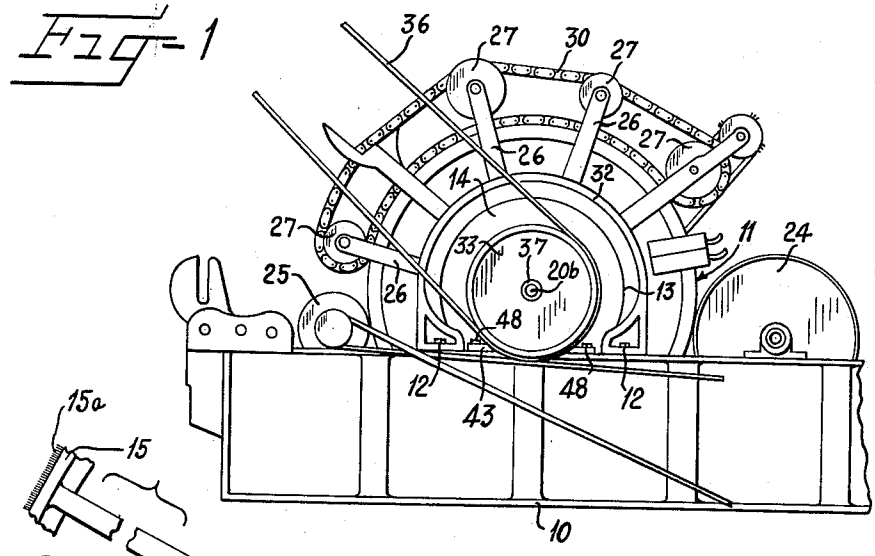
Jan. 12, 1954 G. G. SHERRILL 2,665,954

MOUNTING FOR CARDING MACHINE CYLINDER SHAFTS AND THE LIKE

Filed Feb. 26, 1951

3 Sheets-Sheet 1

Fig-1



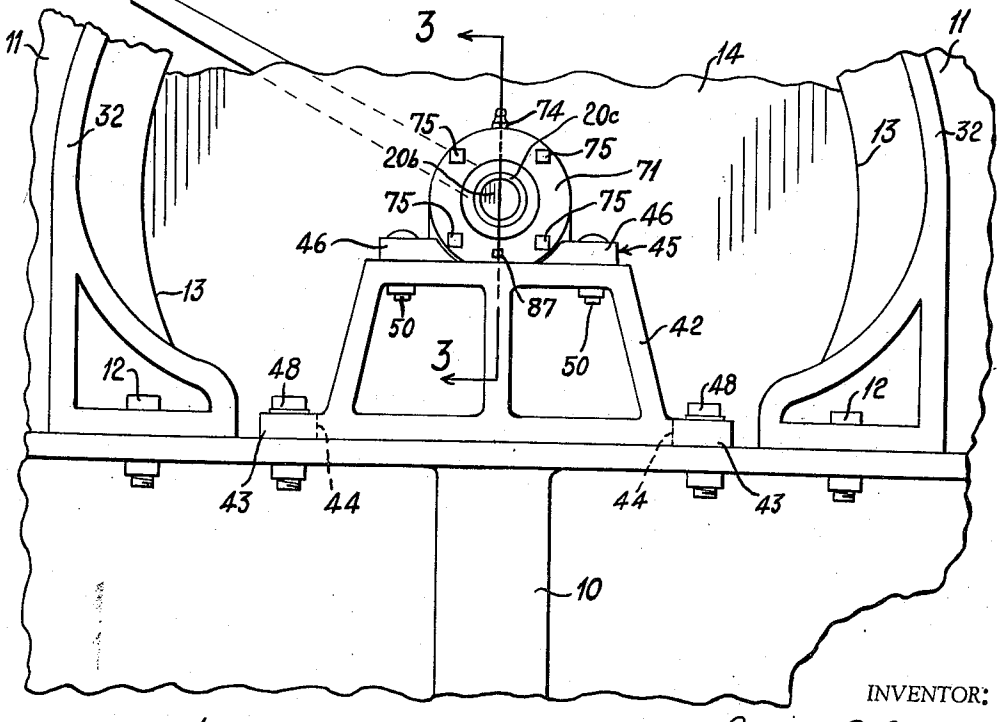


Fig-2

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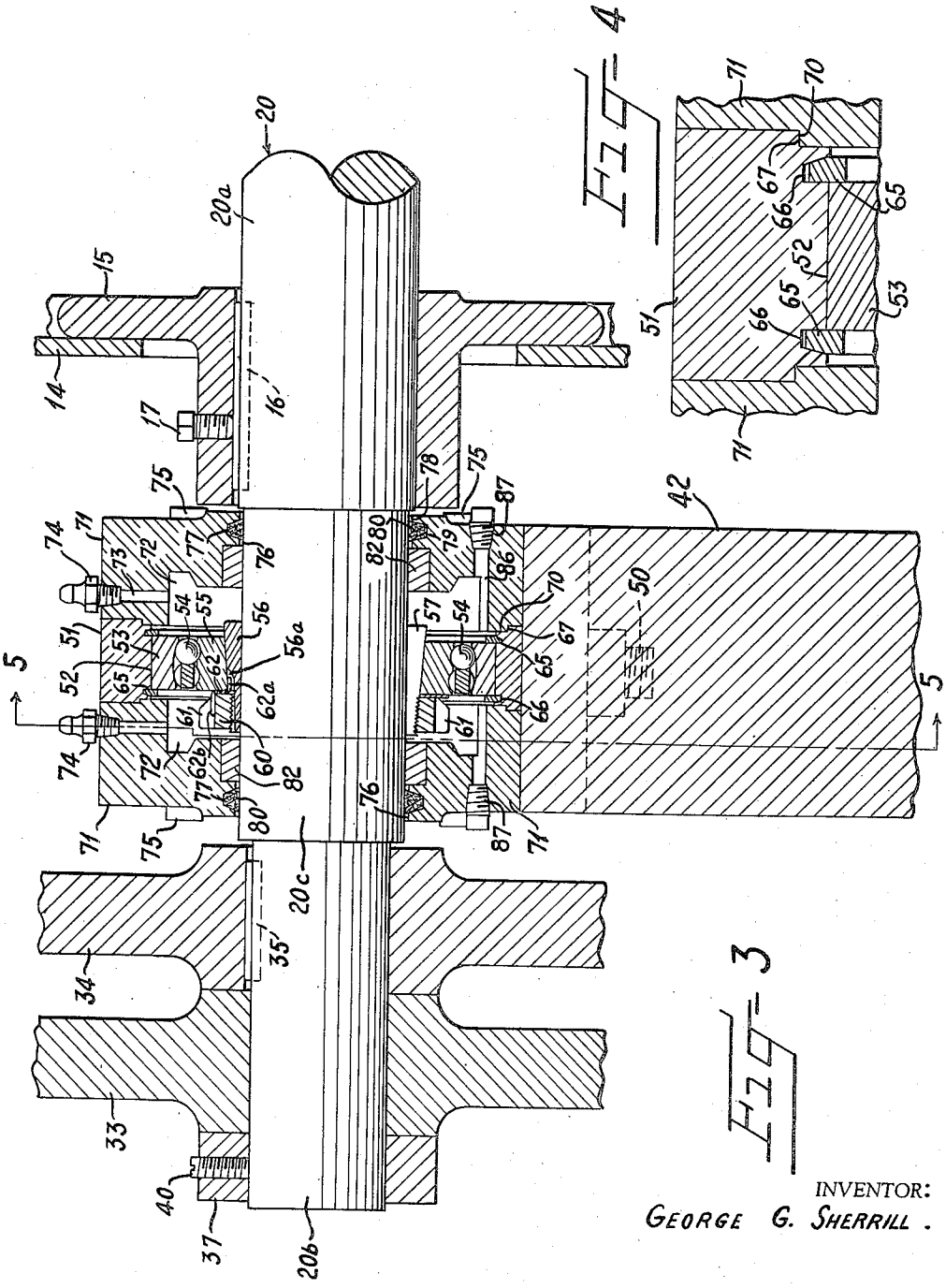


Fig. 4

Fig. 3

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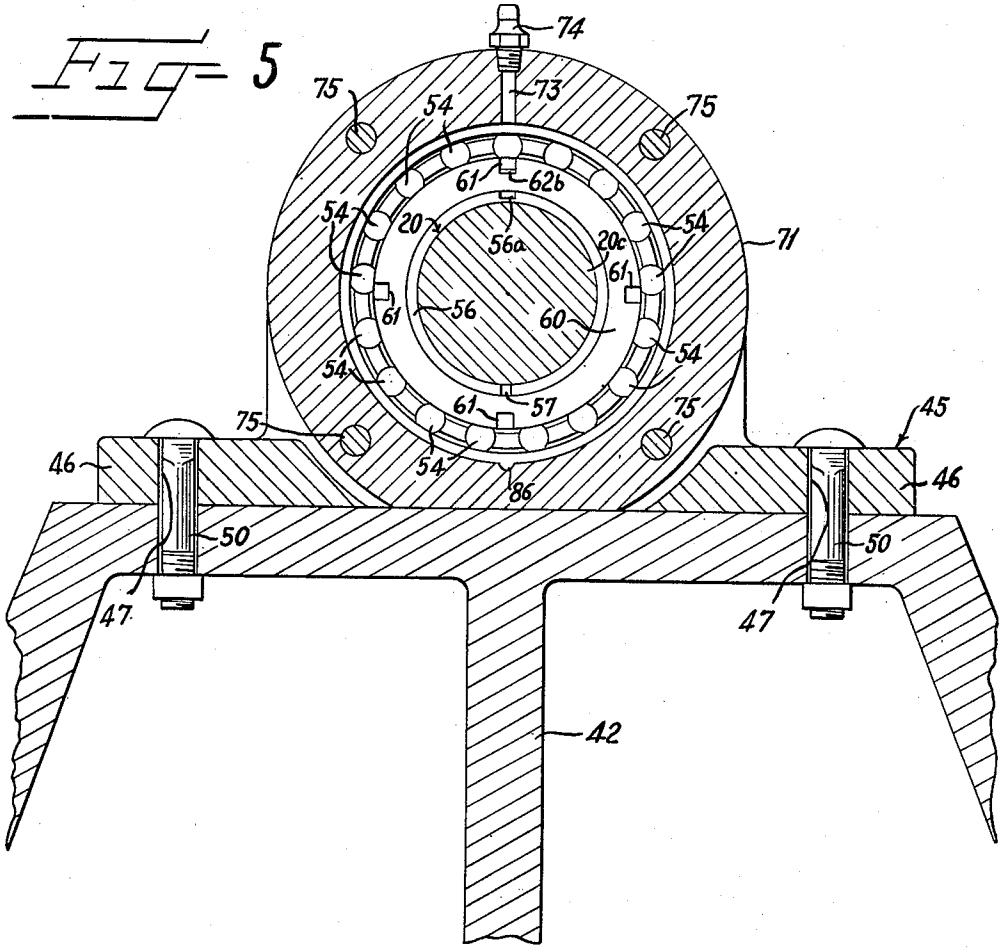
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MOUNTING FOR CARDING MACHINE CYLINDER SHAFTS AND THE LIKE

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Fig. 5



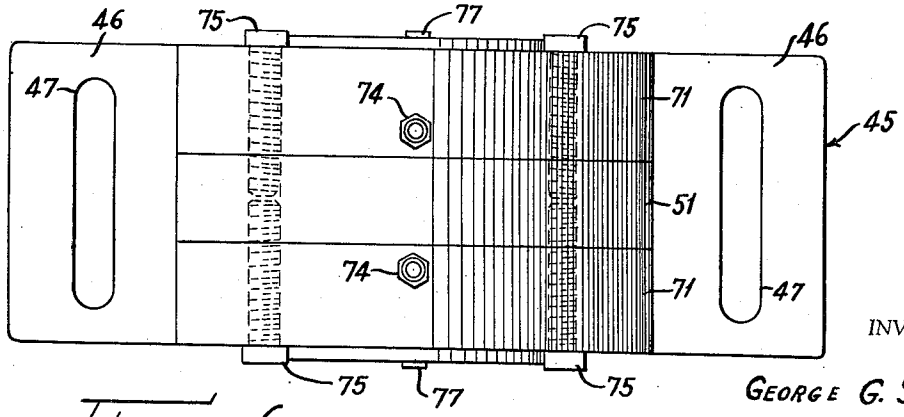


Fig. 6

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UNITED STATES PATENT OFFICE

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MOUNTING FOR CARDING MACHINE CYLINDER SHAFTS AND THE LIKE

George G. Sherrill, Troutmans, N. C.

Application February 26, 1951, Serial No. 212,717

2 Claims. (Cl. 308—35)

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This invention relates to an improved mounting for shafts and more especially for shafts which support a relatively heavy weight such as the main cylinder for a carding machine.

It is an object of this invention to provide a mounting for rotatably supporting opposed end portions of a carding machine main cylinder shaft comprising a pedestal on which a bearing block is mounted. The bearing block has a self-alining anti-friction bearing in the center thereof and the bearing is disposed within bearing caps forming an enclosure which is adapted to receive a suitable lubricant and the bearing caps being disposed in spaced axial relation to the anti-friction bearing and each being provided with a friction bearing or sleeve mounted therein, the internal diameter of which is slightly greater than the external diameter of the shaft extending therethrough and also extending through the anti-friction bearing to permit free rotation of said shaft therein so that in the event of breakdown of the anti-friction bearing as a result of continuous use over a relatively long period, the friction bearings at opposed sides thereof will support the shaft for rotation therein until the anti-friction bearing can be replaced.

Such a structure is extremely important when employed in association with the main cylinder of a carding machine since this will prevent the main cylinder from moving downwardly by gravity, upon wear, to substantially below its normal axis which would result in the card clothing on the cylinder being badly damaged as it engaged by either or both the doffer cylinder and the licker-in cylinder.

With the usual types of bearings heretofore in use, upon break-down of the anti-friction bearing in which the main cylinder shaft is mounted, the card clothing on the main cylinder would be seriously damaged as heretofore stated and as a result of which it would be necessary to replace the card clothing thereon, this being an extremely difficult, costly and time consuming operation.

Some of the objects of the invention having been stated, other objects will appear as the description proceeds, when taken in connection with the accompanying drawings in which—

Figure 1 is a side elevation of a carding machine wherein many of the parts are shown schematically and the parts which are not pertinent being omitted from the drawings;

Figure 2 is an enlarged fragmentary view of the central portion of Figure 1 but omitting the driving and idling pulleys therefrom and illustrating the improved mounting for the main cylinder shaft of the carding machine;

Figure 3 is an enlarged vertical sectional view

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taken substantially along the line 3—3 in Figure 2 and showing the idler and driving pulleys on the reduced outer end of the shaft;

Figure 4 is an enlarged fragmentary sectional view of the upper central portion of Figure 3;

Figure 5 is an enlarged fragmentary vertical sectional view taken substantially along the line 5—5 in Figure 3;

Figure 6 is a top plan view of the improved bearing block removed from the pedestal and disassociated from the carding machine.

Referring more specifically to the drawings, the numeral 10 indicates one of the lower side frame members of a carding machine which supports intermediate its ends an upper substantially semi-circular side frame member 11 being suitably secured to the upper surface of the side frame member 10 by any suitable means such as bolts 12. The upper side frame member 11 of the carding machine has a substantially semi-circular opening 13 therein, through which may be observed the sheet metal covering 14 of a conventional main cylinder 15 of the carding machine which is fixedly mounted, as by a key 16 and a set screw 17 on the main or medial portion 20*a* of a main cylinder shaft designated broadly at 20.

It will be observed in Figure 3 that the main cylinder shaft 20 has a reduced outer end portion 20*b* integral therewith and also has a portion 20*c* disposed between the medial portion 20*a* and the reduced portion 20*b* which is of slightly smaller diameter than the medial portion 20*a*, this portion of the shaft preferably having been turned to this slightly smaller diameter by any suitable means such as the device shown in my said co-pending application entitled Cutting Device for Turning Down Card Cylinder Shafts, Serial No. 212,716, filed February 26, 1951.

It might be stated that this portion 20*c* is turned down to a smaller diameter than the portion 20*a* because the particular bearing structure of this invention is adapted to replace bearings which have heretofore been in use for supporting the shaft 20. Heretofore, in using other bearings, continuously over long periods of time, the portion would become worn unevenly and become elliptically-shaped in cross-section and consequently it is usually necessary to turn down the portion 20*c* so that it will be perfectly round in cross-section and concentric with the mean axis of the shaft 20.

The carding machine illustrated in Figure 1 also includes a doffer cylinder 24 and a licker-in cylinder 25 which are driven in a conventional manner and which are supported for rotation in

a conventional manner on the lower side frame member 10. The upper substantially semi-circular frame member 11 also supports a plurality of top flat brackets 26 which, in turn support suitable rollers 27 rotatably mounted therein and about which conventional flat carrying chains 30 are adapted to move in the usual manner. It will be observed in Figures 1 and 2 that the lower ends of the brackets or stands 26 are disposed adjacent a substantially semi-circular flange 32 which is integral with and projects outwardly from the side frame member 11.

The outer reduced end 20b of the shaft 20 has an idler pulley 33 and a driving pulley 34 mounted thereon, the pulley 33 being adapted to rotate on the reduced portion 20b and the pulley 34 being suitably secured, as by a key 35 (Figure 3) to the reduced portion 20b of the shaft 20. It will be observed in Figure 1 that a suitable continuously driven belt 36 engages the pulleys 33 and 34 and may be shifted by conventional means not shown from one of the pulleys 33 and 34 to the other. These pulleys 33 and 34 are retained on the reduced portion 20b of the shaft 20 by a collar 37 fixed on the reduced end portion 20b as by a set screw 40.

The parts heretofore described are the usual parts of a carding machine and it is with these parts that the present invention is particularly adapted to be associated. However, it is to be understood that the instant bearing structure, presently described, may be employed in supporting any desired type of shaft and is particularly designed for a shaft such as the shaft 20 which supports a substantial weight such as the main cylinder of a carding machine and wherein it is detrimental to the machine if the bearing becomes worn to such an extent that the axis of the shaft 20 is permitted to move downwardly, by gravity, below a predetermined elevation.

The improved mounting for each end of the shaft 20 comprises a pedestal or stand 42 of any desired construction, the particular stand 42 in Figure 2 being illustrated as being of cast construction and having flanges 43 at the bottom thereof provided with longitudinally extending slots 44 which are penetrated by respective bolts 48 for securing the pedestal or stand 42 to the upper surface of the lower side frame member 10 of the carding machine between the walls of the opening 13, as defined at the lower end thereof by the flange 32 on the upper side frame member 11.

A bearing block broadly designated at 45 is supported on the upper surface of the pedestal 42 and this bearing block has flange portions 46 on opposed sides thereof each of which is provided with an adjustment slot 47 which is slidably penetrated by a square-shank bolt 50 for securing the bearing block 45 to the upper surface of the pedestal 42. The slots 47 are so arranged as to permit adjustment of the bearing block 45 parallel to the axis of the shaft 20 and the slots 44 in the pedestal 42 permit adjustment of the pedestal 42 and the bearing block 45 transversely of the axis of the shaft 20.

The bearing block 45 has an upwardly extending substantially semi-circular center portion 51 which is preferably of substantially less width than the width of the flange portions 46 and which has a circular opening or bore 52 therethrough for slidably accommodating the outer periphery of an outer race 53 of a self-alining anti-friction bearing which is shown in the form of a ball bearing in Figures 3 and 5. The concave inner surface of the outer race 53 encircles

two rows of circularly spaced balls 54 which, in turn, engage the grooved outer peripheral surface of an inner race 55. Also, the particular type of anti-friction bearing employed as shown in Figure 3 is secured to the portion 20c of the shaft 20 by means of a tapered sleeve 56. However, it is to be understood that any type of anti-friction bearing may be employed and may be secured to the shaft 20 in any desired manner.

The tapered sleeve 56 has the same internal diameter throughout its length and the outer diameter thereof is larger at one end of the sleeve than at the other end of the sleeve and this taper on the sleeve 56 corresponds to the taper of the internal wall of the inner race 55. The sleeve 56 is provided with a radially extending slot 57 at one side thereof which extends longitudinally of the sleeve 56 from one end thereof to the other. The outer end of the sleeve 56 is threaded for reception of a lock nut 60 provided with spaced notches 61 in the outer periphery thereof which are adapted to be engaged by a suitable spanner wrench for tightening the nut 60 against a washer 62 which, in turn, bears against the adjacent surface of the inner race 55 of the anti-friction bearing.

The washer 62 is provided with suitable tabs 62a and 62b which are bent to extend respectively, into a keyway or groove 56a extending longitudinally of the periphery of the tapered sleeve 56 and in the adjacent notch 61 in the nut 60 to thus lock the nut 60 in position after it has been driven home. The portion 51 of the bearing block 45 has a pair of spaced snap rings 65 therein which are adapted to fit into annular grooves 66 in the wall of the bore 52. It will be noted in Figure 4 that the remote walls of the grooves 66 relative to each other extend at an angle relative to the vertical and the corresponding snap rings 65 are also tapered at their outer surfaces to tend to urge the snap rings tightly against the adjacent surfaces of the outer race 53 of the anti-friction bearing.

The opposed inner surfaces of the upwardly extending center portion 51 of the bearing block 45 are each provided with an angular recess 67 into which angular projections 70 of corresponding bearing caps 71 are adapted to snugly fit. Since both of these bearing caps 71 are identical, only one of the bearing caps 71 will be described and the same reference characters will apply to like parts associated with each of the bearing caps 71. Each of the bearing caps 71 has a cavity 72 in the surface thereof adjacent the upwardly projecting center portion 51 of the bearing block 45 which provides a cavity or enclosure into which lubricant may be directed through a passageway 73 in the upper face of the bearing cap 71, each bearing cap 71 having a suitable lubrication fitting or grease fitting 74 mounted thereon and threadably embedded therein and communicating with the passageway 73 for introducing lubricant to the cavity 72. Each of the bearing caps 71 is secured to the corresponding surfaces of the upwardly projecting center portion 51 of the bearing block 46 by any suitable means such as screws 75.

Each of the bearing cap members 71 has a bore 76 therethrough which is of substantially larger diameter than the portion 20c of the shaft 20 and through this portion 20c extends. In order to seal the lubricant within the cavity 72, the wall of each of the bores 76 has an annular groove 77 therein in which resilient sealing ring 80 is

mounted, this sealing ring 80 preferably being made of a felt material.

One of the most important features of the present invention is a friction bearing or sleeve 82 which is fixedly mounted, as by a pressed fit, in the inner wall of each of the bearing caps 71. These friction bearings 82 are in axial alinement with each other as well as being in axial alinement with the anti-friction bearing comprising the outer and inner races 53 and 55. As heretofore stated, the sleeve 56 fits tightly along the portion 20c of the shaft 20. However, although it is not perceivable in the drawings, the internal diameter of the friction bearings 82 may be from seven to eleven one thousandths of an inch larger than the corresponding portion 20c of the shaft 20.

It is thus seen that during normal operation; that is, during which the duration of use of the anti-friction bearing in which the inner and outer races 55 and 53, respectively, are held in correct spaced relation to each other by the balls 54, the anti-friction bearing will be the sole means of support for the corresponding end of the shaft 20. However, after continued use of the anti-friction bearing has worn various parts thereof to such an extent that they should be replaced, the balls 54 and possibly the inner and outer races 55 and 53 thereof, may break down and whereupon the shaft 20 will then be supported by the friction bearings 82 in the respective bearing caps 71. This will insure that the weight supported by the shaft 20 will only cause the shaft 20 to be lowered, by gravity, a few thousandths of an inch below its normal elevation and will thus prevent the card clothing on the main cylinder of the carding machine from being moved so close to the doffer cylinder and the licker-in cylinder in Figure 1 as to damage the card clothing. It is evident that when the anti-friction bearing has broken down in the manner heretofore described, continued use of the bearing will cause the bearing to make sounds audible to the operator with the result that he may remove the bearing block 45 from the pedestal 42 and replace the worn anti-friction bearing therein. Removal of the bearing block 45 may be facilitated by the use of the shaft supporting means shown in my said copending application.

In order to permit the escapement of air from the cavity 72 as lubricant is introduced thereto through the fitting 74 and passageways 73, the lower portions of the cap members 71 have respective passageways 86 therein which extend horizontally and are normally closed by a threaded plug 87 which may be removed during the introduction of lubricant to the respective cavity 72 and may then be threadably embedded in the cap member 71 to close the passageway 86.

It is thus seen that there is provided an improved bearing for supporting a shaft having heavy weight thereon and where it is important that said shaft maintain a relatively constant elevation wherein said bearing includes an anti-friction bearing serving as principal support for the shaft and a pair of auxiliary friction bearings positioned about said shaft and cooperating with said anti-friction bearing to provide additional support for the shaft and serving to maintain the shaft in a substantially constant attitude upon wearing of the anti-friction bearings.

In the drawings and specification there has been set forth a preferred embodiment of the

invention and although specific terms are employed, they are used in a generic and descriptive sense only and not for purposes of limitation, the scope of the invention being defined in the claims.

I claim:

1. An improved bearing assembly adapted to be mounted on a frame member for rotatably supporting a shaft, said improved bearing assembly comprising a bearing block adapted to be secured on the frame member and through which the adjacent portion of a shaft extends, an anti-friction bearing mounted in the bearing block, said anti-friction bearing including an outer race fixed in the bearing block and an inner race, means securing the inner race of said anti-friction bearing on said shaft, a bearing cap secured on each end of the bearing block, a friction bearing mounted in each of said bearing caps and being positioned concentrically relatively to the anti-friction bearing and the shaft, the proximal surfaces of the bearing caps being provided with cavities therein to provide spaces between the bearing caps and the anti-friction bearing, means for introducing lubricant into the space between each end of the anti-friction bearing and the corresponding bearing cap, and the internal diameter of the friction bearing being slightly larger than the external diameter of the shaft whereby said friction bearings will permit the shaft to rotate freely therein and will support said shaft upon failure of the anti-friction bearing.

2. An improved mounting adapted to be secured to a frame member for rotatably supporting a shaft, said improved mounting comprising a bearing block adapted to be secured on said frame member and through which a shaft extends, an anti-friction bearing mounted in said bearing block, said anti-friction bearing having an outer race secured in the bearing block and an inner race fixed on said shaft, a bearing cap fixed on each end of the bearing block, opposite ends of the bearing block and the corresponding ends of the bearing caps being provided with mating shoulders thereon for maintaining the bearing caps concentric with the bearing block, each of said bearing caps having a friction bearing therein positioned concentrically with the anti-friction bearing and the shaft, said bearing caps being cut away internally to provide a space between each of the bearing caps and corresponding ends of the anti-friction bearing, and means for introducing lubricant into each of said spaces between the bearing caps and the anti-friction bearing whereby said friction bearing will support said shaft upon failure of the anti-friction bearing.

GEORGE G. SHERRILL.

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