Dec. 22, 1953 C. P. GEEN 2,663,138

SPINDLE MOUNT

Filed Jan. 15, 1951

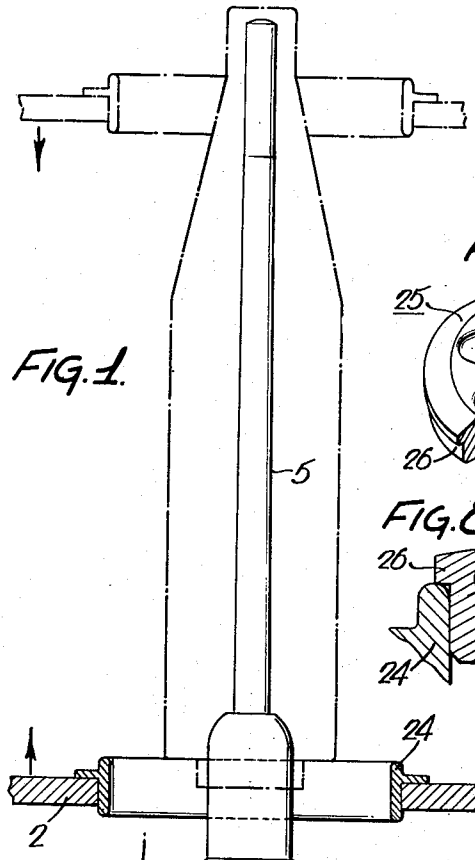


FIG. 1.

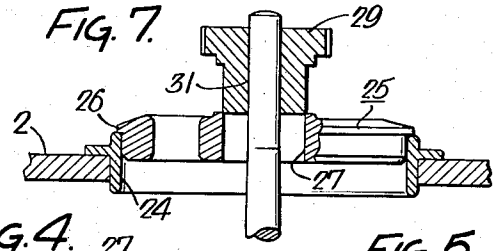


FIG. 7.

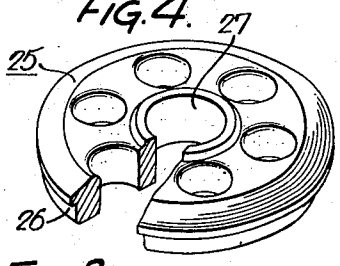


FIG. 4.

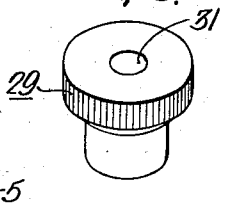


FIG. 5.

FIG. 8.

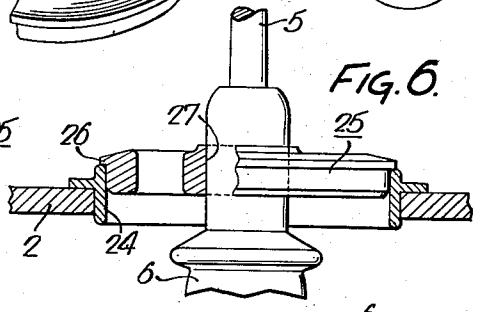


FIG. 6.

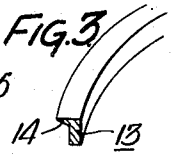


FIG. 3.

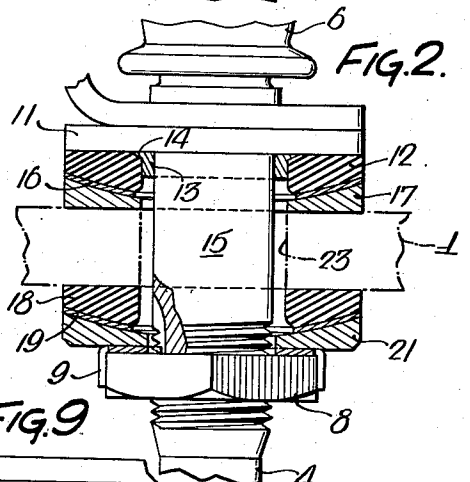


FIG. 2.

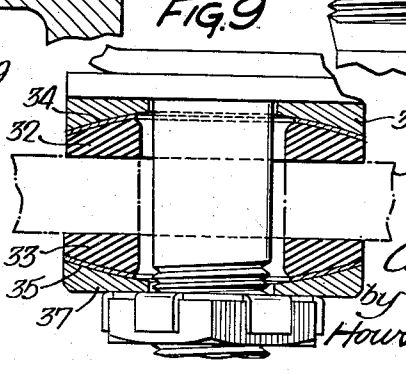


FIG. 9.

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SPINDLE MOUNT

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Application January 15, 1951, Serial No. 206,059

14 Claims. (Cl. 57—129)

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This invention relates to an improved means for mounting work spindles and particularly spindles of the type employed in textile machinery.

A principal object of the invention is to provide a spindle mount which shall have the properties both of resilience for damping vibration and of adjustability in a universal sense so as to permit adjustment of the spindle in the frame or other supporting structure to a most favorable operative position.

Another and broader object of the invention is to provide a spindle mount of structural simplicity and high functional efficiency.

Still another object is to provide, in conjunction with a spindle mount of the aforesaid characteristics, a simple and readily operative gauge device whereby the spindle units of a textile spinning or like frame may be adjusted to correct settings with respect to the ring rails, regardless of variations in the spacing of the units in the frame, with each spindle located centrally of its associated ring in every position of rail travel.

The invention will be more readily understood by reference to the attached drawings, wherein:

Fig. 1 is a side elevational and partial sectional view illustrating a spindle having a mount made in accordance with the invention;

Fig. 2 is an enlarged fragmentary sectional view illustrating the structural details of the mount;

Fig. 3 is a fragmentary sectional perspective view of an element of the mount structure;

Fig. 4 is a view in sectional perspective of an element of the gauge device;

Fig. 5 is a view in perspective of another element of the gauge device;

Fig. 6 is a fragmentary sectional view illustrating application of the device illustrated in Fig. 4 in the gauging operation;

Fig. 7 is a fragmentary sectional view illustrating the manner in which the element illustrated in Fig. 5 is used in the gauging operation;

Fig. 8 is an enlarged fragmentary sectional view illustrating a detail of the gauging device, and

Fig. 9 is a fragmentary sectional view similar to Fig. 2 but illustrating a modification within the scope of the invention.

With reference to the drawings, the numeral 1 designates the spindle rail of a textile spinning or twister frame, and the numeral 2 the ring rail. Mounted in the rail 1 is a spindle, designated generally by the reference numeral 3, and comprising in the present instance, a housing 4 and a blade 5 which may be journaled in the housing either flexibly, in accordance with the conventional practice, or rigidly. In accordance with the conventional practice the blade 5 is provided with a whorl 6. The housing 4 is provided externally with threads 7 and a nut 8 constituting means for securing the spindle in the rail 1, the rail being confined as hereinafter described between the inner or clamping face of the nut 8 and the confronting face of a shoulder 11 at the upper end of the housing.

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In accordance with the present invention an annular pad 12 of resilient rubber or the like, preferably of 35 to 55 durometer, finds a seat against the shoulder 11. In the present instance, an annular spacer element 13 is provided at the inner end of the bore of the pad, said spacer having a flange 14 confined between the pad and the face of the shoulder 11, and having an inner diameter corresponding to the external diameter of the portion 15 of the spindle housing 4 which immediately adjoins the shoulder 11. The spacer 13 thus functions to center the pad 12 accurately with respect to the axis of the spindle housing and makes it possible, by providing spacers of different thicknesses and internal diameters, to standardize the size of pad 12 independently of the diameter of the spindle housing. The spacers 13 may be in the form of turned metal or other rings, flanged as shown; but for economical adaptation to more than one size of spindle it is preferred to produce them from preformed flexible strip material of the desired cross sectional shape, said strip being cut into sections of appropriate lengths and the sections then being shaped to the required annular form. Such strip material may suitably be composed of rubber, plastic or the like.

As illustrated in Fig. 2 the lower face of the pad 12 is spherical in contour, and bonded to this face of the pad is a concave-convex facing plate 16, preferably of brass or brass-plated metal, conforming to the spherical contour of the face of the pad to which it is secured. The lower face of the plate 16 seats in the correspondingly contoured upper face of a cup 17, preferably also of metal, this cup element 17 having a lower flat face which seats against the upper surface of the rail 1. The face plate 16 is adjustable in the spherical socket afforded by the cup 17.

Below the rail 1 is a second resilient pad 18 similar in form to the pad 12 and having similar physical properties. The lower face of the pad 18 is of spherical contour and has bonded thereto a metal face plate 19 similar to the plate 16 described above. The spherical lower face of the plate 19 seats in a spherical socket in the upper face of a metal cup member 21, the lower face finds a bearing on the nut 8. The cup member 21 differs from the member 17, however, in that its inner peripheral edge fits neatly about the housing 4 so that the cup 21 is automatically centered with respect to the axis of the spindle. A suitable lock washer 9 is confined between the nut 8 and cup member 21.

It will be apparent that when the nut 8 is turned up solidly against the cup 21, the spindle

as a whole will be clamped securely but resiliently in place in the rail 1 without metal to metal contact between the structural elements of the spindle and the rail. Since the aperture 23 of the rail through which the housing 4 extends is of greater diameter than the housing, opportunity is afforded to adjust the spindle in the rail both laterally and angularly so that the axis of the spindle may be placed on a vertical line or in other position favorable to the operation of the spindle. The adjustment may be effected by first positioning the nut 8 so that the spindle is held firmly but not tightly and thereafter exerting lateral pressure on the spindle to move it bodily in the rail or to cause relative movement in the desired direction between the abutted spherical faces of the liners 16 and 19 and the corresponding spherical sockets of the cups 17 and 21. It will be apparent that the spacer 13 and cup member 21 will act to maintain the elements of the mount at the respective sides of the rail 1 in properly spaced relation to the spindle housing without interference with the aforesaid adjustments.

As previously stated the invention contemplates provision of means for establishing the spindle accurately in vertical position. As shown in Fig. 1 the blade 5 extends upwardly through an opening in the ring rail 2, in which opening the usual traveler ring 24 is mounted. In accordance with the present invention, I provide a disk 25, see Fig. 4, which as shown in Figs. 6, 7 and 8 is dimensioned so as to fit closely within the ring 24. The disk 25 has a radially projecting flange 26 at its upper end, which when the disk is inserted in the ring 24, seats upon the upper edge of the latter and maintains the disk in place, see Fig. 8. The disk is provided at its center with an opening 27 which is dimensioned to fit the blade 5 in the area which adjoins the upper end of the whorl 6. In the present instance this lower portion 28 of the blade is tapered so that by lowering the rail 2 the aperture 27 of the disk 25 may be brought into closely fitting relation to the blade. With the nut 8 backed away sufficiently to permit the elements of the mount to move with respect to each other, and with the ring rail 2 in its lower position, the disk 25, as illustrated in Fig. 6, will function to establish the spindle in a vertical position and at the center of the ring 24.

After thus setting the spindle and mount assembly in the center of the ring while the ring rail is in the lowest position, as in Fig. 6, the setting can be rechecked at topmost position of the rail by means of the apertured plug element 29 shown in Fig. 5. This element is designed to fit the central aperture 27 of the disk 25, as illustrated in Fig. 7, and the bore 31 of the element 29 is sized to fit the upper end of the spindle 5. With this plug 29 in position in the aperture 27, the rail 2 may be brought to a position wherein the plug lies at the upper end of the spindle blade, see Fig. 7, and if the registration of the upper end of the spindle and the bore 31 of the plug 29 is accurate, assurance is then had that the spindle is central to the ring at any point in its travel. Tightening the nut 8 will fix the spindle in the adjusted position.

The aforedescribed gauge device, in conjunction with the adjustable mount, provides a highly practical method for establishing spindles centrally of their rings in every position of the ring rail and regardless of variations in spindle spacing.

A modification of the mount described above is illustrated in Fig. 9. In this case two resilient pad units 32 and 33 are provided each corresponding to the pads 14 and 18 and their face plates 16 and 19 described above. These pads are positioned at opposite sides of the plate 1 with the resilient elements seating against the latter. The convex surfaces of the metal liners 34 and 35 seat in the socketed faces of cup elements 36 and 37 respectively, each of said cup elements corresponding to the element 21 of the previously described embodiment and like the element 21 closely embracing the cylindrical housing of the spindle. Adjustments are made in the same general manner described above, it being noted that the cups 36 and 37 function in this case to maintain the elements of the mount in proper relative positions with respect to the spindle housing. It will be noted that in this case, the pivot points of the interseating surfaces of the sets of elements 32—34—36 and 33—35—37 at the respective opposite sides of the rail 1 are relatively remote as compared to the pivot points of the corresponding surfaces of the embodiment of Fig. 2. Angular displacement of the spindle in the rail from a normal position such as shown in Fig. 9 will therefore involve a relatively heavy distortion of the resilient pads 32 and 33, and the resistance to such spindle displacement will be relatively great. It will be noted also that in the embodiment of Fig. 2 the actual point about which angular adjustment of the spindle on the said interseating surfaces occurs is well above and relatively remote to the rail 1; whereas in the embodiment of Fig. 9 the angular adjustment will occur about a point in the median plane of the rail 1. These differences in structure and in functional characteristics can be used to advantage in providing mounts of differing characteristics to meet the special requirements of the particular application.

Both of the aforedescribed embodiments are subject to modification without departure from the invention. The materials of the elements of the respective sets (12—17; 18—21; 32—36; and 33—37) are interchangeable, for example, and if interchanged it would be desirable also to reverse the relative thicknesses. It would be possible also to form all of the aforesaid elements of rubber or other suitable resilient material; and, for some purposes it might be desirable to form all of the said elements of metal or other substantially rigid material. Reversal of the sets of elements 12—17 and 18—21 so that the elements 12 and 21 contact the faces of the rail 1 is also contemplated, and introduces different characteristics into the mount without however affecting the functional principle.

It will be understood that the utility of a mount of the character described above is not confined to spindles of the form herein illustrated and will be found useful in the mounting of work spindles of other forms, such for example as that shown in my copending application, Serial Number 184,284, filed September 11, 1950. The language of the present claims is designed to embrace spindles of this form. Also, while the spindle mount is of primary utility in the textile field, it may find useful application for work spindles of analogous character in other fields where the combined characteristics of resiliency and adjustability are required.

I claim:

1. A spindle mount comprising clamping elements having confronting clamping faces, means

for forcibly urging said elements into clamping relation at opposite sides respectively of a support member, and two sets of elements interposed between the said clamping faces for confinement under pressure between the respective clamping faces and the confronting faces of the opposite member, each of said sets comprising two elements having interseating convex and concave faces relatively adjustable on said seats so as to provide for angular adjustments of the spindle axis with respect to the support member, and one of the interseating elements of each set being composed of resilient material.

2. A spindle mount according to claim 1 wherein the resilient element is non-compressible and is free for distortion under the compressive force exerted by the clamping means.

3. A spindle mount according to claim 2 wherein the resilient element is provided with a hard surface for seating engagement with the other element.

4. In a mount for work spindles, the combination with a housing comprising relatively adjustable clamping elements and adapted for installation in an aperture of a spindle supporting member with the said clamping elements at the opposite sides respectively of said member, said housing having clearance with the edges of said aperture, of means for relatively adjusting the said elements into clamping relation to the support member, and two sets of elements embracing the housing and interposed between the clamping elements for confinement under pressure between the respective elements and the confronting faces of the supporting member, each of said sets comprising two elements having interseating convex and concave faces relatively adjustable on said seats so as to provide for angular adjustments of the spindle axis with respect to the support member, and one of the said elements of each set closely embracing the housing so as to move with the housing when the latter is adjusted laterally in the said aperture, the other element of each set having clearance with the housing.

5. A spindle mount according to claim 4 wherein the element of each set which closely embraces the housing is the element of the set relatively remote from the said opposite sides of the support member.

6. A spindle mount according to claim 5 wherein one of the elements of each set is resilient.

7. A spindle mount according to claim 6 wherein the faces of the resilient elements which seat against the other elements of the respective sets are convex.

8. A spindle mount according to claim 7 wherein the convex faces of the resilient elements are provided with substantially non-resilient liners for contact with the other elements of the respective pairs.

9. In a mount for work spindles, the combination with a housing comprising relatively adjustable clamping elements and adapted for installation in an aperture of a spindle supporting member with the said clamping elements at the opposite sides respectively of said member, said housing having clearance with the edges of said aperture, of means for relatively adjusting the said elements into clamping relation to the support member, and two sets of elements embracing the housing and interposed between the clamping elements for confinement under pressure between the respective elements and the confronting faces of the supporting member, each of said sets comprising two elements having interseating convex and concave faces relatively adjustable on said seats so as to provide for angular adjustments of the spindle axis with respect to the support member, and the concave-convex interseating faces of the elements of the respective sets facing in the same direction.

10. In a mount for work spindles, the combination with a housing comprising relatively adjustable clamping elements and adapted for installation in an aperture of a spindle supporting member with the said clamping elements at the opposite sides respectively of said member, said housing having clearance with the edges of said aperture, of means for relatively adjusting the said elements into clamping relation to the support member, and two sets of elements embracing the housing and interposed between the clamping elements for confinement under pressure between the respective elements and the confronting faces of the supporting member, each of said sets comprising two elements having interseating convex and concave faces relatively adjustable on said seats so as to provide for angular adjustments of the spindle axis with respect to the support member, and the concave-convex interseating faces of the elements of the respective sets facing in opposite directions.

11. In a mount for work spindles, the combination with a housing comprising relatively adjustable clamping elements and adapted for installation in an aperture of a spindle supporting member with the said clamping elements at the opposite sides respectively of said member, said housing having clearance with the edges of said aperture, of means for relatively adjusting the said elements into clamping relation to the support member, and two sets of elements embracing the housing and interposed between the clamping elements for confinement under pressure between the respective elements and the confronting faces of the supporting member, each of said sets comprising two elements having interseating convex and concave faces relatively adjustable on said seats so as to provide for angular adjustments of the spindle axis with respect to the support member, and one of the elements of each set being resilient.

12. A spindle mount according to claim 11 wherein the resilient elements of the respective pairs are identical.

13. A spindle mount according to claim 12 wherein the resilient elements have clearance with the housing, and wherein further a separate spacer ring is provided to fill the space between one of the resilient elements and the housing.

14. A spindle mount according to claim 13 wherein the spacer ring is split, being formed of flexible strip material.

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