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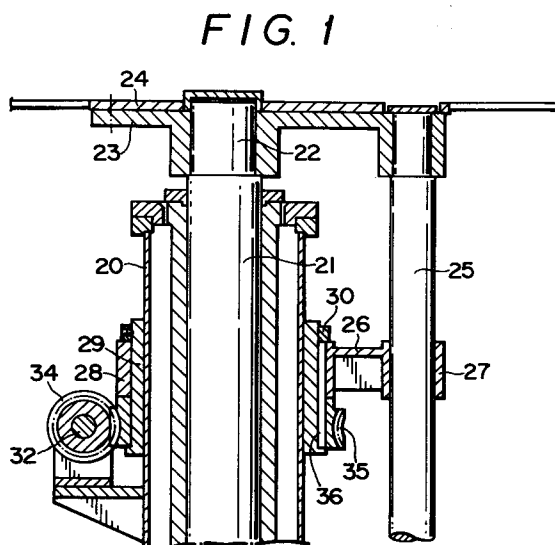
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54 **Turning apparatus for stirring head of stirrer.**

57 A turning apparatus which turns a stirring head (24) of a stirrer wherein the stirring head is mounted to the end of an elevating shaft (21) provided to a cylindrical frame (20), and includes a guide rod (25) extending toward the lower portion along the frame. The guide rod is supported by an arm (26). The arm is rotatably mounted around the frame, and is rotated by a handle (31) through a worm gear device. A driving shaft of the worm gear (34,35) device can be prevented from rotating with use of a stopper. Upon rotation of the handle, the stirring head is turned around the frame through the arm and the guide rod, and is prevented from rotating at its stopped position.



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BACKGROUND OF THE INVENTION

(1) Field of the Invention

The present invention relates to a turning apparatus for a stirring head of a stirrer wherein a stirring shaft can be turned around a frame body.

(2) Background Information

Stirrers such as a dissolver a mixer, and agitator and the like are often constituted to have a stirring blade which can be moved up and down to insert it into a tank and can be turned around a center shaft. Fig. 5 shows an example of such a dissolver, in which an elevating shaft 2 which can be moved up and down by an oil hydraulic cylinder is placed in a frame body 1 and a stirring head 3 is provided at the upper portion of the elevating shaft. The stirring head 3 is provided with a driving section such as a motor 4, a belt case 5, a stirring shaft 6 which is rotated by the motor, a stirring blade 7 and the like.

As an elevating and turning apparatus for the above stirring head, the construction as shown in Fig. 6 is generally known. In this figure, a turning base 8 supporting the stirring head is mounted at the upper end of the elevating shaft 2, and a turning gear 9 is rotatably fitted on its upper surface. A turning shaft 11 of a turning pinion 10 engaging with the turning gear 9 extends toward the lower portion along the frame body through the turning base 8, and connects to a handle 14 through a bevel gear 12, 13. According to such a construction, by rotating the handle 14 to rotate the turning shaft 11 and the pinion 10, the turning gear engaging with the pinion 10 is rotated and the stirring head 3 which is fixed to the turning gear 9 is turned around the elevating shaft 2 as the center. Further, the turning base 8 is provided with a guide rod 15 which is slidably inserted through a guide section 16 provided on the frame body 1, thereby guiding the stirring head 3 and the turning base 8 when these are moved up and down.

A brake device is provided to prevent the stirring shaft 6 or the like from moving at the turned position. In the brake device as shown in Fig. 6, a brake plate 17 is arranged on the upper surface of the turning gear 9, and the brake plate 17 is provided with a pulling shaft 18 which is connected to a brake handle 19. When the brake handle is rotated, the pulling shaft 18 is moved in the direction of its axis to press the brake plate against or detach from the turning gear 9. When the stirring head is turned, the brake plate 17 is detached to release the pressed turning gear 9 and permit the gear to rotate. At the turned position, the brake plate 17 is pulled by the operation of the brake

handle 19, and the turning gear 9 is then clamped between the brake plate 17 and the turning base 8 to prevent its rotation.

As described above, in the conventional stirrers, the turning shaft or the guide rod is vertically hanging from the turning base and the brake device is provided between the turning base and the turning gear. Hence, the structure of the apparatus is wholly complicated and its parts are large in number. Further, since the brake device is required to be operated before and after the turning to control the rotation of the turning gear, such operation is troublesome.

SUMMARY OF THE INVENTION

An object of the present invention is to reduce the number of shafts or rods vertically hanging from the stirring head, simplify the construction of the brake device, and provide a turning apparatus for a stirring head of a stirrer having good operability.

Another object of the present invention is to provide a turning apparatus for a stirring head of a stirrer wherein the stirring head is not easily turned even if the brake device is not particularly provided.

According to the present invention, the above objects can be accomplished by a turning apparatus for a stirring head of a stirrer which comprises a turning base holding the stirring head which is formed at the end of an elevating shaft, and a guide rod extending from the turning base toward the lower portion along a frame body surrounding the elevating shaft, said guide rod being slidably engaged with an arm which is rotatably fitted to said frame body, and said arm being rotated by a worm gear device.

When the elevating shaft is driven, the turning base is moved up and down with the guiding of the guide rod. When the worm gear device is driven, the arm is rotated and the turning base is turned through the guide rod around the elevating shaft as the center. After turning, the turning base is pawled by the worm gear device through the guide rod and the arm. When a brake device is particularly needed, an appropriate stopper may be provided to the driving shaft of the worm gear device.

The other objects and features of the present invention will become apparent from the following description with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a vertical sectional view of an example of the turning apparatus for the stirring head of the stirrer according to the present invention.

Fig. 2 is a cross-sectional view of the apparatus of Fig. 1.

Fig. 3 is a side view showing another example of the turning apparatus for the stirring head of the stirrer according to the present invention with parts broken away.

Fig. 4 is a vertical sectional view of another example of a section including the turning base and the elevating shaft.

Fig. 5 is a side view of a dissolver illustrated as an example of the conventional stirrer.

Fig. 6 is a vertical sectional view of the turning apparatus for the stirring head of the conventional stirrer.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Fig. 1 shows a sectional view of the turning apparatus of the present invention wherein, as well known in the prior art, an elevating shaft 21 which moves up and down by an oil hydraulic cylinder (not shown) is provided in the inside of a frame body 20, and a turning base 23 is fitted to a small diameter section 22 at the end of the elevating shaft 21. At the upper portion of the turning base 23, a stirring head 24 is fixed similarly as in Fig. 6, and a driving section such as a motor or the like, a stirring shaft including a stirring blade, a belt case and the like are held.

At one end of the turning base 23, a guide rod 25 extending toward the lower portion is fixed, and the guide rod 25 is slidably engaged with a shaft supporting section 27 of an arm 26 which is fitted to the frame body 20.

A ring section 28 formed on the base end of the arm 26 is rotatably fitted to a cylindrical body 29 which is fixed to the frame body 20 and is prevented from disengaging by a ring-like stopper 30.

A worm gear device is provided to rotate the arm 26. The worm gear device can be provided at an appropriate position of a rotation transfer mechanism between a driving shaft, which is rotated by a handle 31 (Fig. 2) provided in the frame body 20, and the arm 26.

In the examples as shown in Fig. 1 and Fig. 2, a worm 34 is fixed to the handle 31 by use of a pin 33, a worm wheel 35 engaging with the worm 34 is rotatably fitted to the cylindrical body 29, and the worm wheel 35 and a ring section 28 of the arm 26 are connected to each other by use of a key 36.

The rotation of the arm is prevented by the worm gear device, but, for further securing the preventive action, the rotation of the driving shaft of the worm gear device may be prevented by an appropriate stopper. In the stopper as shown in Fig. 2, a clamp screw 38 is tightened against the

driving shaft 32 by use of a clamp lever 37. However, a ratchet system or the like may be used.

The above stopper is not necessary when the friction at the worm gear section is sufficiently large.

Fig. 3 shows another example of the worm gear device wherein the worm wheel 35 in the example as shown in Fig. 1 is replaced with a spur gear 39, a pinion 40 engaging with the spur gear 39 is fixed to a transfer shaft 41, and a worm wheel 42 is fixed at the lower portion of the transfer shaft 41. The transfer shaft 41 is held in the frame body 20 by use of a bearing 43. A worm 44 is engaged with the worm wheel 42 and the worm 44 is fixed to a driving shaft 45 operated by a handle similarly as in the above example. By such construction, the handle can be positioned at an appropriate height of the frame body 20.

Since the turning apparatus is constructed as described above, when the elevating shaft 21 is operated by the oil hydraulic cylinder, the turning base 23 is moved up and down by the guiding of the guide rod 25, and when the handle 31 is rotated, the above turning base 23 is turned around the elevating shaft as the center through the worm gear device, the arm 26 and the guide rod 25. Since the worm gear device can hardly be reversed, the turning base 23 is maintained at the turned position. If there is a possibility of reversing, the stopper may be used as described above.

In the above example, since the turning base 23 is only fitted to the small diameter section 22 of the elevating shaft 21, the elevating shaft can be turned. However, it is possible to construct such that the elevating shaft may not be turned.

Fig. 4 shows an example wherein the elevating shaft is not rotated. In this example, the turning base 23 is rotatably fitted to the small diameter section 22 of the elevating shaft 21, a bearing 46 such as a thrust bearing is provided, and a covering plate 47 is fixed to the end of the elevating shaft 21 to prevent them from disengaging. By such construction, the elevating shaft 21 may not be rotated, even if the turning base 23 is turned by use of the guide rod 25 or the like.

The present invention is constructed as described above, wherein the turning shaft and the guide rod which are used in the prior art are not used, but only one guide rod is provided to the turning base. Hence the construction of the turning base is simple and can be obtained economically. Since the worm gear device serves to effect a braking action without particularly providing any brake device, it can be handled easily with good operability. In addition, if the rotation of the driving shaft of the worm gear device is prevented by the stopper, such an action can be further secured.

Claims

1. A turning apparatus for a stirring head of a stirrer which comprises a turning base which is provided to a frame body such that it can be moved up and down and supports the stirring head, characterised in that the turning apparatus is provided with a guiderod (25) which extends toward the lower portion from the turning base (23) along the frame body (20); an arm (26) which is rotatably mounted to the circumference of the frame body (20) and slidably supports the guide rod (25); and a device which rotates the arm (26).

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2. A turning apparatus for a stirring head of a stirrer according to claim 1, wherein the device rotating the arm (26) is a worm gear.

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3. A turning apparatus for a stirring head of a stirrer according to Claim 1 or 2, wherein a worm wheel (35) is fitted to the frame body (20), said worm wheel (35) is connected to the arm (26), and a worm (34) which engages with the worm wheel (35) is provided to the frame body (20).

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4. A turning apparatus for a stirring head of a stirrer according to one of the preceding claims, wherein a driving shaft (32), (45) which is rotated by a handle (31) is provided to the frame body (20) to transfer the rotation of the driving shaft to the arm (26) through the worm gear device, thereby rotating the arm.

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5. A turning apparatus for a stirring head of a stirrer according to Claim 4, wherein the driving shaft (32), (45) is prevented from rotating by use of a stopper.

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FIG. 1

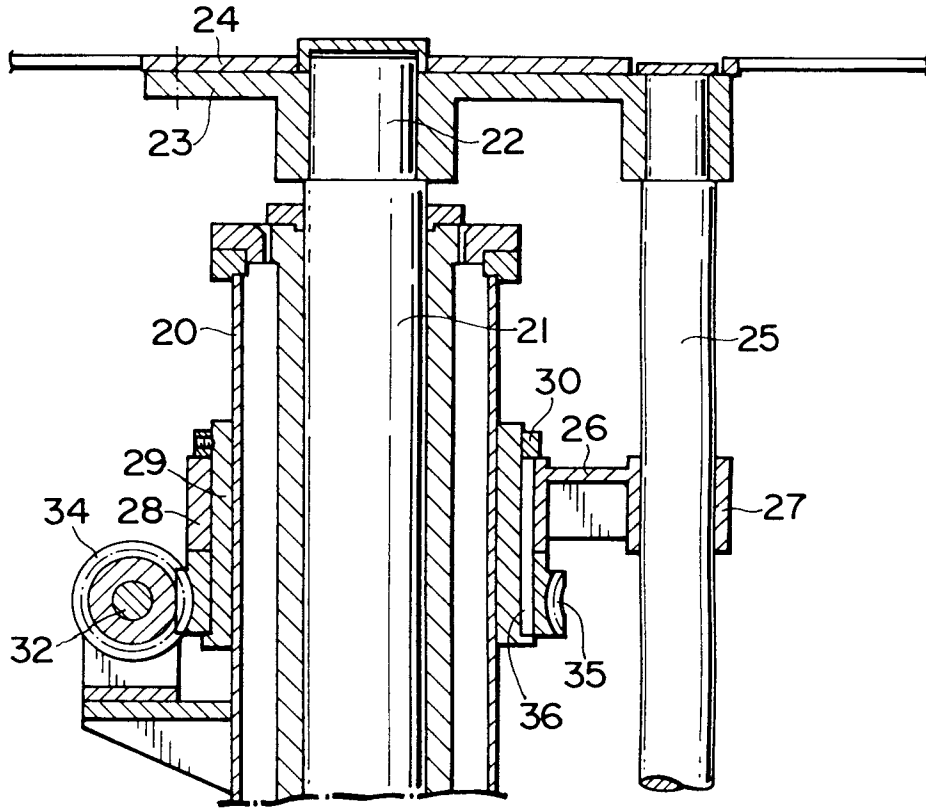


FIG. 2

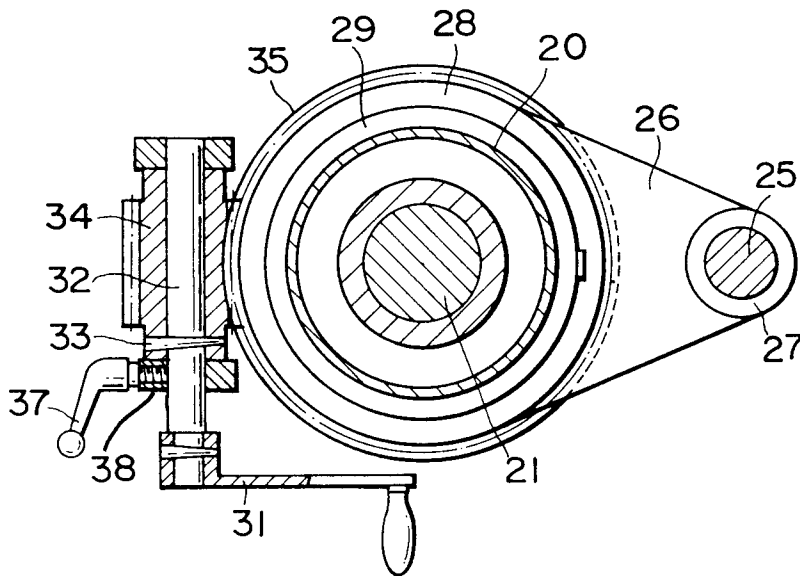


FIG. 3

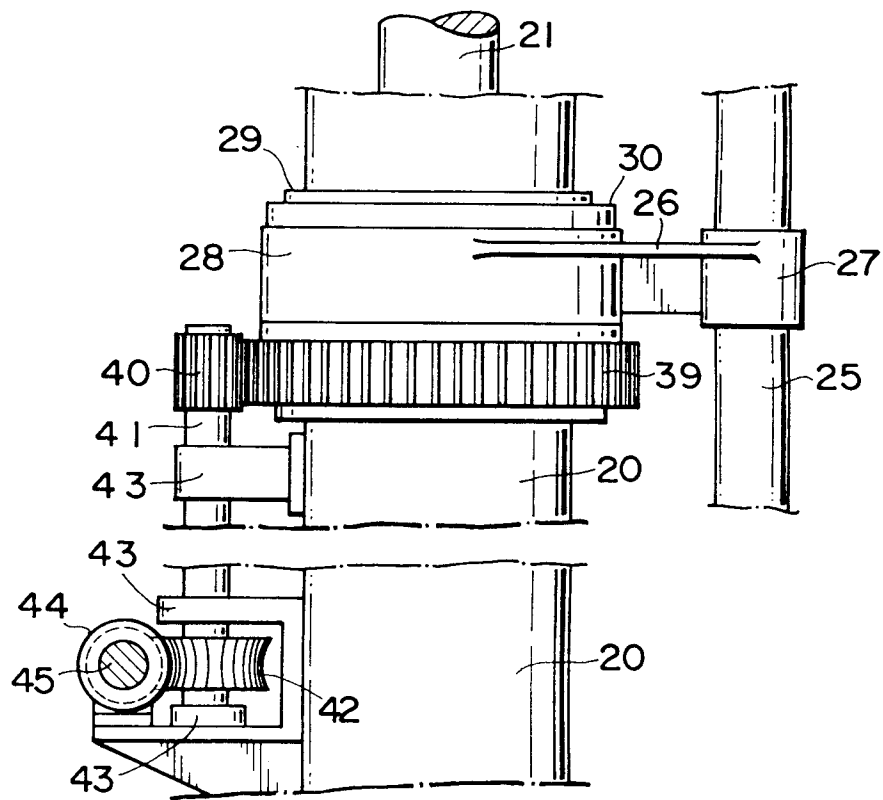
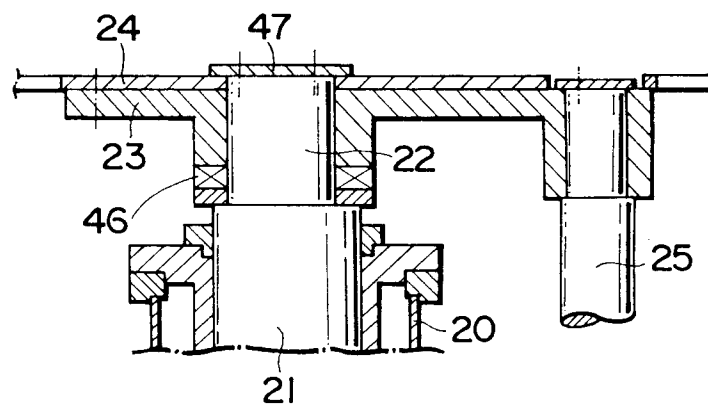


FIG. 4





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EUROPEAN SEARCH REPORT

Application Number

EP 91 11 9247

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	DE-A-1 557 206 (SPANGENBERG) * claim 1; figures * ---	1	B01F7/16
A	US-A-4 697 929 (MULLER) * abstract; figures * ---	1	
A	CH-A-570 827 (NIELAENDER) ---		
A	US-A-3 156 452 (TOUZALIN) -----		
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			B01F A21C
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 06 APRIL 1992	Examiner PEETERS S.
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
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