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(54) **Textile winding machine cradle.**

(57) A textile winding machine cradle (21) is disclosed which permits of the discharge of full yarn packages (18) through the pivot axis (22) thereof onto a conveyor (38). The spaced cradle arms (28, 29) are pivotally mounted in respective support structures (222) and extend forwardly from the ends of a U-shaped bridge-piece (23) through which a progressively varying loading is applied to the yarn package during build-up by piston and cylinder means (24).

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TITLE MODIFIED

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TEXTILE MACHINE

This invention relates to textile machines and in particular to apparatus forming part of such machines for the winding of packages of yarn processed by such machines. Such processing may constitute twisting,
5 doubling, texturising or the like.

It is conventional in such machines to wind the processed yarn on a mandrel. The mandrel is mounted in a cradle of the machine so as to be freely rotatable and
10 the mandrel and package being wound thereon is driven in rotation at substantially constant peripheral speed. This is achieved by contact between the outer surface of the package with a package driving bowl, itself being driven at constant rotational speed by the drive motor of the
15 machine.

Several problems arise with an arrangement as described above. One problem is that of maintaining a sufficient pressure between the package and the package driving bowl to ensure a positive, non-slip drive there-
20 between whilst at the same time ensuring that such pressure is not too great such as will compress and damage the package. Also the cradle is mounted so as to pivot away from the package driving bowl as the package diameter increases, and the increasing weight of the package tends
25 to increase the package-to-bowl contact pressure towards the end of the package build to an unacceptable level. For economic reasons it is preferable to build relatively

large packages, which of necessity are heavy. In addition to the previously mentioned problem there is the problem that the handling of relatively heavy packages over the period of a working day can be very tiring for a machine operator.

5 It is an object of the present invention to provide a textile machine in which the aforementioned problems are avoided or alleviated to a substantial extent.

 The invention provides, in or for a textile machine having at least one package winding mechanism, a cradle adapted
10 to receive and support a package core therein, said cradle being mounted on said machine for pivotal motion between empty package and full package positions, characterised by two spaced cradle arms to receive and support the package core therebetween, and mounted on the machine for pivotal motion as aforesaid by
15 separate means provided at the respective sides of the cradle, thus to allow of the unimpeded discharge through the cradle and rearwardly of the machine of a yarn package wound on the package core.

 According to a preferred feature the cradle further
20 includes a bridge or yoke of generally U-shaped form, the cradle arms extending outwardly from the plane of the bridge and each being supported by a respective limb of such bridge adjacent the remote end of such limb. At least one of said arms is pivotal in a direction away from the other cradle arm
25 so as to release a package mounted between said arms. Said pivotal arm part may be resiliently biased towards the other cradle arm.

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According to a still further preferred feature, the pivot axis of the cradle lies at or about the line of intersection of the planes defined by the cradle arms and by the bridge, respectively, and parallel to such line of intersection.

5 Said textile machine may include a conveyor extending longitudinally thereof to receive packages discharged by the cradle and to convey full packages therealong. Said conveyor may be mounted rearwardly of said machine relative to said cradle and package driving bowl. Said machine may be double
10 sided, having yarn processing stations disposed in back-to-back relationship on opposed sides of a longitudinal vertical centre plane of said machine, in which case said conveyor may extend between said back-to-back processing stations.

 According to yet another preferred feature, there is
15 further provided a loading means operable to apply a loading to said cradle which varies so as to tend to reduce the pressure between a package mounted in said cradle and a package driving bowl engaged by said package as the diameter of said package increases.

20 The loading means may apply a force to said cradle the line of action of which passes closer to the pivot axis of said cradle as said cradle pivots from said empty package position for at least a part of the range of movement of said cradle. The line of action of said force may pass through

said pivot axis at one position of said cradle and may pass further from said pivot axis as said cradle pivots from said one position to said full package position. The loading means may comprise a piston and cylinder device which may be operable
5 by means of air under pressure. Alternatively said loading means may comprise a compression spring and may have adjusting means whereby the force applied by said compression spring may be varied. The loading means may be mounted in said frame at a location which is adjustable to vary the line of action of
10 said force.

Latch means may be provided operable to retain said cradle in a position slightly beyond said full package position, so that such package might be supported out of contact with the drive bowl, and latch release means may also be provided.

15 The invention will now be further described with reference to the accompanying drawings in which:-

Fig. 1 is a sectional end view of part of a yarn processing textile machine;

Fig. 2 is a view similar to Fig. 1 of a part thereof
20 to an enlarged scale;

Fig. 3 is a view similar to Fig. 2 showing an alternative form of loading means;

Fig. 4 is a sectional plan view of the cradle arms of the cradle of Fig. 1; and

25 Fig. 5 being a view in the direction of arrow A

of Fig. 3, is a front elevation of a part of the machine and shows the mounting of a cradle therein.

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Referring now to Fig. 1, there is shown a part of a textile machine 10 having yarn processing stations 11, 12 in back-to-back relationship on opposed sides of the longitudinal vertical central plane 13 of the machine 10. In each processing station 11, 12 of such a machine 10, yarn 14 is fed from a supply 15 to yarn processing means (not shown) and then by means of a final feed mechanism 16a and traverse mechanism 16b to a package winding mechanism 17. In such package winding mechanism 17 the yarn 14 is wound into a package 18 on a mandrel 19. The mandrel 19 and/or package 18 is driven at substantially constant peripheral speed by means of a package driving bowl 20, which is itself driven at constant rotational speed by the drive means of the machine (not shown). The mandrel 19 and package 18 are received in a cradle 21, the two cradles 21 shown in Fig. 1 being in the full package position on the left hand side of machine 10 and in the empty package position on the right hand side of machine 10. Each cradle 21 is pivotally mounted on and between spaced, successive depending support plates 222 of the machine 10 to pivot about a common pivot axis 22. The distances of the rotational axes of the package driving bowl 20 and the mandrel 19 and/or package 18 from the pivot axis 22 of the cradle 21 are substantially equal, so as to maintain the point of contact of the package 18 with the package driving bowl 20 substantially constant, and downstream of the first contact of the yarn with the driving bowl, as the diameter of the package 18 increases.

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The yoke or bridge 23 of each cradle 21 has one end of loading means 24 attached thereto, the other end of the loading means 24 being attached to the frame 25 of machine 10 at one of several attachment points 26. The loading means 24 comprises
5 a piston and cylinder device to which air under pressure may be fed, the pressure being adjustable to provide the desired force to the cradle 21.

As can be seen in the right hand side of Fig. 1 the line of action of the force provided by loading means 24 when
10 the cradle 21 is in the empty package position passes forwardly of the pivot axis 22 by a relatively large amount d. In consequence a relatively large clockwise moment is applied to the cradle 21 to provide a desired contact pressure between the mandrel 19 and the package driving bowl 20, the actual
15 magnitude of such contact pressure being dependent upon the air pressure applied to the cylinder of loading means 24 and the attachment point 26 chosen for the attachment of loading means 24 to the frame 25 of machine 10.

It will be seen that as the package 18 grows the
20 cradle 21 will pivot away from the package driving bowl 20 so that the line of action of the force provided by loading means 24 moves nearer to cradle pivot axis 22, thereby reducing the distance d and tending to reduce the contact pressure between

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the package 18 and the package driving bowl 20. This tendency offsets the tendency for such contact pressure to increase due to the increasing weight of the package 18 so that the total effect can be one of slightly reducing, substantially constant, 55 or slightly increasing contact pressure as desired.

Dependent upon which attachment point 26 is chosen it can be arranged that the line of action of the force provided by the loading means passes through the pivot axis 22 of the cradle 21 at one intermediate position of the cradle 21 and 100 thereafter passes rearwardly of the pivot axis 22 by a distance \underline{d} which increases until the full package position is reached. During this latter stage of the package building process the force provided by the loading means 24 tends to lift the package 18 mounted in cradle 21 out of contact with the package 155 driving bowl 20, thereby relieving the contact pressure therebetween created by the increasing weight of the package 18.

The effect of the choice of attachment point 26 on the distance \underline{d} at both full package (Fig. 2) and empty package (Fig. 3) positions can be clearly seen.

200 In the Figure 3 embodiment the loading means is mechanical, instead of the pneumatic device of Figs. 1 and 2. In this case the loading means 24 comprises a compression spring (not shown) whose initial compression force may be adjusted by means of screw 27.

225 Referring now to Fig. 4, it may be seen that the cradle comprises two arms 28, 29 between which mandrel 19 is

mounted. Cradle arm 29 comprises two parts 30, 31, the former being mounted on the latter to pivot about axis 32 so that arm part 30 can pivot away from cradle arm 28 to release the mandrel 19 against the force of a compression spring 39. A
5 handle 33 is secured to arm part 30 for this purpose.

When the package 18 is nearly completed and the cradle 21 moves towards the full package position a spring-loaded plunger 34 provided on cradle arm 23 comes into contact with the surface of a cam plate 35 provided on the frame 25 (see
10 Figs. 2 and 3). This causes the plunger 34 to be depressed. When build-up of the package 18 is completed, the cradle 21 is raised manually by a small amount to bring the plunger 34 into engagement with a recess 36 provided in the cam plate 35, thus to park the cradle 21 with the surface of the package spaced
15 slightly from the driving bowl. The handle 33 is then moved outwardly to release the full package 18 from the cradle arms 28, 29 whereupon such package falls backwards into the machine 10 in the direction of arrow 37 through the bridge section formed by the yoke 23 of the cradle onto a conveyor 38 mounted
20 along the central axis 13 of the machine, to be carried by such conveyor to the end of the machine for removal. A new mandrel 19 is then placed between the arms 28, 29 of the cradle 21.

A lever 40 is provided at the end of cradle arm 29
25 and is connected to plunger 34 by means of a flexible cable 41. Movement of lever 40 causes retraction of plunger 34 from

recess 35 so that the cradle 21 and empty mandrel 19 can pivot downwardly to the empty package position and the package winding operation repeated.

The structure as hereindisclosed provides a cradle
5 which is so mounted as automatically to compensate, at least in part, for continuing changes in winding conditions as package build-up proceeds and which is laterally stable as a result of the form of mounting and the positioning of the pivot axis. Furthermore, the nature of the cradle is such as to facilitate
10 doffing of the wound package with minimal effort on the part of the operator.

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Claims :

1. In or for a textile machine having at least one package winding mechanism, a cradle adapted to receive and support a package core therein, said cradle being mounted on said machine
5 for pivotal motion between empty package and full package positions, characterised by two spaced cradle arms to receive and support the package core therebetween and mounted on the machine for pivotal motion as aforesaid by separate means provided at the respective sides of the cradle, thus to allow
10 of the unimpeded discharge through the cradle and rearwardly of the machine of a yarn package wound on the package core.

2. A cradle as claimed in claim 1, wherein the cradle further includes a bridge or yoke of generally U-shaped form, the cradle arms extending outwardly from the plane of the
15 bridge and each being supported by a respective limb of such bridge adjacent the remote end of such limb.

3. A cradle as claimed in claim 1 or 2, wherein at least one cradle arm is pivotal in a direction away from the other cradle arm so as to release a package mounted between said
20 arms.

4. A cradle as claimed in claim 3, wherein said pivotal arm part is resiliently biased towards the other cradle arm.

5. A cradle as claimed in claim 2, or either of claims 3 and 4 when dependent on claim 2, wherein the pivot axis of the
25 cradle lies at or about the line of intersection of the planes

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defined by the cradle arms and by the bridge, respectively, and parallel to such line of intersection.

6. A cradle as claimed in any one of the preceding claims, characterised by a loading means operable to apply a loading
5 to said cradle which varies so as to tend to reduce the pressure between a package mounted in said cradle and a package driving bowl engaged by said package as the diameter of said package increases.

7. A cradle as claimed in claim 6, wherein the loading
10 means has a line of action relative to the cradle which passes closer to the pivot axis of said cradle as said cradle pivots from said empty package position for at least a part of the range of movement of said cradle.

8. A cradle as claimed in claim 7, wherein the line of
15 action of said force passes through the pivot axis at one position of the cradle and passes further from said pivot axis as said cradle pivots from said one position to said full package position.

9. A cradle as claimed in any one of claims 6 to 8,
20 wherein the loading means comprises a piston and cylinder device.

10. A cradle as claimed in any one of claims 6 to 8, wherein said loading means comprises a compression spring and
adjustment means whereby the force applied by the spring may
25 be varied.

11. A cradle as claimed in any one of the preceding claims,

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further including releasable latch means operable to retain the cradle in a position slightly beyond the full package position, so that the package might be supported out of contact with a drive bowl.

5 12. A textile machine including a cradle as claimed in any of the preceding claims.

13. A textile machine as claimed in claim 12, including spaced depending support plates pivotally to receive a cradle therebetween.

10 14. A textile machine as claimed in claim 12 or 13, further including a conveyor extending parallel to the pivot axis of the cradle and below the level thereof, to receive packages discharged by the cradle and convey full packages therealong.

15 15. A textile machine as claimed in any one of the preceding claims 6 to 11 or claims 12 to 14 when dependent on claim 6, wherein the loading means is mounted on the machine frame and is positionally adjustable thereon to vary the line of action of the loading force.

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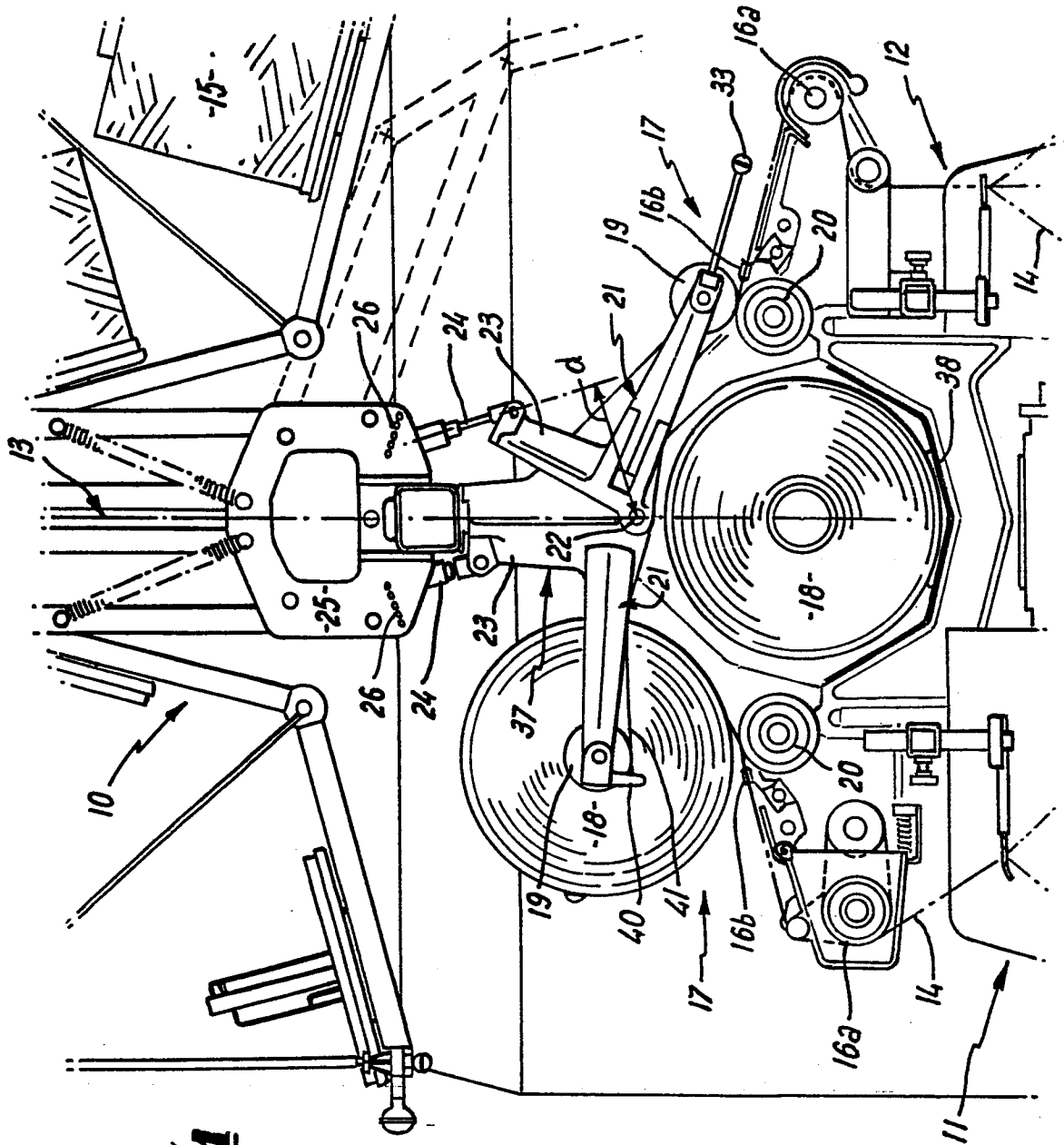
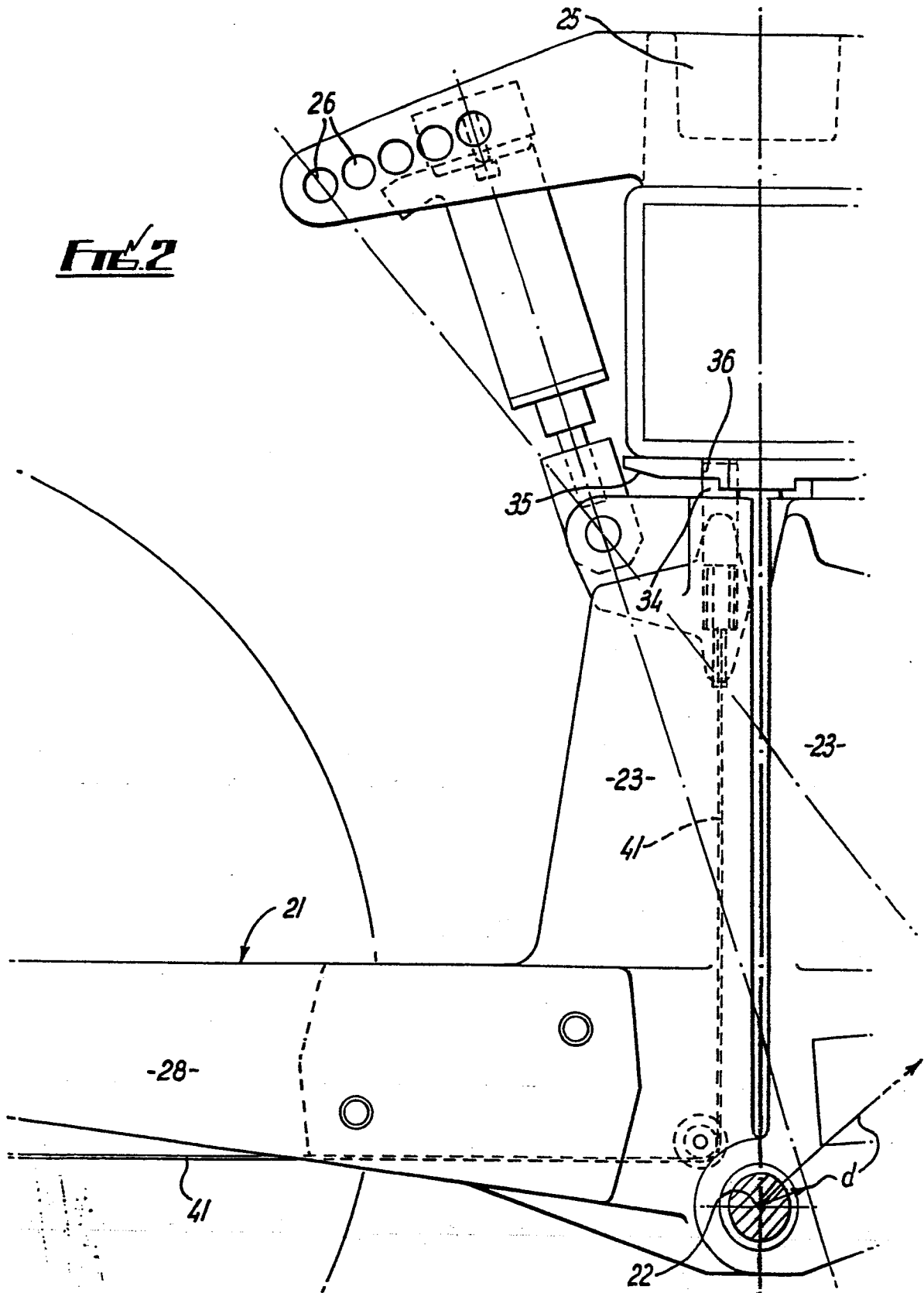


FIG. 1

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FIG. 2



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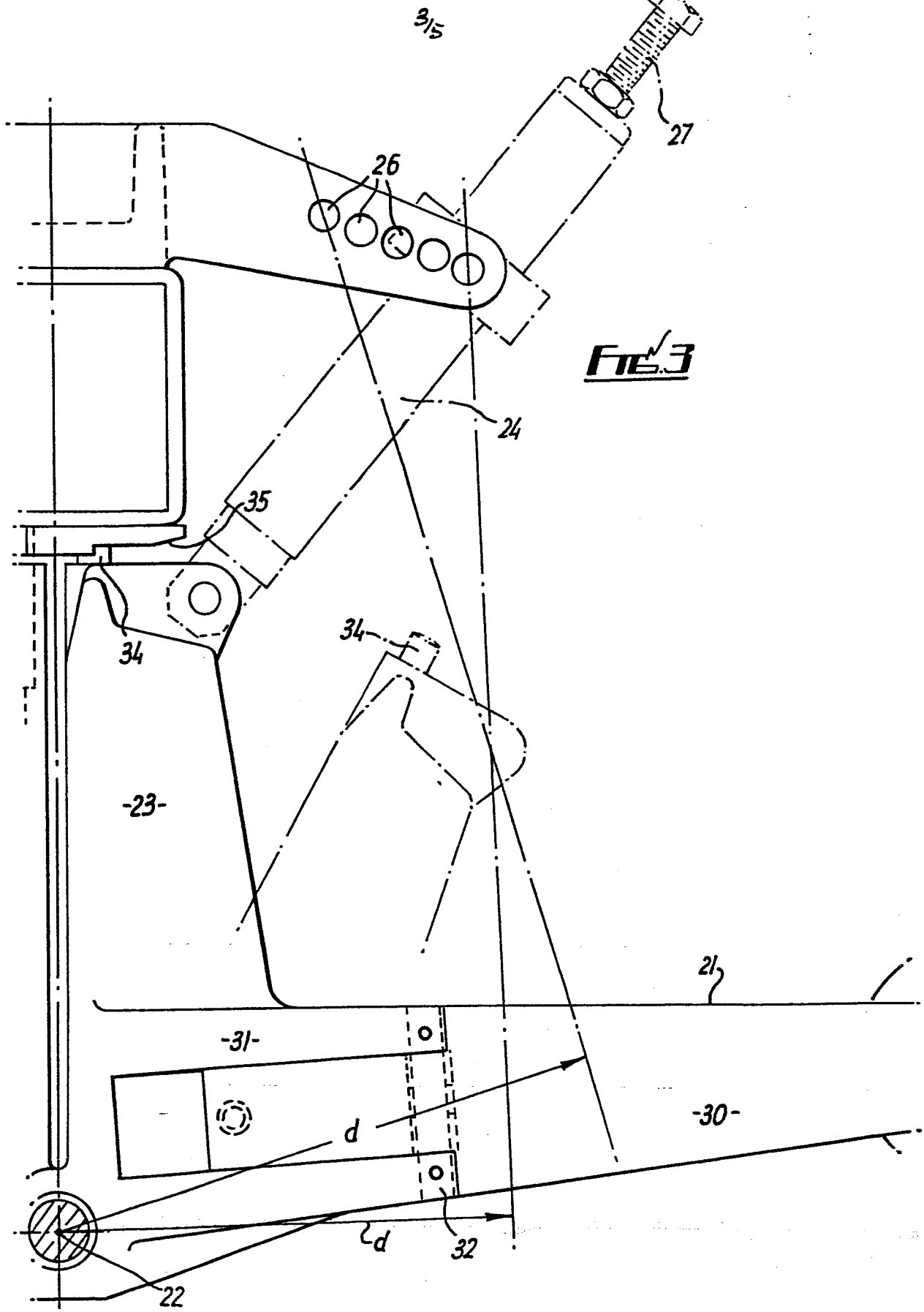
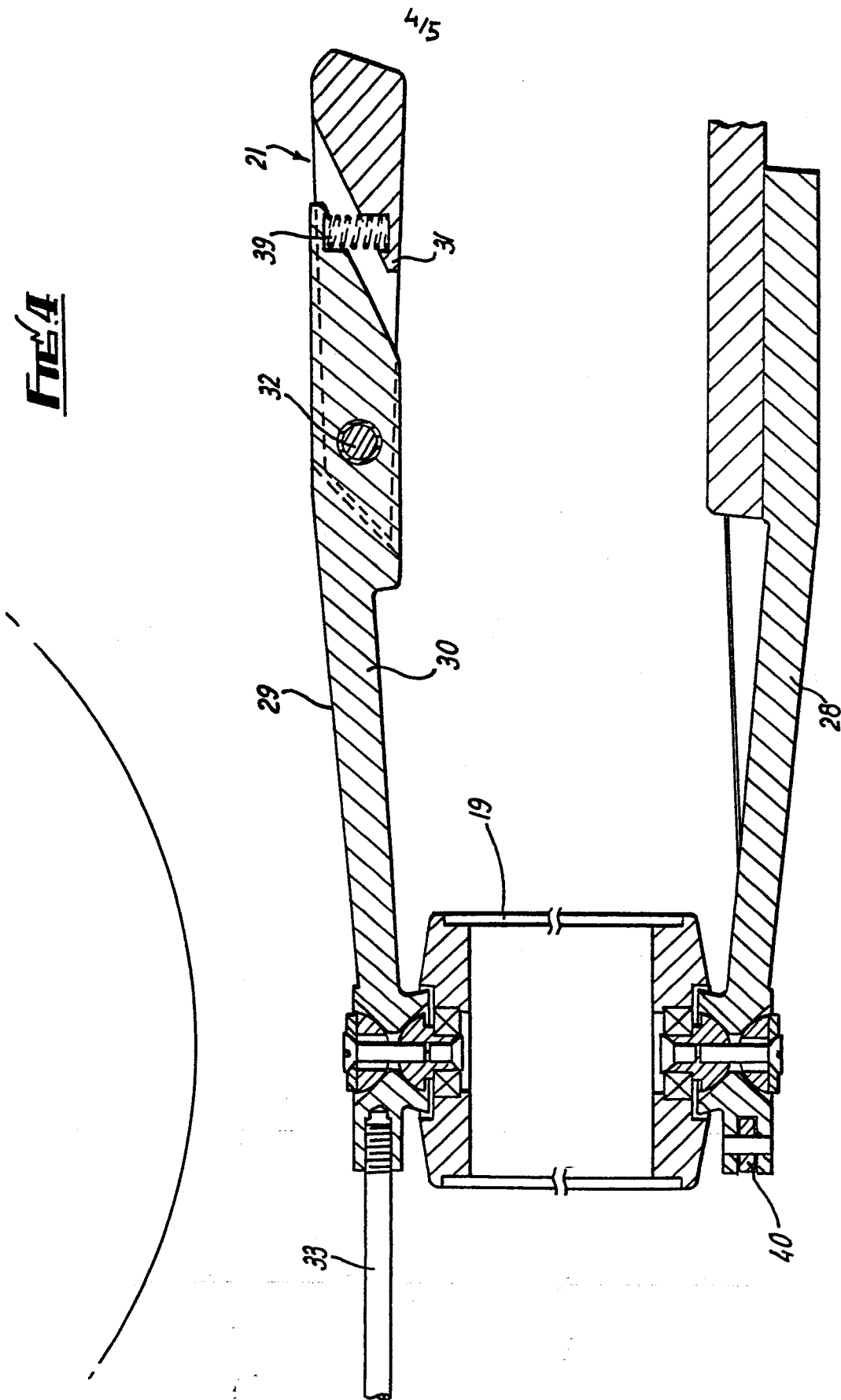


FIG. 4



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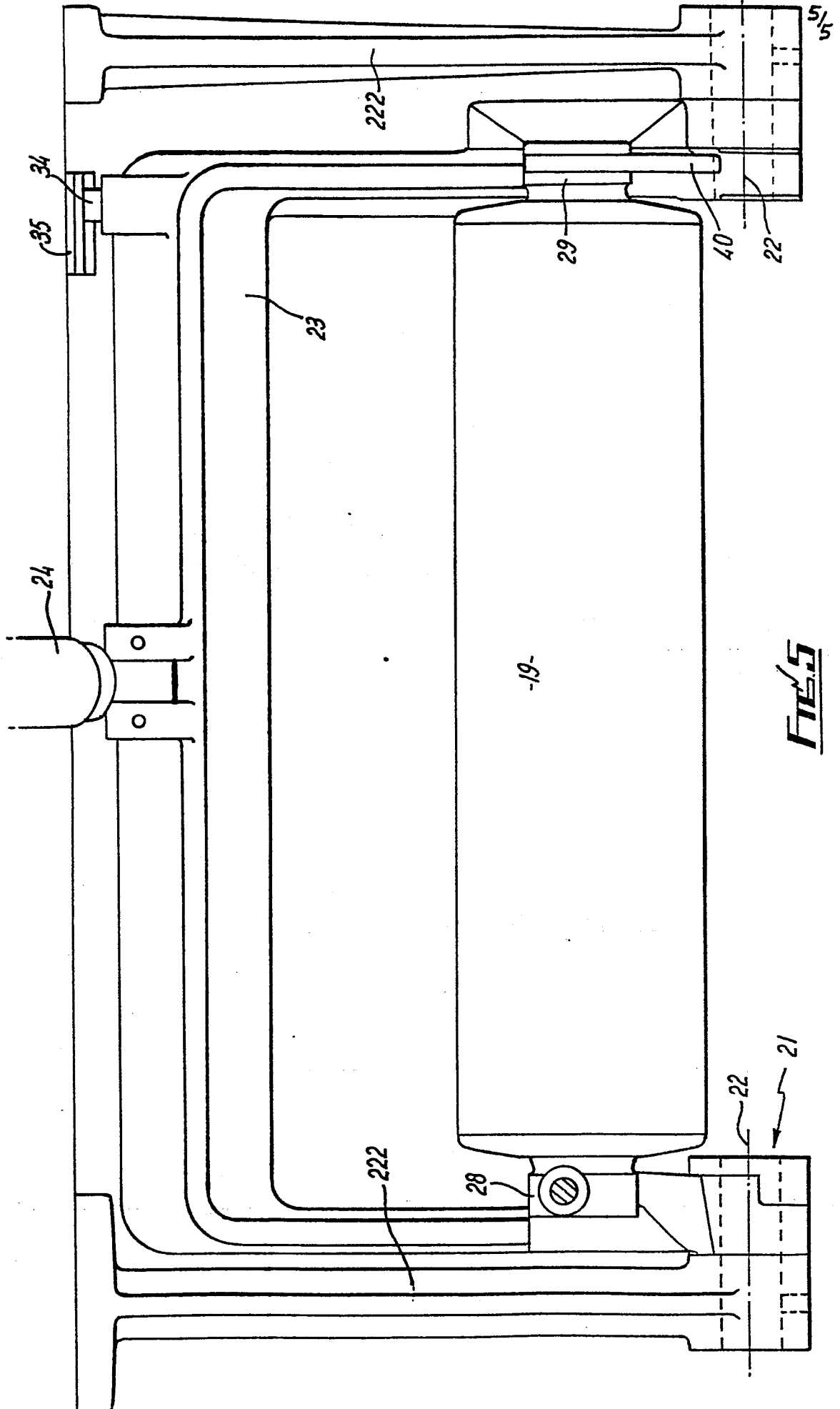


FIG. 5

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