligning ball bearing for a warp beam adapted to be attached to a beam rack of a knitting machine, said bearing having a vertical notch adapted to engage its rack, and jaws adapted to fit over both sides of said rack and prevent said notch from slipping off said rack.

2. A removable self-aligning ball bearing for a warp beam of a knitting machine having a ring, ball bearings held on the surface of said ring and a bearing collar around said balls permitting said ring and balls to turn in any direction provided their pivot point is within the ring, and preventing removal of said ring and balls from said collar.

3. In a knitting machine, a notched warp beam rack, a warp beam, an axial pin at each end of said warp beam in combination with a self-aligning ball bearing for each of said axial pins, each bearing having a lug adapted to engage one of the notches in the rack, said bearing being adapted to also engage the flat surface on either side of the notch in the rack engaged by the lug in the bearing, and jaws overlapping the rack on each side thereof and preventing the bearing from slipping off the rack.

4. In a knitting machine, notched racks, warp beams, an axial pin in each end of said warp beams, ball bearings adapted to be set on said racks support said axial beams, each bearing having a ring in which one of the axial pins is free to rotate or move longitudinally, balls supported around said ring, a collar mounted in said bearing and surrounding said balls and ring and permitting said balls and ring to rotate or pivot freely therein provided their pivot center remains within said collar.

In testimony whereof I have signed my name to this specification.

HANS ZAHN.