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(12) # EUROPEAN PATENT APPLICATION

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(54) **Improvements in wheelchairs.**

(57) There is described a wheelchair which is height adjustable by means of a winch and pulley arrangement wherein increase in height in the wheelchair is assisted by gas-filled rams.

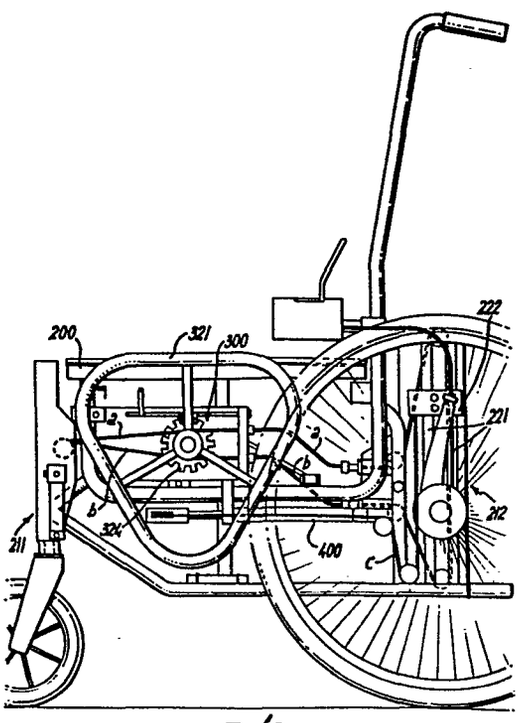


Fig 1

EP 0 064 414 A2

"Improvements in Wheelchairs"

This invention relates to improvements in wheelchairs.

A difficulty encountered by persons confined to a wheelchair is that conventional work surfaces and furniture are at a height which preludes use of a work surface. One solution is to provide low work surfaces but clearly this solution suffers from the drawback that it involves specialized design and installation.

There are known wheelchairs which are height adjustable by means of an electric motor but such a design is expensive to implement.

It is an object of the present invention to obviate or mitigate the above disadvantages.

According to the present invention there is provided a wheelchair which is height adjustable by means of a winch and pulley arrangement wherein increase in height in the wheelchair is assisted by gas-filled rams.

Embodiments of the present invention will now be described, by way of example, with reference to the accompanying drawings, in which:-

Fig. 1 is a side elevational view of an improved wheelchair made in accordance with the present invention;

Fig. 2 is a front elevational view of the wheelchair of Fig. 1;

Fig. 3 is a rear elevational view of the wheelchair of Fig. 1;

Fig. 4 is a detail of the wheelchair of Fig. 1 showing the front leg;

Figs. 5 and 6 are side and rear elevational views of the rear wheel support slide assembly;

Figs. 7 and 8 are side and front views of the winch drum;

Figs. 9a to 9c show the operation of a rear-front angular control mechanism;

Figs. 10 and 11 are front and side views of the mechanism of Fig. 9;

Fig. 12 is a side elevational view of an embodiment of a wheelchair made in accordance with the present invention;

Figs. 13 and 14 are front and side elevational views respectively, of a double acting winch forming part of the wheelchair of Fig. 12;

Fig. 15 is a side elevational view showing a modified duplex slide in a part open position;

Figs. 16 and 17 are end and front elevational views respectively, of the duplex slide of Fig. 15 in the closed position.

Referring to the drawings, a wheelchair comprises a frame 200 including a telescopic front slide 211 and a rear slide assembly 212 having support slides 221 and a rear wheel sliding bracket 222.

The wheelchair is caused to move upwards by increasing the length of the front slide 211 and of the rear assembly 212. This is achieved by first cables a which are tensioned by rotating a winch 300 in a clockwise direction as viewed in Fig. 1. As the first cables a are pulled in, second cables b are let out permitting the desired lengthening of the front slide 211 and rear assembly 212. The raising of the chair is assisted by a gas filled ram or gas spring 400 which acts to extend the rear wheel sliding assembly 212 through cable c and partially overcome the weight of the wheelchair user. Thus, only a reduced effort is required to raise the chair.

Clearly, the winch fitted to the other side of the chair (not shown) must be moved simultaneously in the opposite rotational direction to the winch 300 to effect level raising and lowering of the chair.

The winch 300 is illustrated in Figs. 1, 7 and 8 and comprises an operating triangular wheel 321 which is fitted to a winch drum 324. The winch drum 324 has cable receiving grooves 324a and 324b.

In Figs. 9 to 11 there is illustrated a front-rear angular control mechanism comprising a support plate 410 carrying two pairs of fixed pulleys 412 and 414 and a pair of movable pulleys 416. The control cables a and b pass around the pulleys 412, 414 and 416 such that on linear movement of the movable pullyes by means of quadrant 418

and rack 420 as illustrated in Figs. 9a and 9c the front slide is caused to raise or lower relative to the rear slide. In this way the seal of the wheelchair can be maintained horizontal irrespective of the gradient of the terrain.

Referring now to Figs. 12 to 14 of the accompanying drawings, a wheelchair comprises a frame 10 including a telescopic front leg 11 and a rear slide assembly 12 having a support slide 121 and a rear wheel sliding bracket 122.

The wheelchair is caused to move upwards by increasing the length of the front leg 11 and of the assembly 12. This is achieved by cables c and b respectively which are tensioned by rotating the double acting winch 20 in a clockwise direction as viewed in Fig. 2. As the c and b are pulled in, the cables d and a are let out permitting the desired lengthening of the front leg 11 and assembly 12. The raising of the chair is assisted by a gas filled ram or strut 30 which acts to extend the rear wheel sliding assembly 12 and partially overcome the weight of the wheelchair user. Thus, only a reduced effort is required to raise the chair.

To lower the chair, the double acting winch is rotated anti-clockwise thus tensioning cables d and a and releasing cables c and b. Cable d pulls the telescopic front leg closed whereas cable a serves to move the support slide 121 into the wheel sliding bracket 122.

Clearly, the double acting winch fitted to the other side of the chair (not shown) must be moved simultaneously in the opposite rotational direction to the winch 20 to effect level raising and lowering of the chair.

The double acting winch 20 is illustrated in Figs. 3 and 4 and comprises an operating lever 21 which is spring loaded to engage slots 23 in a winch wheel 24. The winch wheel 24 has a pair of cable receiving grooves 24a and 24b for cables a,d and b,c respectively.

Modifications and improvements may be incorporated without departing from the scope of the invention. For example, a friction drive intermediate wheel may be included to allow the rear driving wheels of the chair to be reached when the chair is in the raised position. Also, different ratings of the gas filled strut may be used to cater for different weights of user.

Thus there has been described a novel wheelchair which is provided with easily operable means to raise and lower the seat of the chair. In the mechanism employed the height of each side of the chair and/or front/back of the chair may be varied by a different amount to permit compensation for variations in camber and gradient.

In a further modification, the driving means for the winch is in the form of an electric motor. Conveniently a separate motor for each side may be provided.

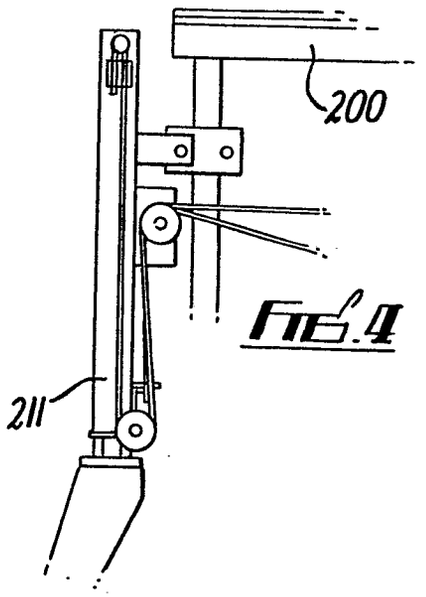
CLAIMS

1. A wheelchair having means for permitting adjustment of the height of the seat of the wheelchair said means including a winch and pulley system and spring means for assisting raising of the seat.

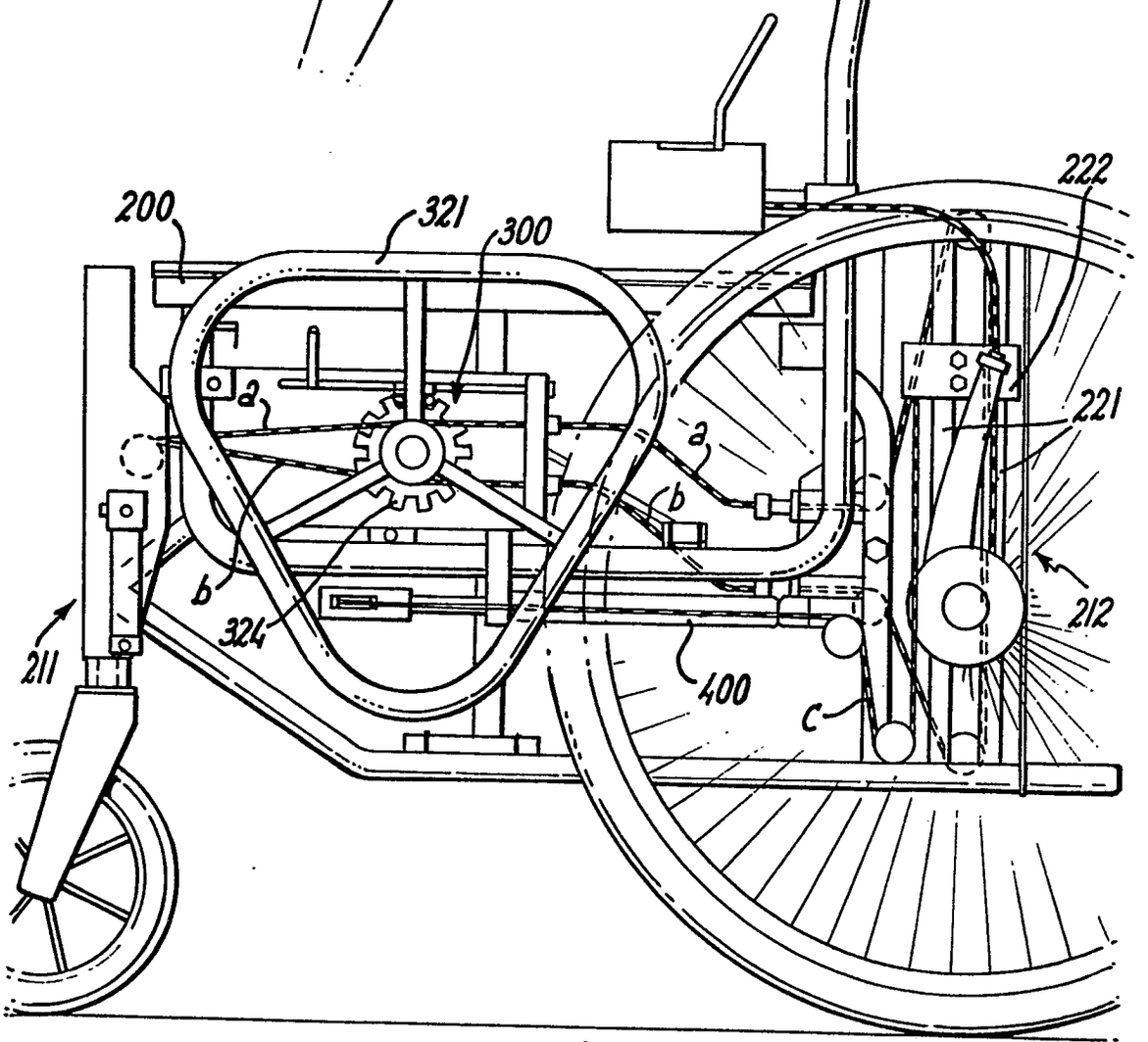
2. A wheelchair as claimed in claim 1 wherein said spring means is included in a gas filled ram.

3. A wheelchair as claimed in either preceding claim wherein the winch is driven by a triangular operating wheel.

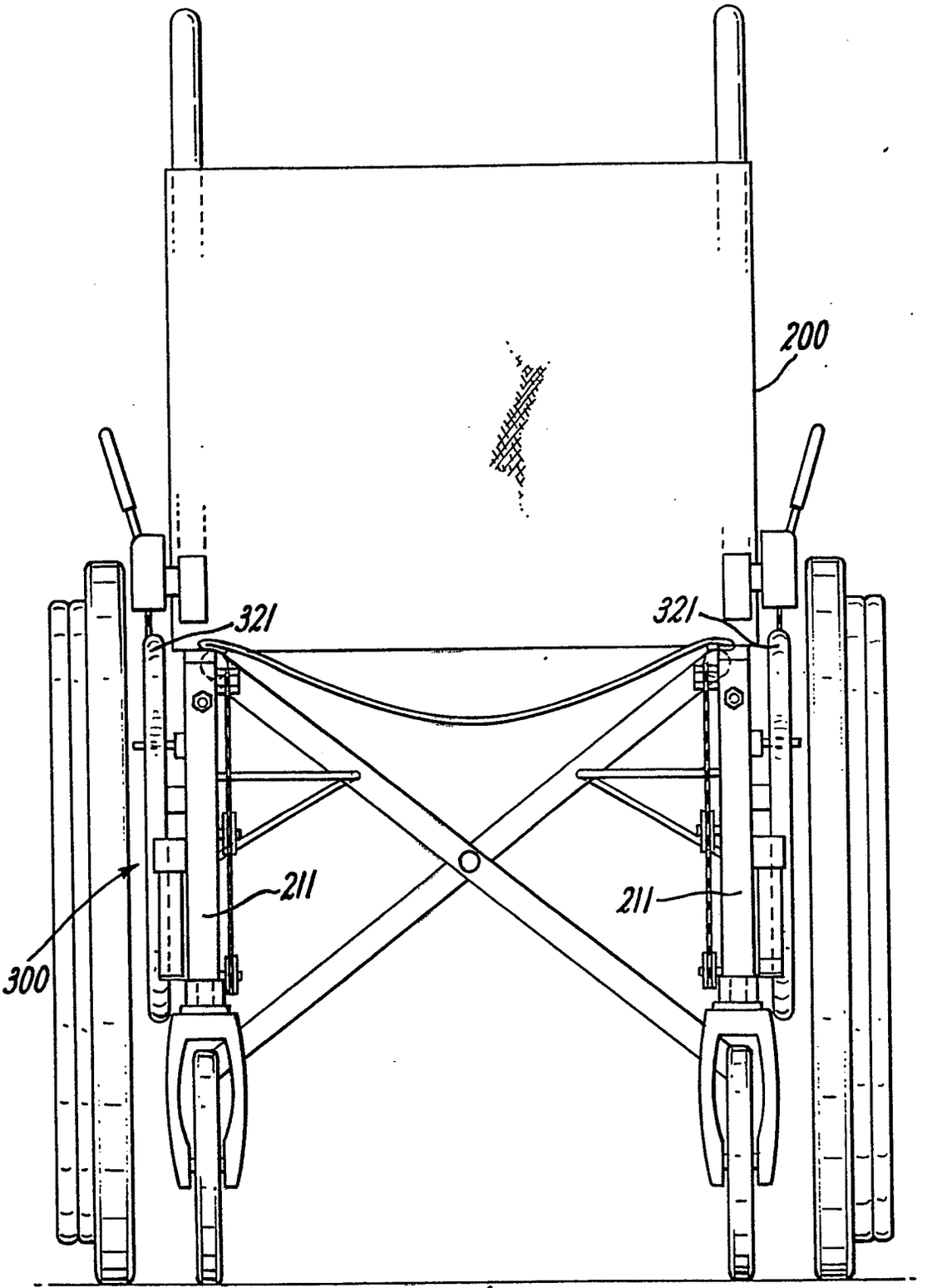
4. A wheelchair substantially as hereinbefore described with reference to the accompanying drawings.



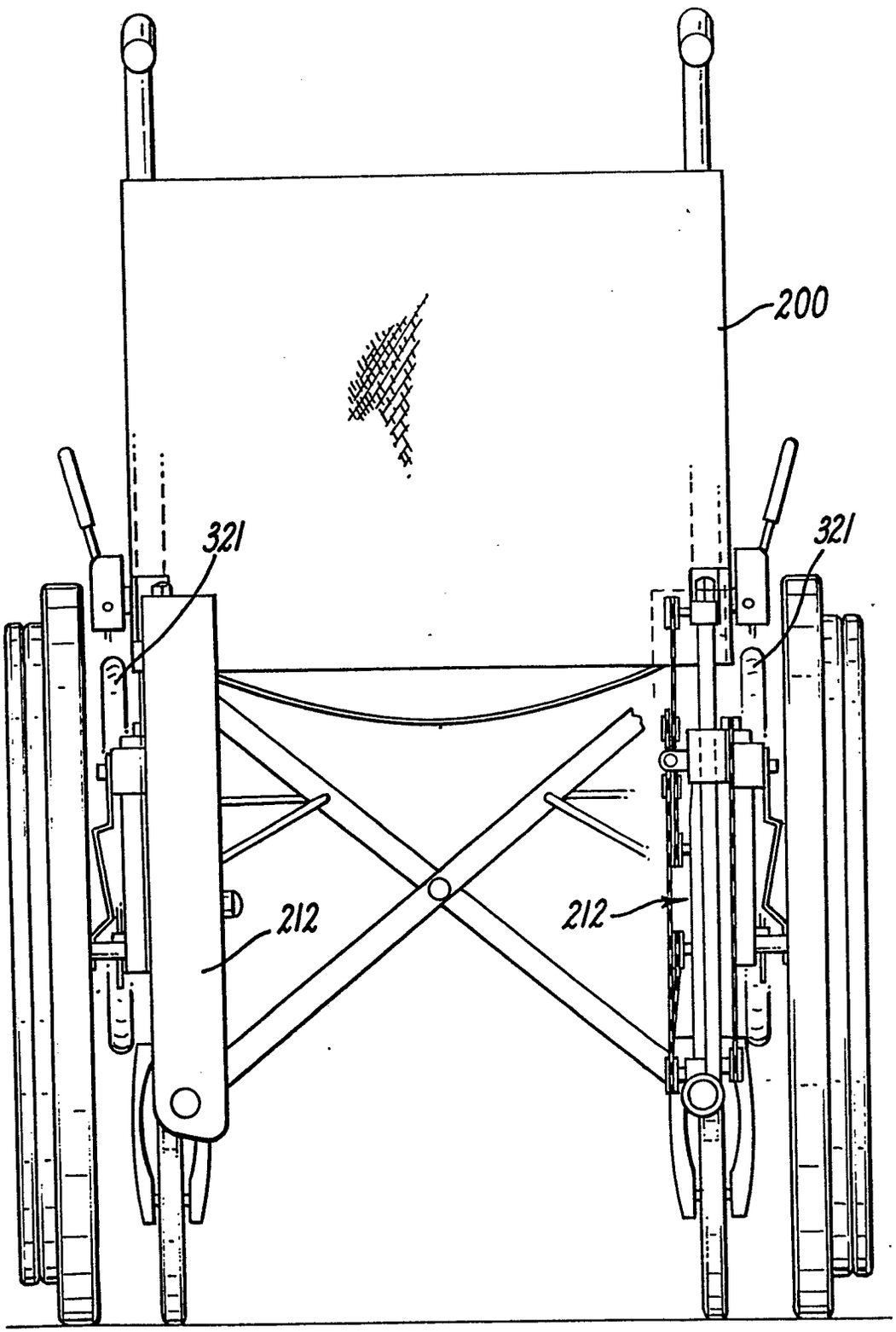
ФИГ.4



ФИГ.1



Фиг.2



ФИГ.3

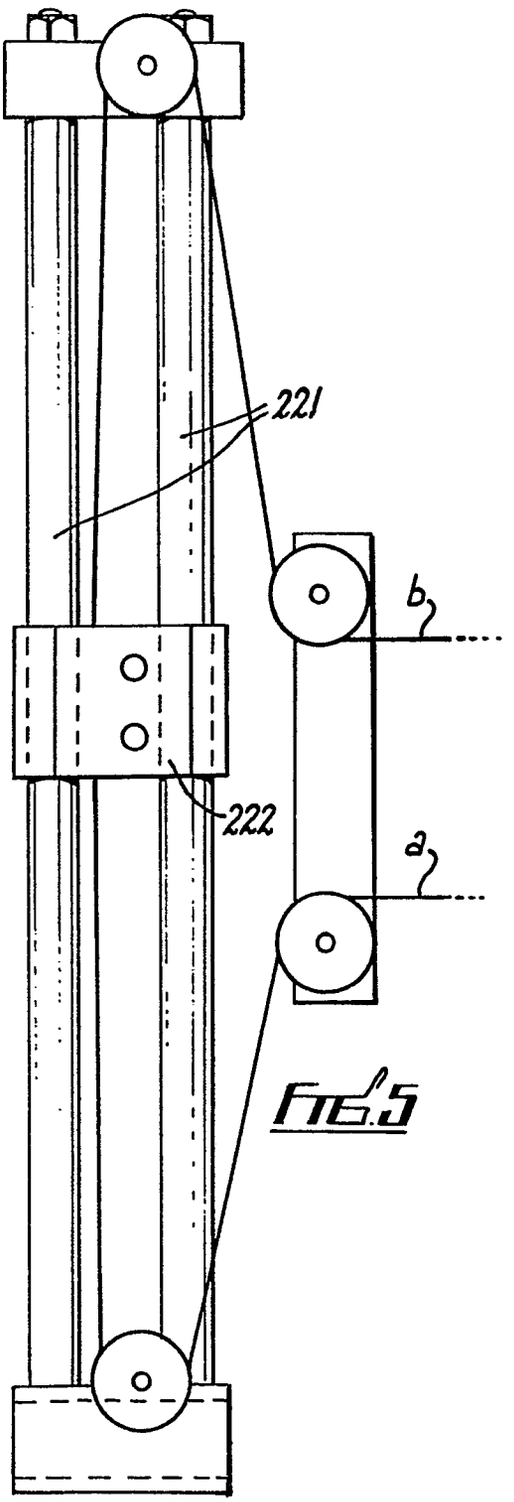


FIG.5

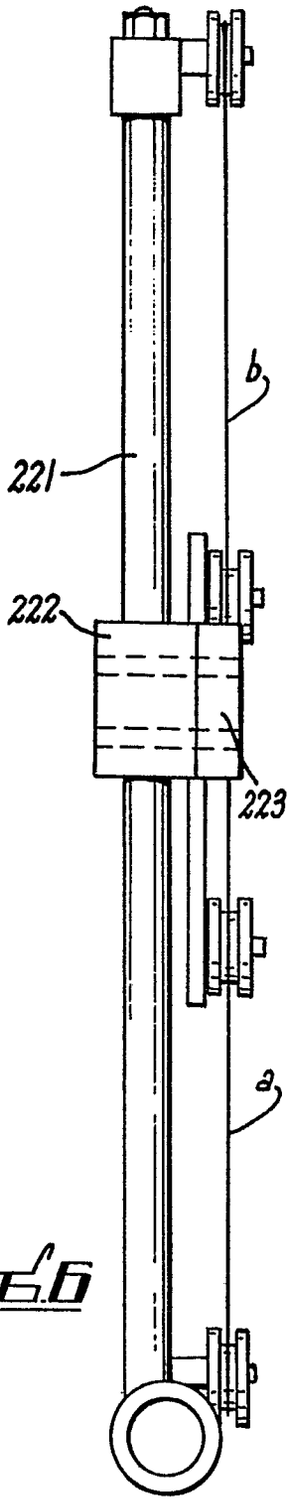


FIG.6

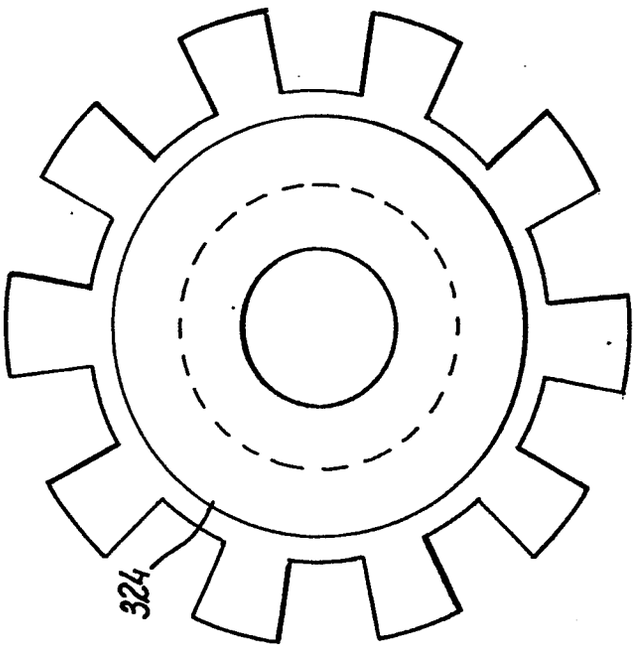


Fig.8

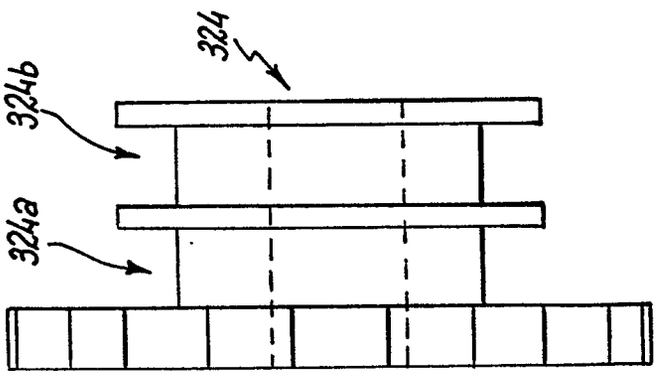


Fig.7

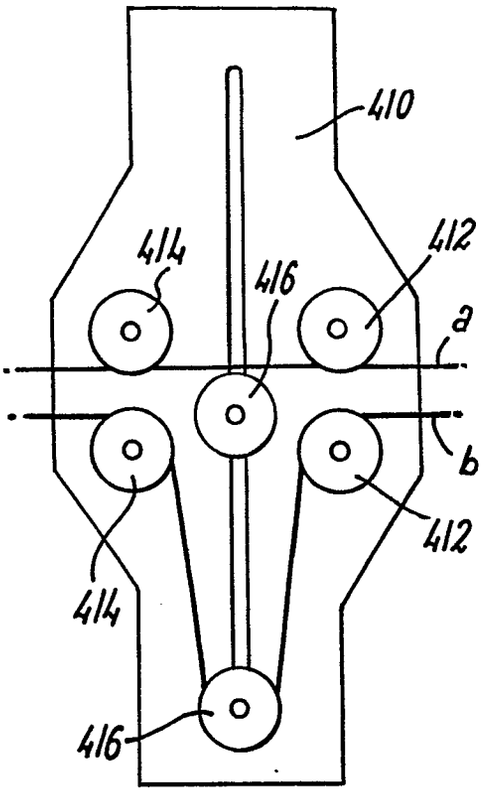


FIG.9a

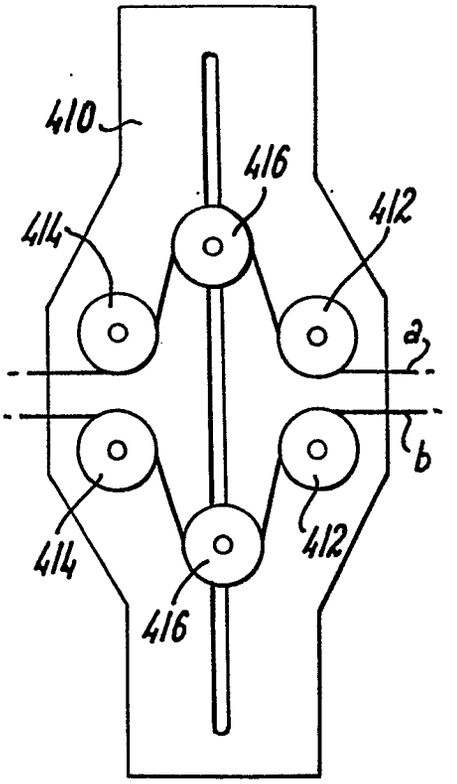


FIG.9b

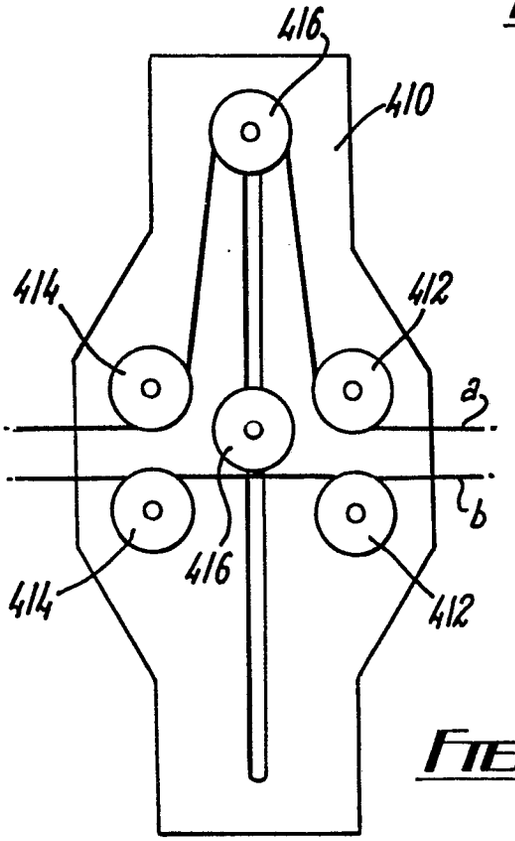


FIG.9c

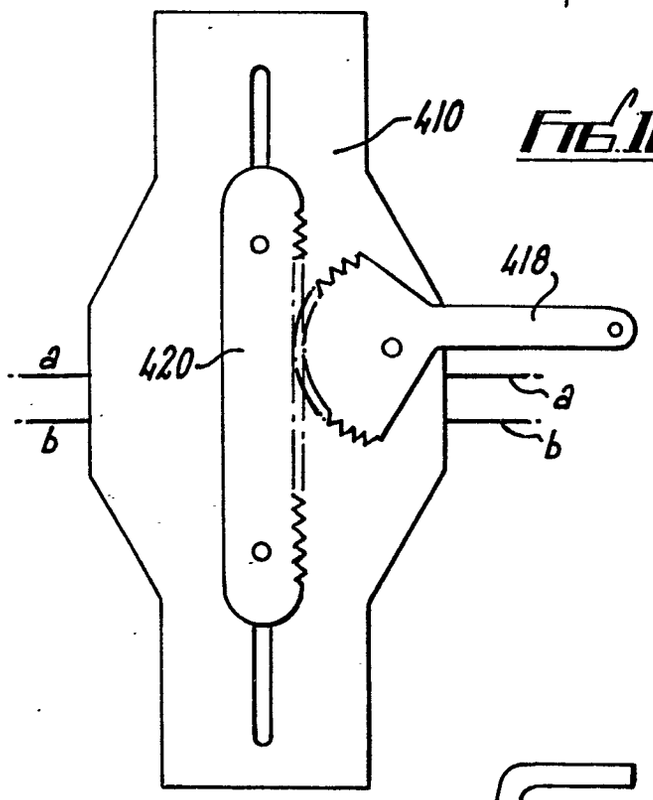


FIG.10

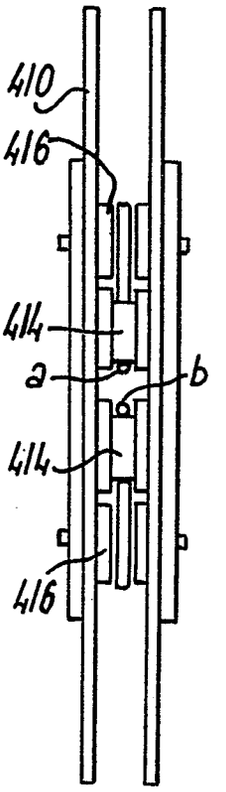


FIG.11

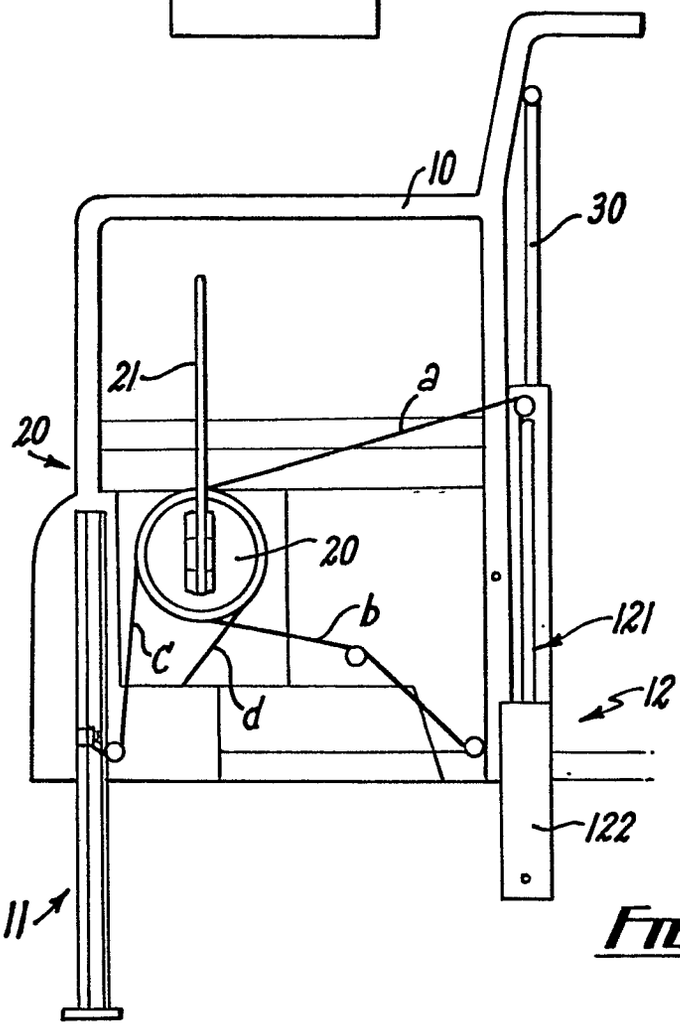


FIG.12

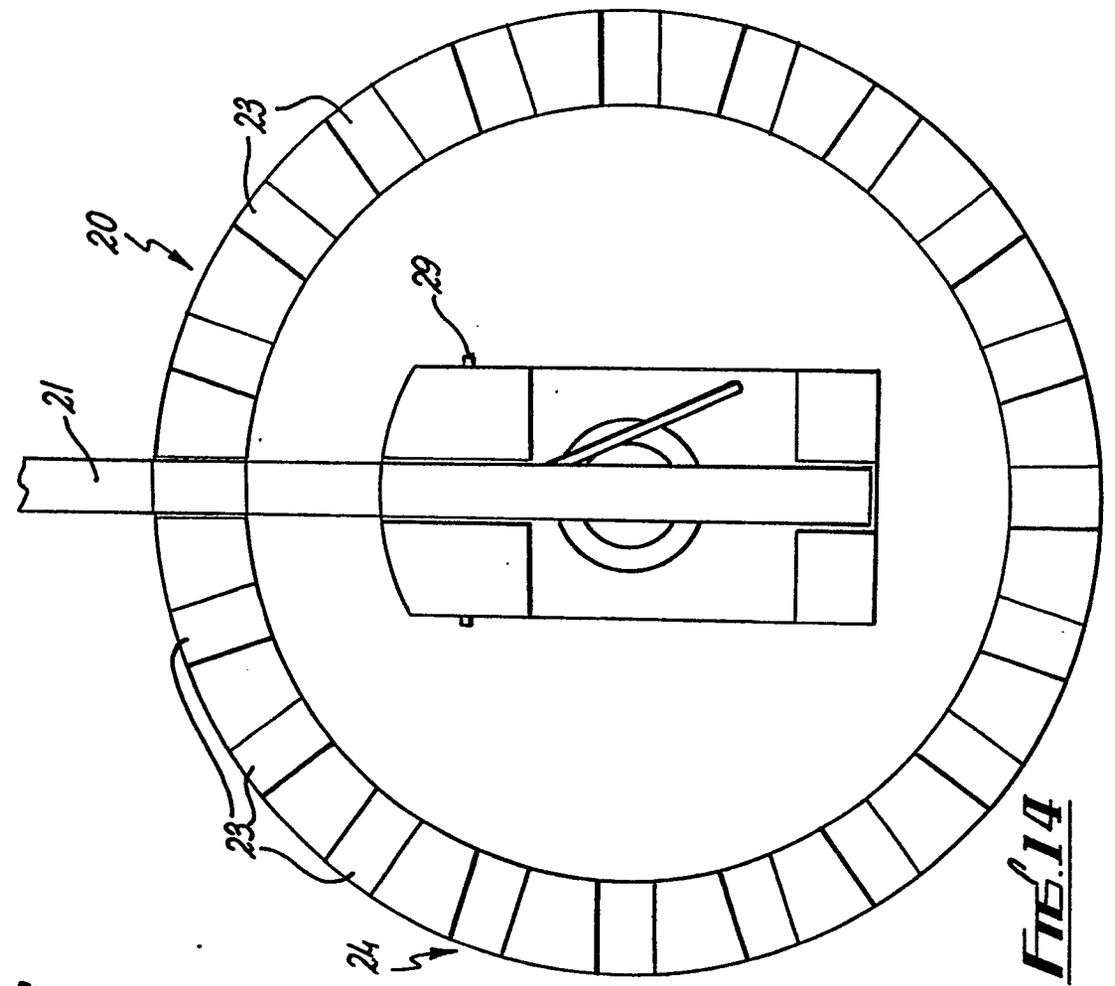
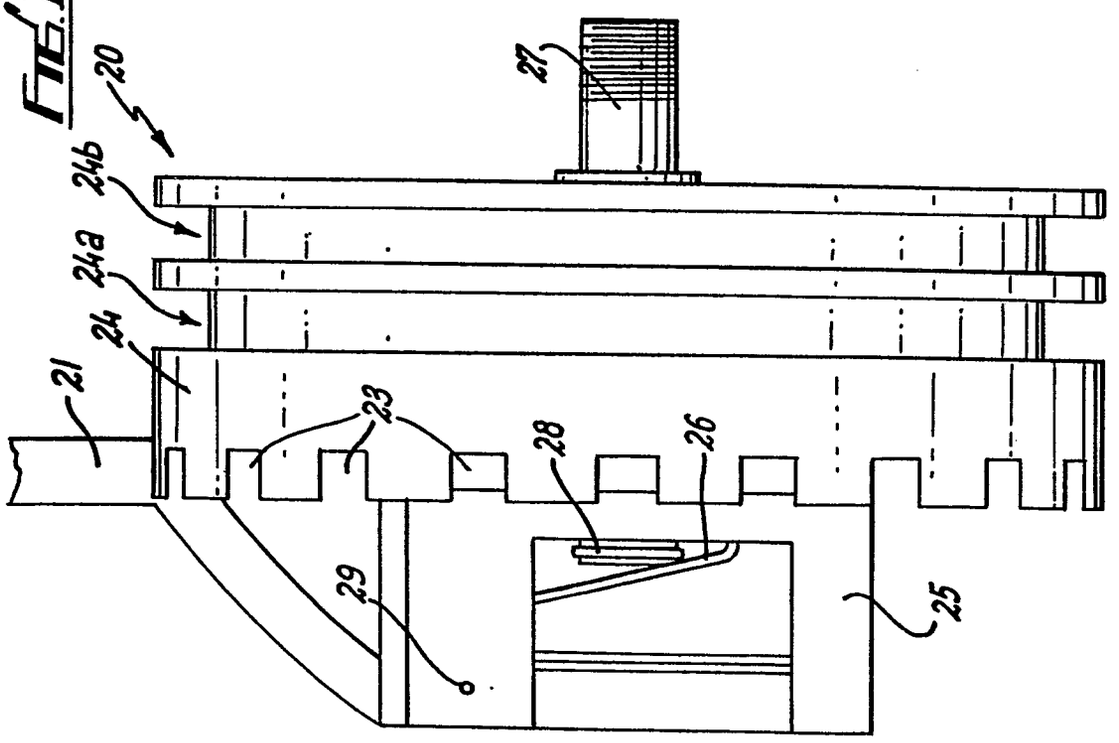


FIG.14

FIG.13



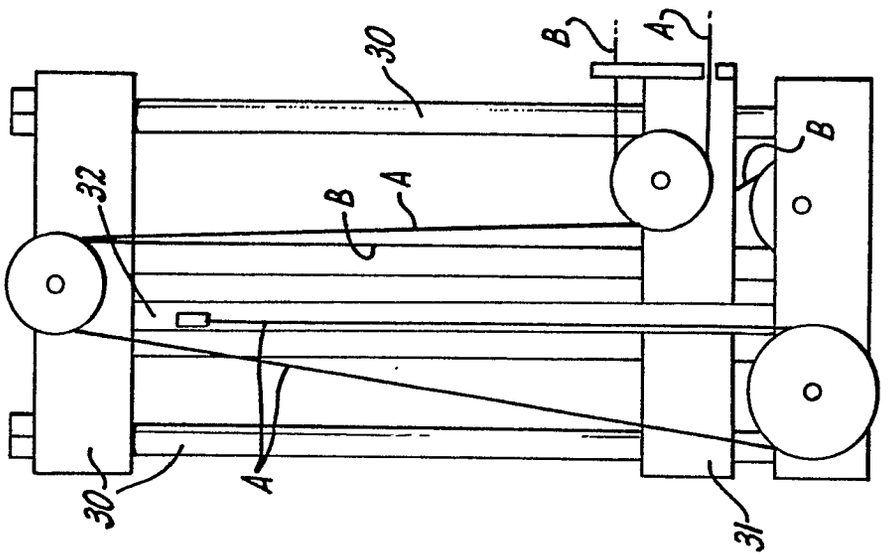


FIG.17

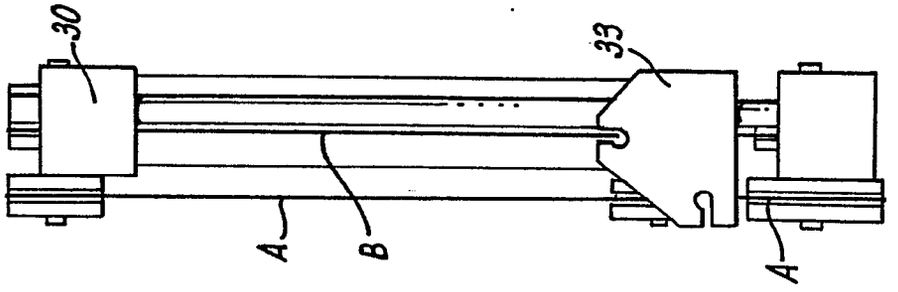


FIG.16

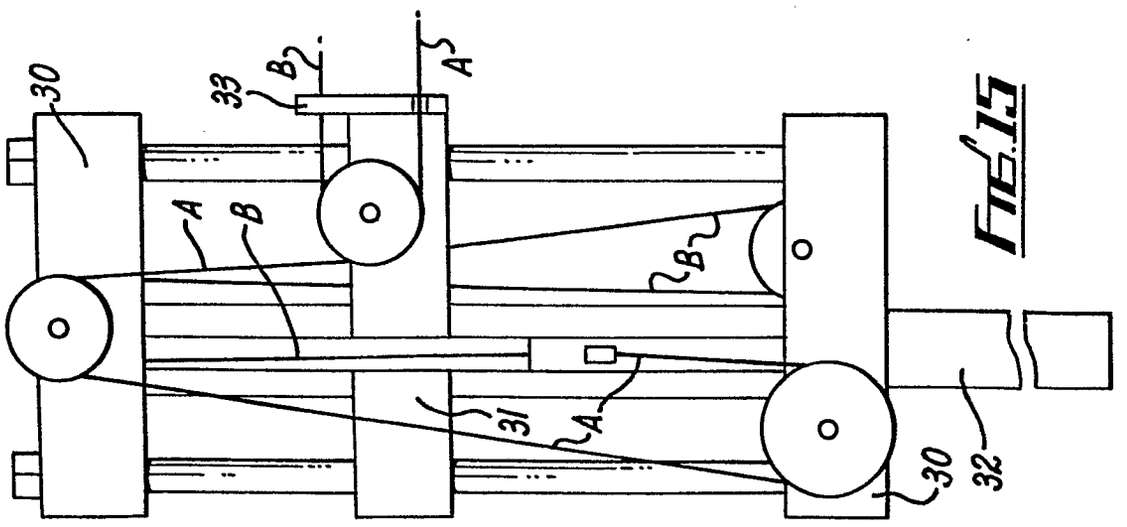


FIG.15