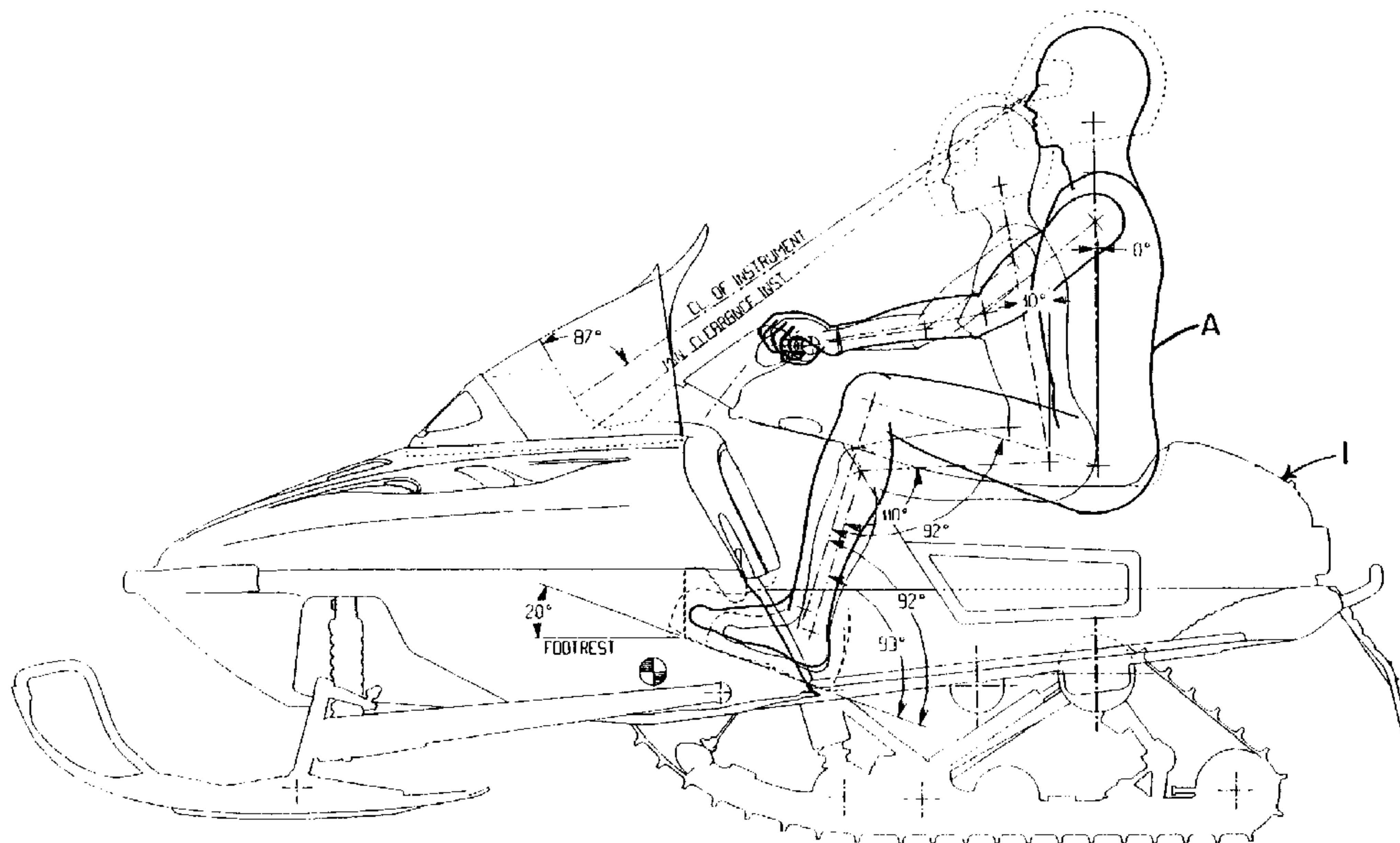




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(54) **IMPROVED VEHICLE**



(57) A new improved snowmobile is provided in which a typical unibody tunnel type snowmobile chassis is reinforced by pyramidal upper support frame members. Furthermore, the vehicle is shorter than a typical snowmobile in order to position the driver and engine closer to the midpoint of the vehicle. The rear suspension has a unique system of linkages.

ABSTRACT

A new improved snowmobile is provided in which a typical unibody tunnel type snowmobile chassis is reinforced by pyramidal upper support frame members. Furthermore, the vehicle is shorter than a typical snowmobile in order to position the driver and engine closer to the midpoint of the vehicle. The rear suspension has a unique system of linkages.

IMPROVED VEHICLEField of the Invention

This invention relates to a snowmobile.

Summary of the Invention

The snowmobile of the present invention is shortened so that the rider sits forwardly and the engine is moved rearwardly, both being located close to the midpoint of the vehicle, so as to have high manoeuvrability and be just as stable or more so than the prior art type snowmobiles. This invention further seeks to provide a vehicle including a unibody rear chassis and an upper support structure, said rear chassis including a tunnel adapted to permit a track to move therethrough; said upper support structure including a plurality of frame members thereby providing additional strength to the vehicle.

Another embodiment of the invention is a new stabilizer bar arrangement on the front suspension whereby the stabilizer bar runs through, on each end, a plastic block or stabilizer block. The block not only pivots but moves inwardly and outwardly such that if one ski rises the other will rise also.

The present invention uses a new unitary front sub-frame assembly which is attached to the main frame and which basically houses the front suspension components. The rear of the main frame is the standard unibody frame with a tunnel therein which permits the mounting of track.

The sub-frame and rear unibody tunnel-type frame are connected

together with various stabilizer bars and lateral supports to produce a very solid frame.

Because the snowmobile body is shortened considerably, a snow flap is necessary to cover the rear part of the track. This snow flap is capable of substantial movement depending upon the compressed or extended state of the rear suspension.

The vehicle also uses a new type of cradle arrangement as an engine mount. The engine can be affixed to the engine mount out of the vehicle and then during assembly the entire engine and engine mount are manoeuvred into the frame and secured thereto.

The vehicle also has another feature. There is capable of being installed in the place of the rear portion of the snowmobile body a second seat which permits the addition of another rider.

The improved vehicle also has a track and rear suspension with more vertical play.

Brief Description of the Drawings

The invention will be more fully described in conjunction with the following drawings wherein:

Fig. 1 is a schematic side view of a driver operating a prior art snowmobile in a normal seated position;

Fig. 2 is a schematic side view of a driver operating a prior art

snowmobile in a forward leaning racing position;

Fig. 5 is a schematic side view of a driver operating a snowmobile of the present invention in a normal seated position.

Fig. 9 is a schematic side view comparing a driver's position on a prior art snowmobile and a driver's position on the snowmobile of the present invention;

Fig. 10 is a schematic side view of a driver sitting on a snowmobile of the present invention;

Fig. 11 is a perspective view of the unibody frame of the present invention;

Fig. 12 is another perspective view of the unibody frame of the present invention;

Fig. 13 is a perspective view of the unibody frame of the present invention with additional structural supports;

Fig. 14 is a perspective view of ski leg of the present invention;

Fig. 15 is various views of a lower front support arm;

Fig. 16 is a partial view of the frame of the present invention and part of the left front suspension;

Fig. 17 is a perspective view of parts of the front suspension;

Fig. 18 is a perspective view of the sub-frame of the front suspension;

Fig. 19 is a perspective view of the front suspension of the present invention;

Fig. 20 is a perspective side view of partially completed vehicle of the

present invention;

Fig. 21 is a perspective front view of a partially completed vehicle of the present invention;

Fig. 22 is a front view of a partially completed vehicle of the present invention;

Fig. 25a is a schematic side view of the basic components of the rear suspension in a compressed state for use when it is equipped with a track;

Fig. 25b is a schematic side view of the basic components of the rear suspension in an extended state for use when it is equipped with a track;

Fig. 26a is a schematic side view of the components of the rear suspension in a compressed state when it is equipped with a track rail;

Fig. 26b is a schematic side view of the components of the rear suspension in an extended state when it is equipped with a track rail;

Fig. 27 is a schematic side view showing rear suspension movement between an extended state and a compressed state;

Fig. 28 shows a rear passenger seat and a rear end body portion in perspective view.

Detailed Description of the Invention

In Fig. 1, one notes a man sitting to the rear of the seat in the dark outline shown as (A). He is seated on a prior art known snowmobile. One notices the weight of the rider is over the rear section of the track. The motor (not shown) is

located over the skis.

In Fig. 2, the operator is leaning forward in a racing position as shown in outline (B). Thus, the weight of the driver is slightly forward which is more useful in doing tight turns and other manoeuvres.

Fig. 9 compares a prior art snowmobile in solid lines marked as 1 with a snowmobile of the present invention in dotted lines marked (4). The driver (A), in solid lines, is sitting on the prior art snowmobile (1) and the driver (E) in dotted lines seated on the snowmobile of the present invention (4). One notes a significant difference in the positions of the two drivers. Driver (E) is much further ahead and closer to the center of the vehicle. In addition, the new vehicle (4) is considerably shorter in length than the old snowmobile (1).

The present invention is shown in greater detail with its component parts commencing with Fig. 10. In Fig. 10, there is a unibody frame (10). The driver is on a seat (11) and is holding on the handle bars (13) of the steering column (12).

In Fig. 10, there is a shock absorber (14) of the front suspension. The ski leg (15) which is used for not only supporting the ski assembly (16) but also wheels (not shown in Fig. 10) is also shown. The engine (17) is placed on a cradle-type engine mount shown as (18). This is done during production. It is then with the use of pins or brackets or screws (21) affixed to the frame.

There are a pair of drive shafts (19) and (20). An endless belt or track (9) is held in place and revolves about the track rail (22). The track rail (22) is suspended using linkage (24) and a shock absorber (23). The track (9) circles

around the rear idler wheel (25). The rear track cover (26) is pivotable up and down depending upon whether the rear suspension is in a compressed or extended state.

In Fig. 11 and 12 are perspective views of the unibody chassis or frame (10). A tunnel area (27) is shown with a curved arrow and indicates the area where the track (9) of the present invention travels.

In Fig. 13 some structural components have been added to the frame in the form of lateral side braces (28a and 28b). There is also a right front frame member (30a) and a left front frame member (30b). Cross braces (29 and 33) strengthen the frame. A horizontal flange (32b) is shown which forms the basis of the foot well. A left lateral flange (31b) has also been attached. This upper metallic structure increases the torsional rigidity and the resistance to flex of the unibody.

In Fig. 14 unitary cast ski leg (15) is used to provide attachment for the skis.

Fig. 15 shows various views of the lower front suspension support arms (34). There is in fact a lower left front suspension support arm (34b) and a lower right front suspension support arm (34a). Support arm anchors (35) are also shown.

In Fig. 16, further structural components are shown. There is a left front strut (36b) and a right front strut (36a) which connect to the frame at cross brace (29). These struts attach to front suspension cross brace (37) at either end. Each end of cross brace (37) is attached to a shock absorber (14).

The basic components of the front suspension are shown clearly in

Fig. 17. There is a lower left suspension support arm (34b), a lower right suspension support arm (34a), an upper right suspension support arm (38a) and an upper left suspension support arm (38b). Bushings (41) are seen. A stabilizer bar (39) has been added and is adapted to slide and pivot by way of pivot blocks (40a and 40b). These blocks slide about the lower suspension arms (34a and 34b).

In Fig. 18 one views the front sub-assembly frame (42).

Fig. 19 shows the front suspension in a near complete condition. The sub-frame (42) connects together the various support arms and also supports a steering gear box (44) which connects to a steering rod (43). The steering gears (44) are adapted to move by steering column (12).

Fig. 20 shows the front suspension in a near completed condition with the exception of the steering rod (43) which has not yet been connected. A crank shaft (45) is visible through an aperture in the side of the unibody frame (10).

Fig. 21 shows the chassis and suspension basically completed. Most of the suspension force is transferred by way of a pyramidal structure to a common point, i.e. at cross-bar (27).

The pyramidal structure of transmitted force from the suspension is more evident in Fig. 22. Again in Fig. 22 one sees the stabilizer bar sliding blocks (40a and 40b) which hold the ends of the stabilizer bar (39). The stabilizer bar sliding blocks move along lower suspension support arms (34b and 34a).

In Figs. 25A and 25B the rear suspension is shown. There is a support arm (46), the first linkage (48), the second linkage (49 and 50), and the front linkage

(56). The shock absorber (23) is also present. The linkage (48) is attached on the lower part of the axle. Fig. 25A is a suspension in the compressed state and in Fig. 25B it is in the extended state.

In Figs. 26A and 26B there are the three linkages (48, 49 and 50), the front linkage (56), and the shock absorber (23). There is also the rear idler wheel (25) as well as idler wheels (57, 58 and 59).

One notes that the idler wheels in Figs. 26a and 26b ride about the track rail (22). The rear idler wheel (25) is attached to rear idler lift arm (60) which is pivotally mounted to the unibody frame.

In Fig. 27, one views the rear snowmobile suspension in two positions, the extended and the compressed positions. One notes the rear idler lift arm (60) is attached to the snow cover or snow flap (26).

In Fig. 28, there is shown a removable rear body portion (61) which is attached behind the driver's seat. In the event that a second seat is required for a passenger during snowmobile operation, seat (62) is placed in the same position as the removable rear body portion (61). Seat (62) has a foot rest (63) and a seat back (64).

THE EMBODIMENTS OF THE INVENTION FOR WHICH AN EXCLUSIVE PROPERTY OF PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. An improved recreational vehicle adapted for use on snow; said vehicle being shorter in length than a prior art snowmobile; said vehicle being constructed such that an operator is positioned forwardly, and an engine is placed rearwardly such that in operation, said engine and said operator are located close to the midpoint of the vehicle.
2. A vehicle as claimed in claim 1 including a unibody rear chassis and an upper support structure, said rear chassis including a tunnel adapted to permit a track move therethrough; said upper support structure including a plurality of frame members thereby providing additional strength to the vehicle.
3. A vehicle as claimed in claim 2 including a front suspension; said front suspension adapted for use with a pair of skis, said front suspension including a pair of ski legs adapted to be connected to said skis.
4. A vehicle as claimed in claim 2 including a rear suspension; said rear suspension comprising a support arm, a plurality of linkages, and at least one (1) shock absorber; said suspension being adapted for use with a snowmobile track.

5. A vehicle as claimed in claim 2 including a removable rear end body portion; said rear end body portion being replaceable with a rear seat assembly.

6. A vehicle as claimed in claim 1 including a removable engine mount cradle, said cradle adapted to be connected to said engine during assembly line operation and thereafter placed into said vehicle and fixedly attached thereto.

7. A vehicle as claimed in claim 1 further including a pivotal snow track guard cover; said cover being mounted to said vehicle.

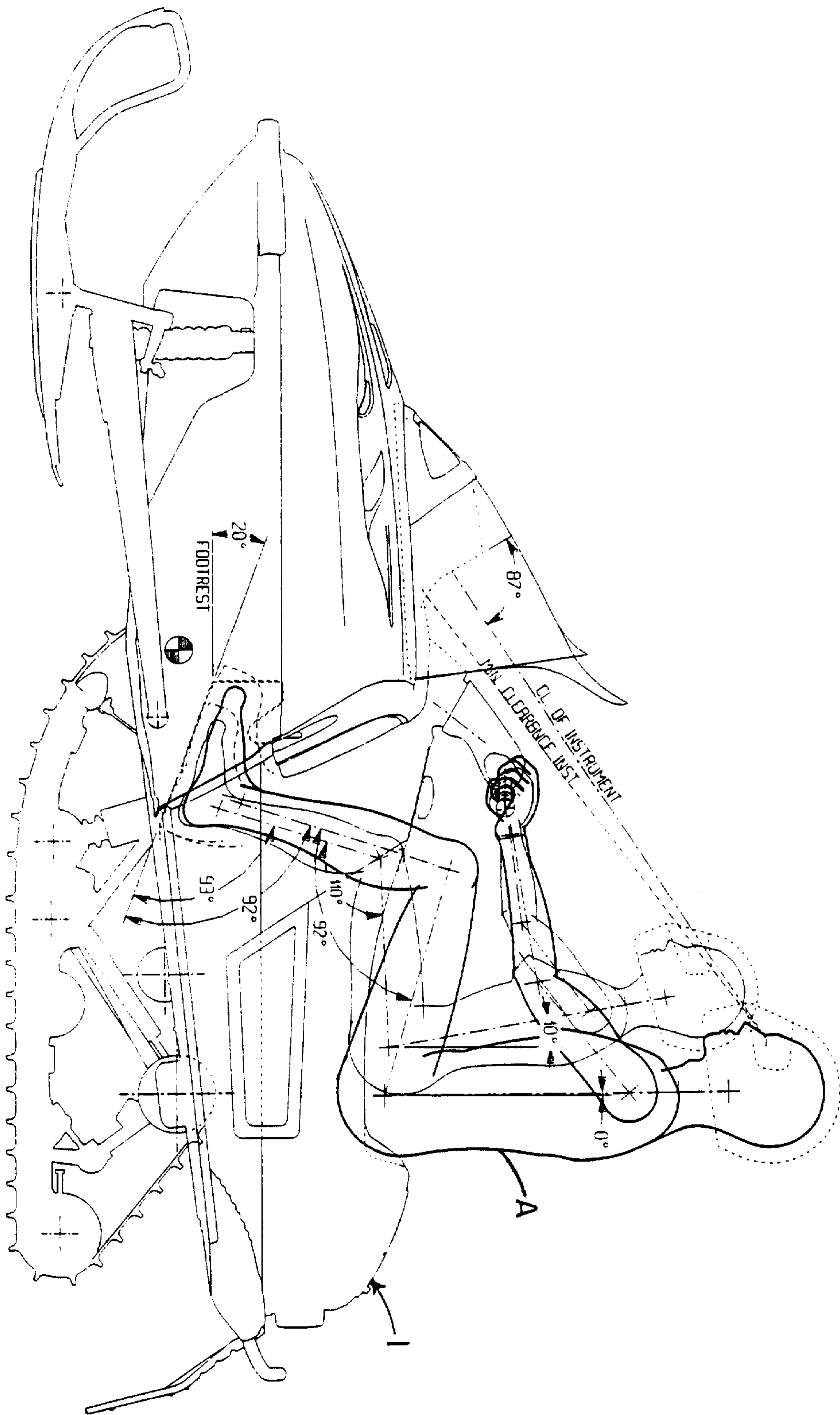


FIG. 1

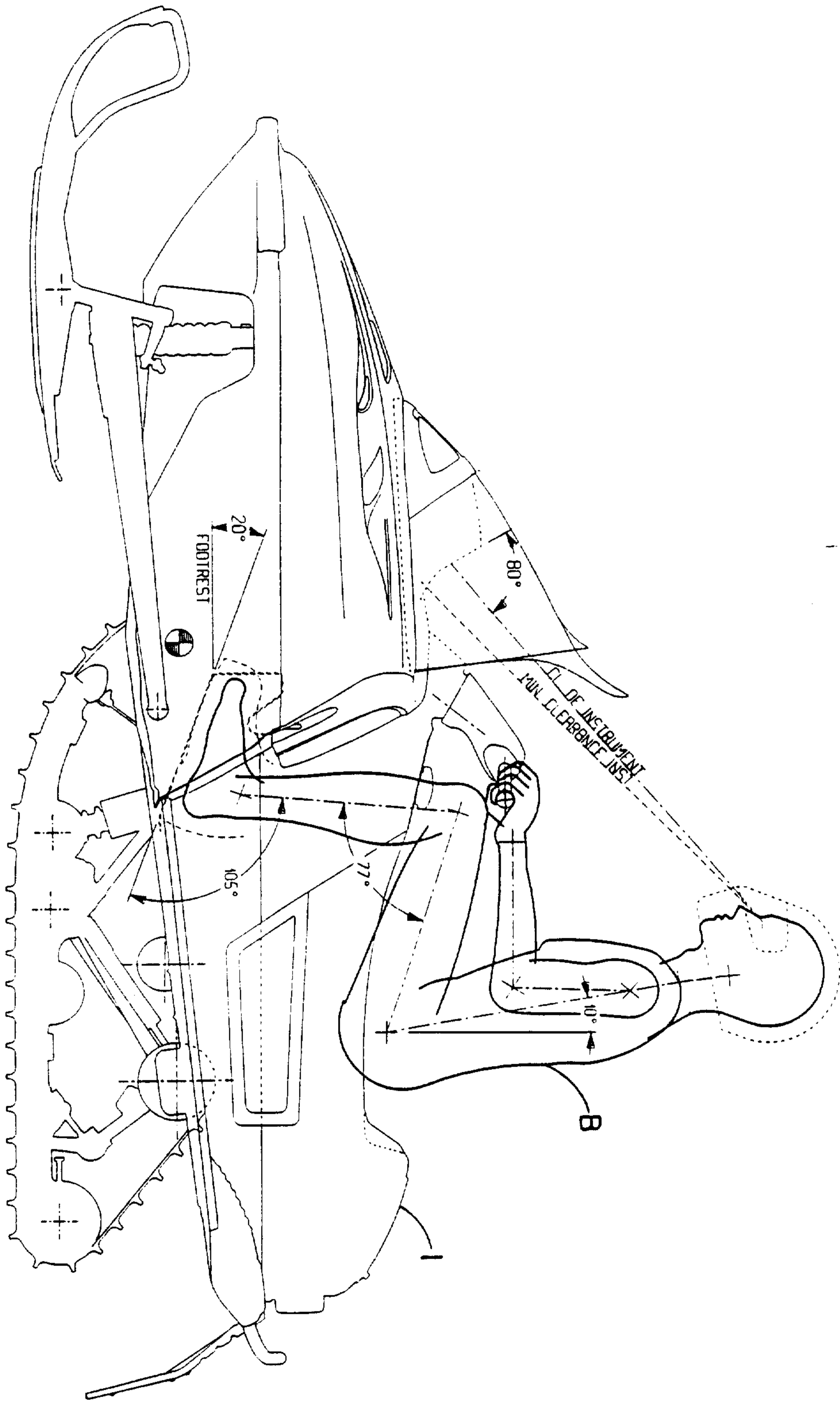


FIG. 2

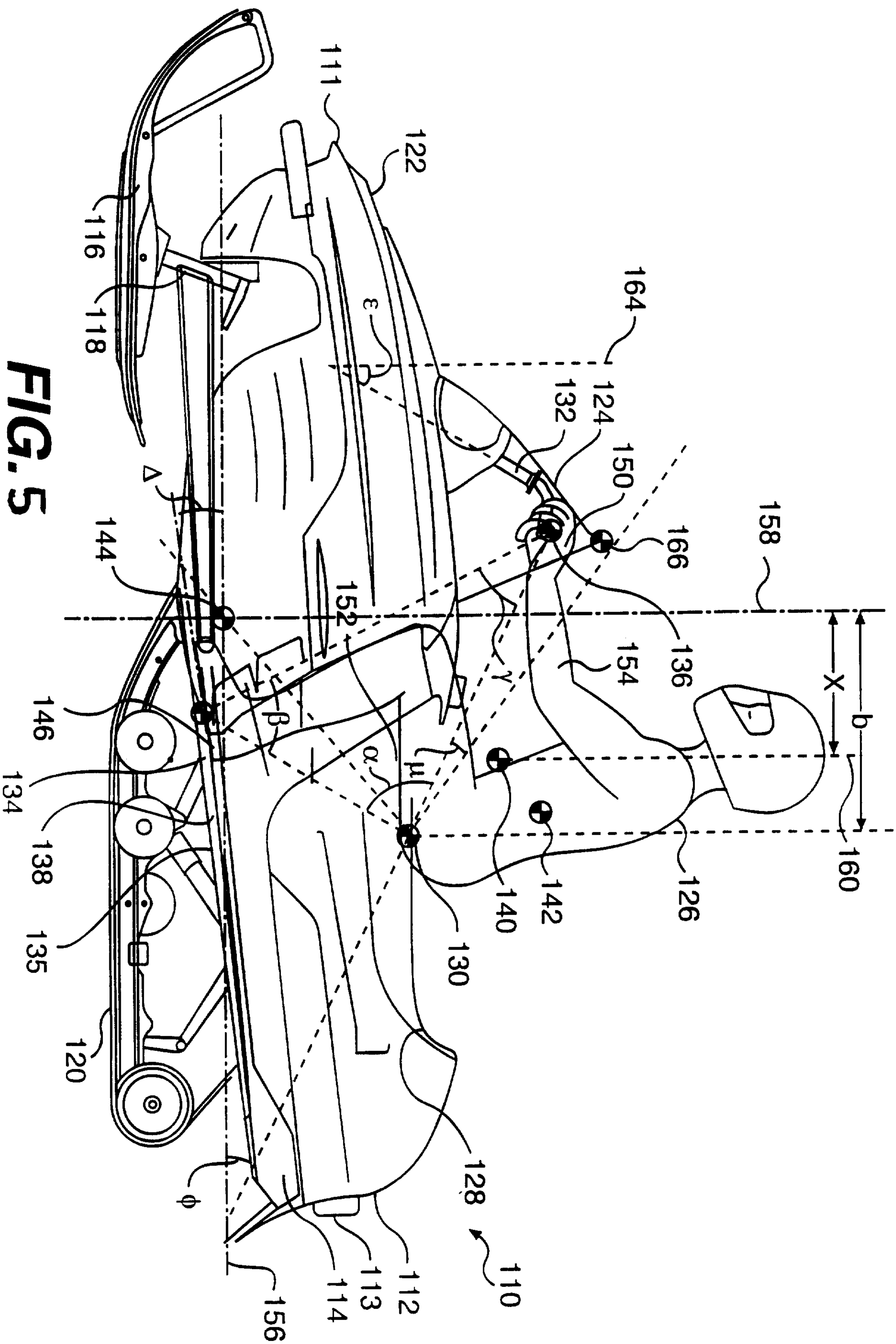


FIG. 5

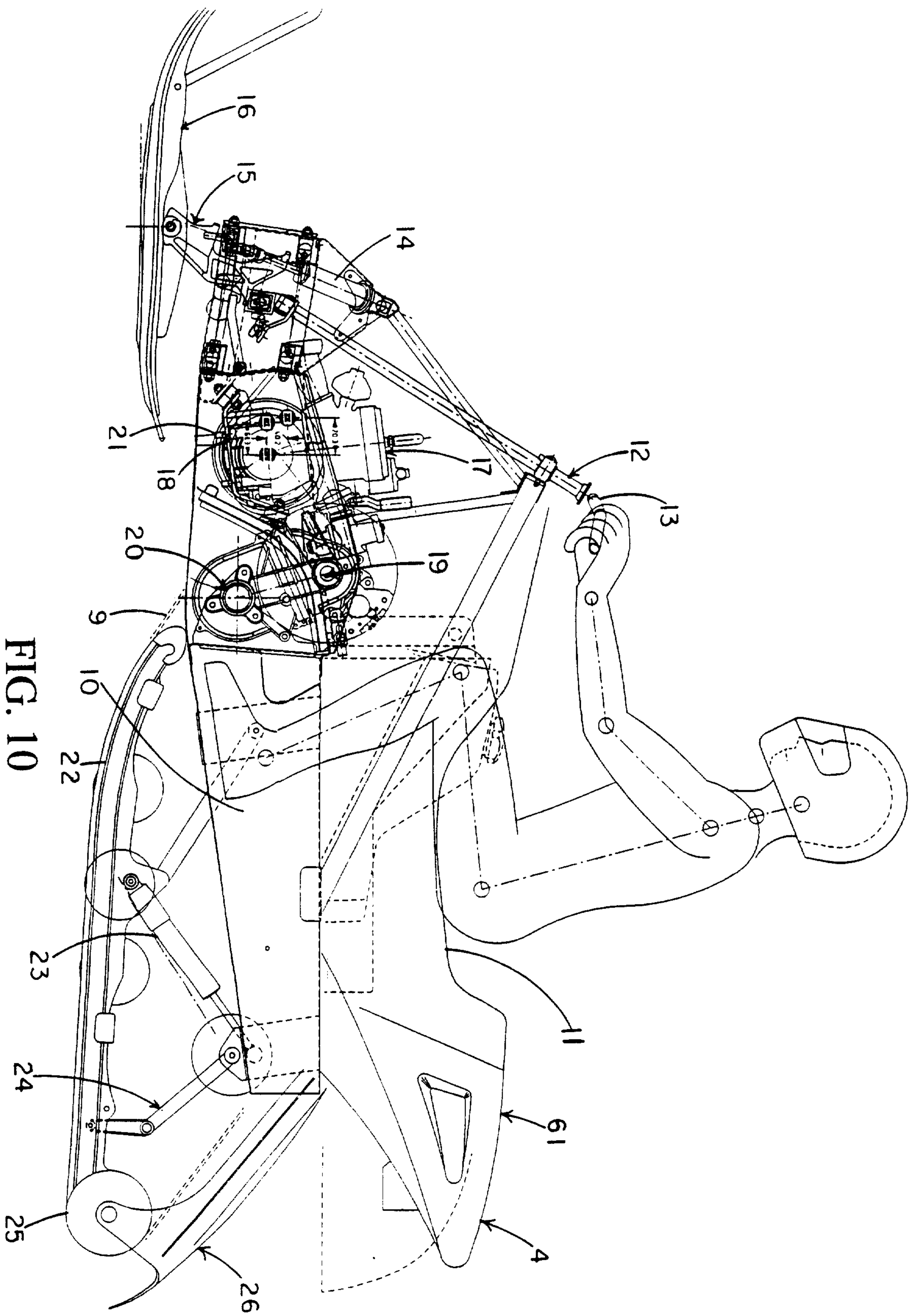


FIG. 10

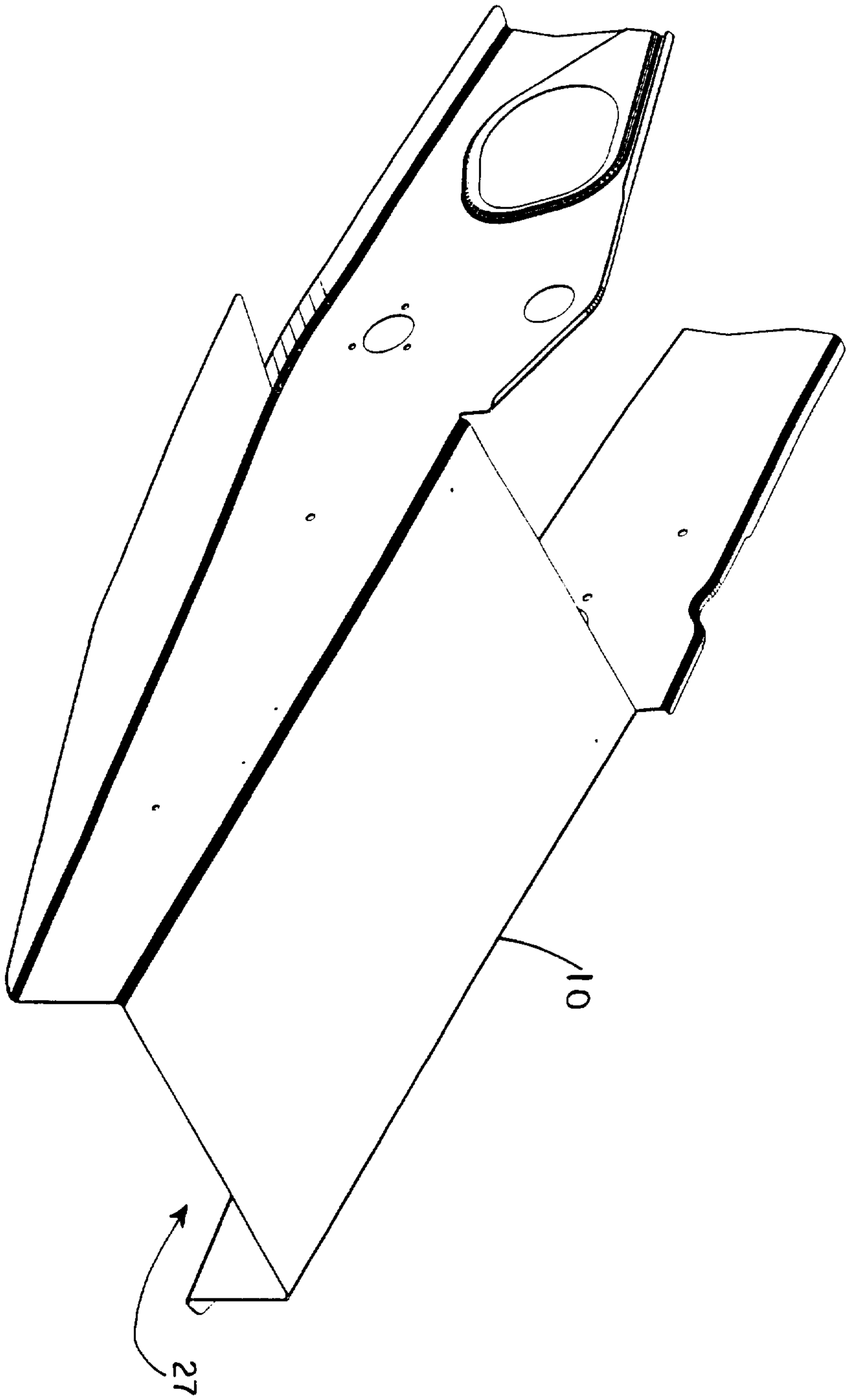
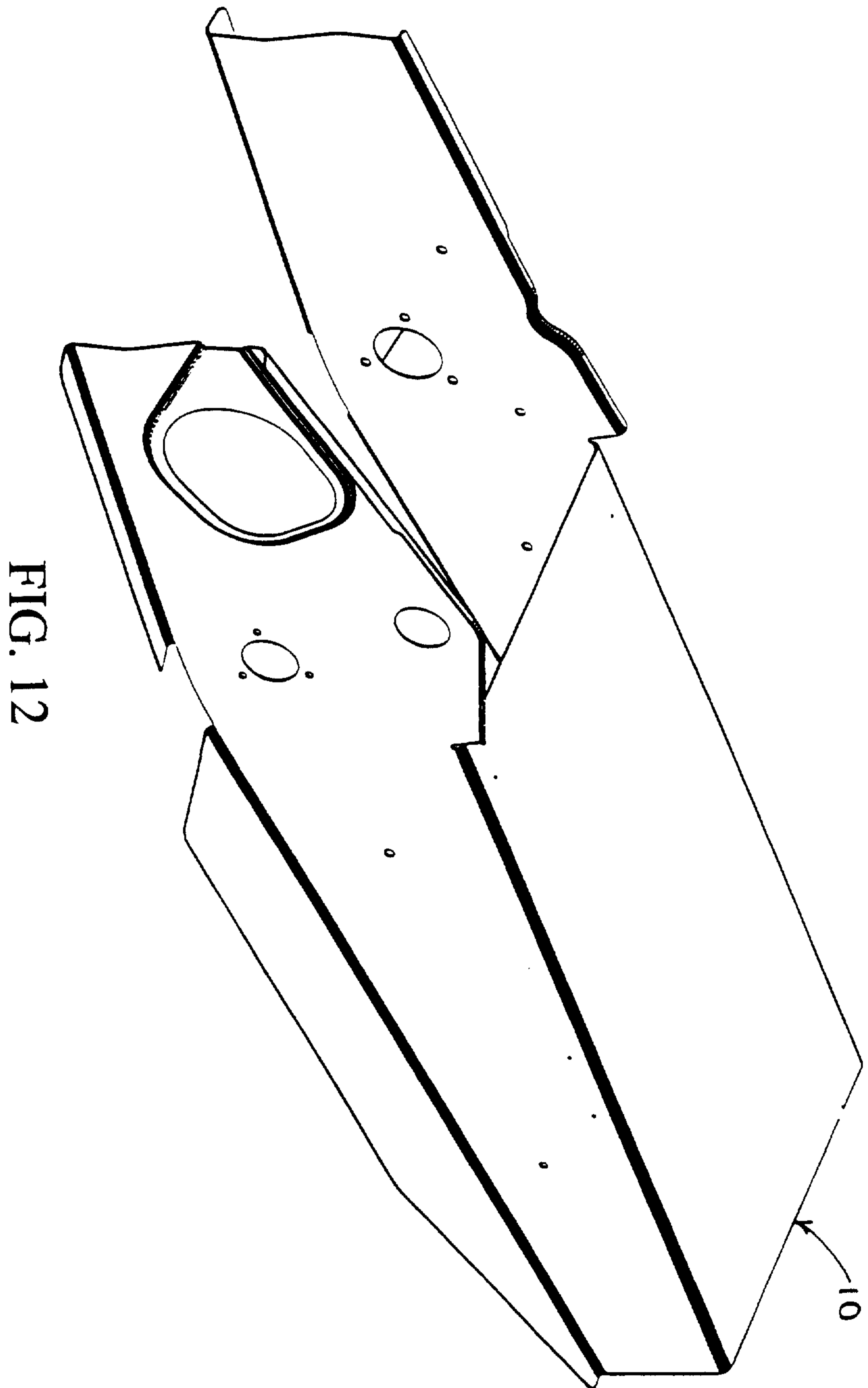
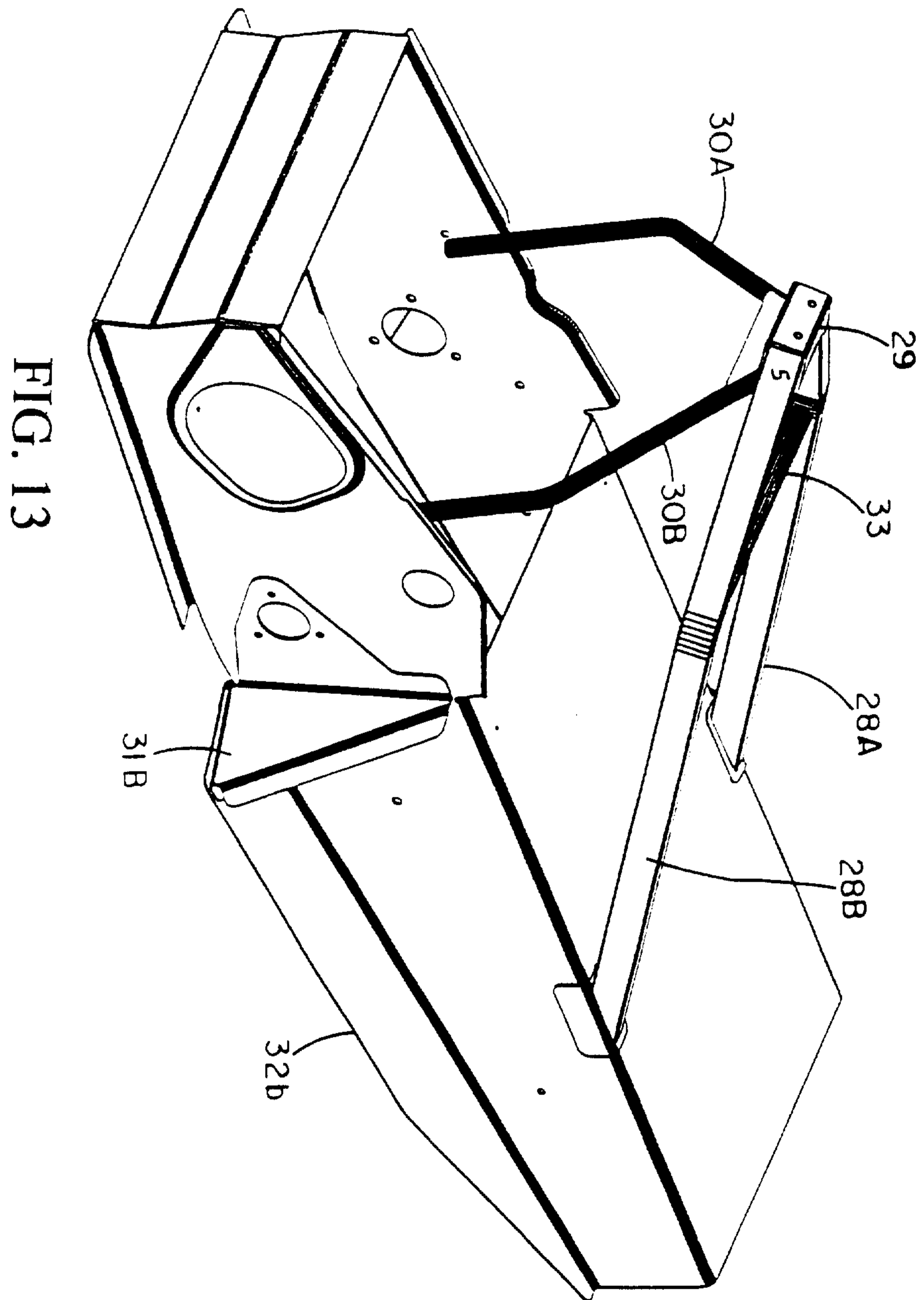


FIG. 11





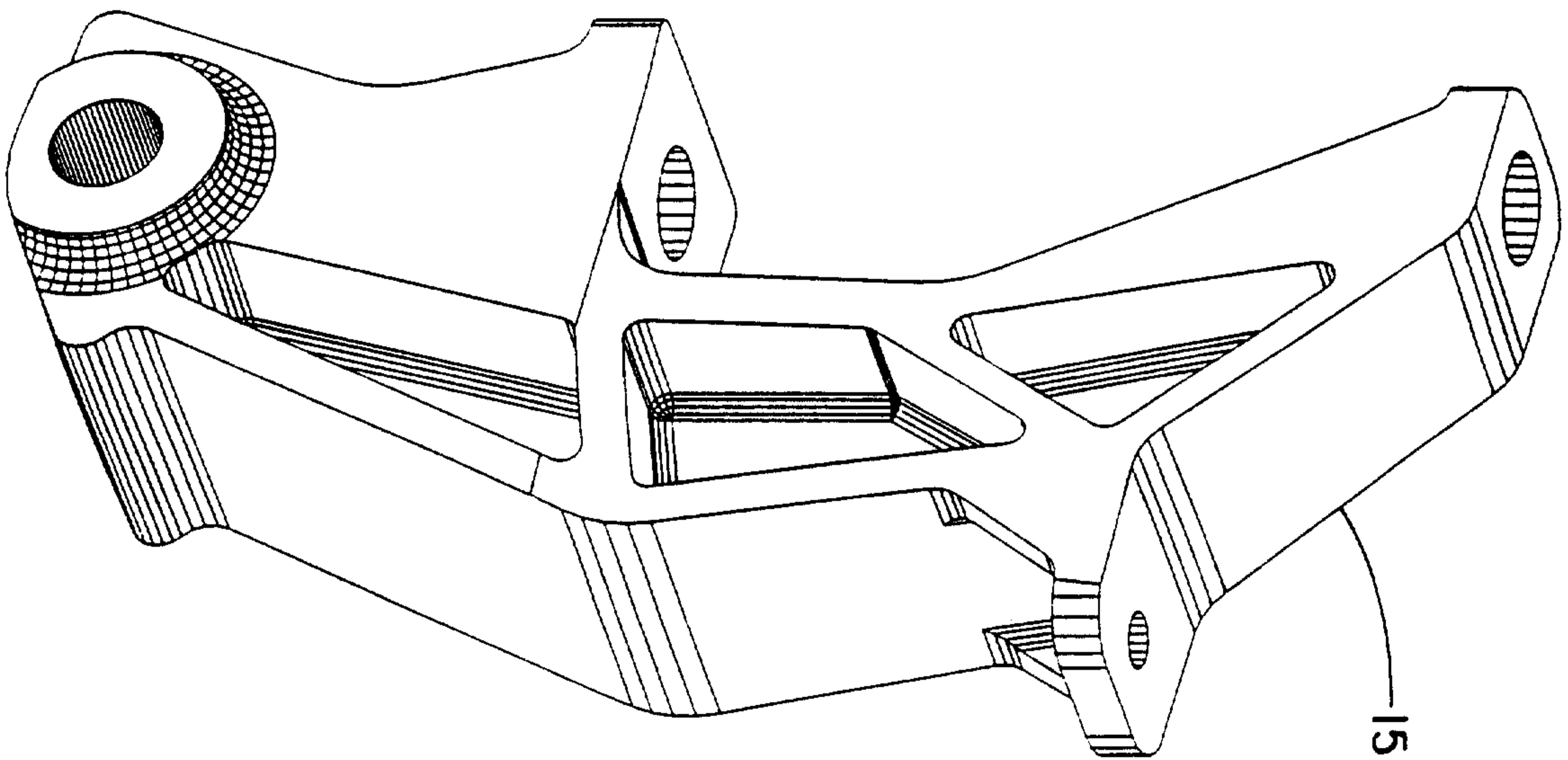


FIG. 14

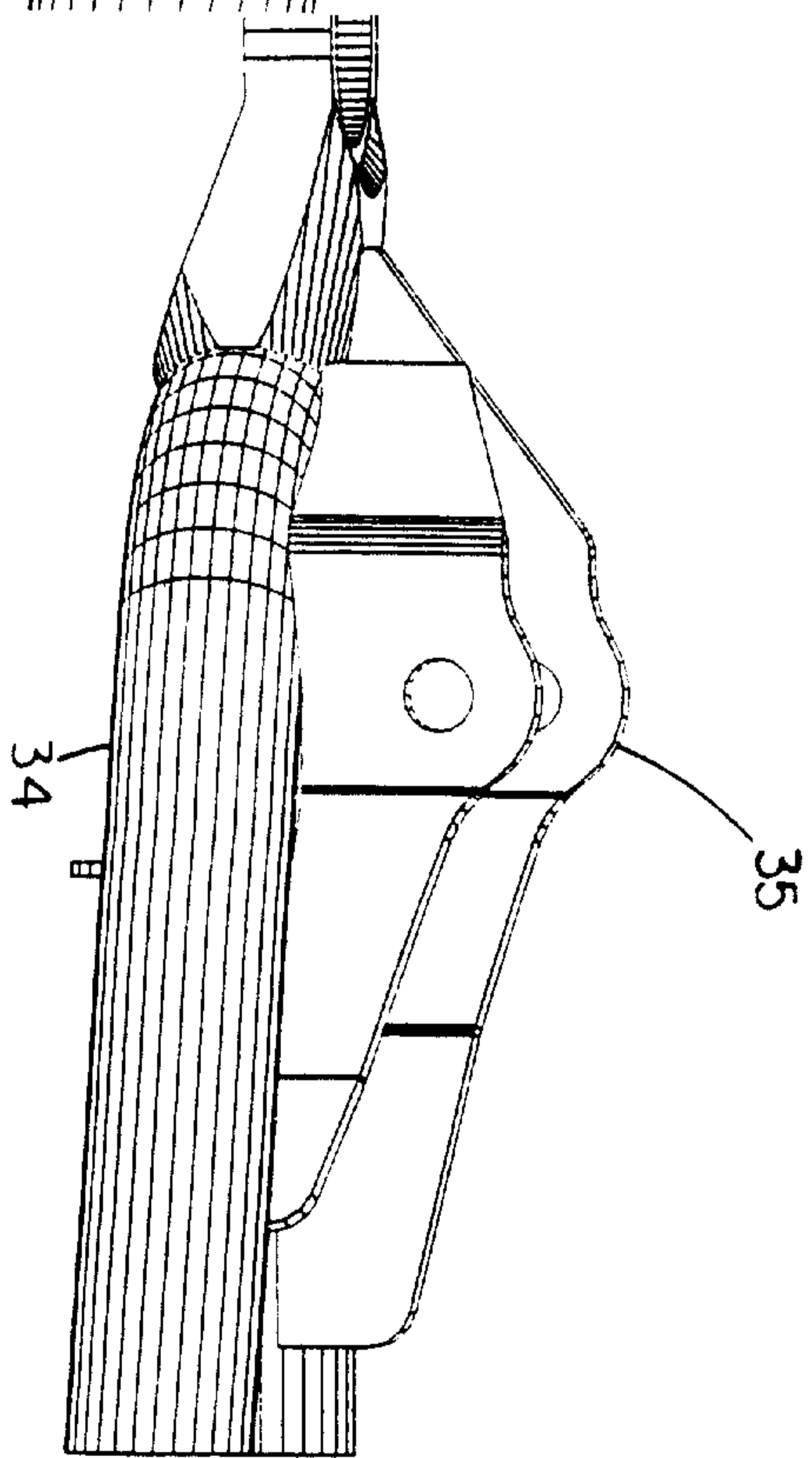
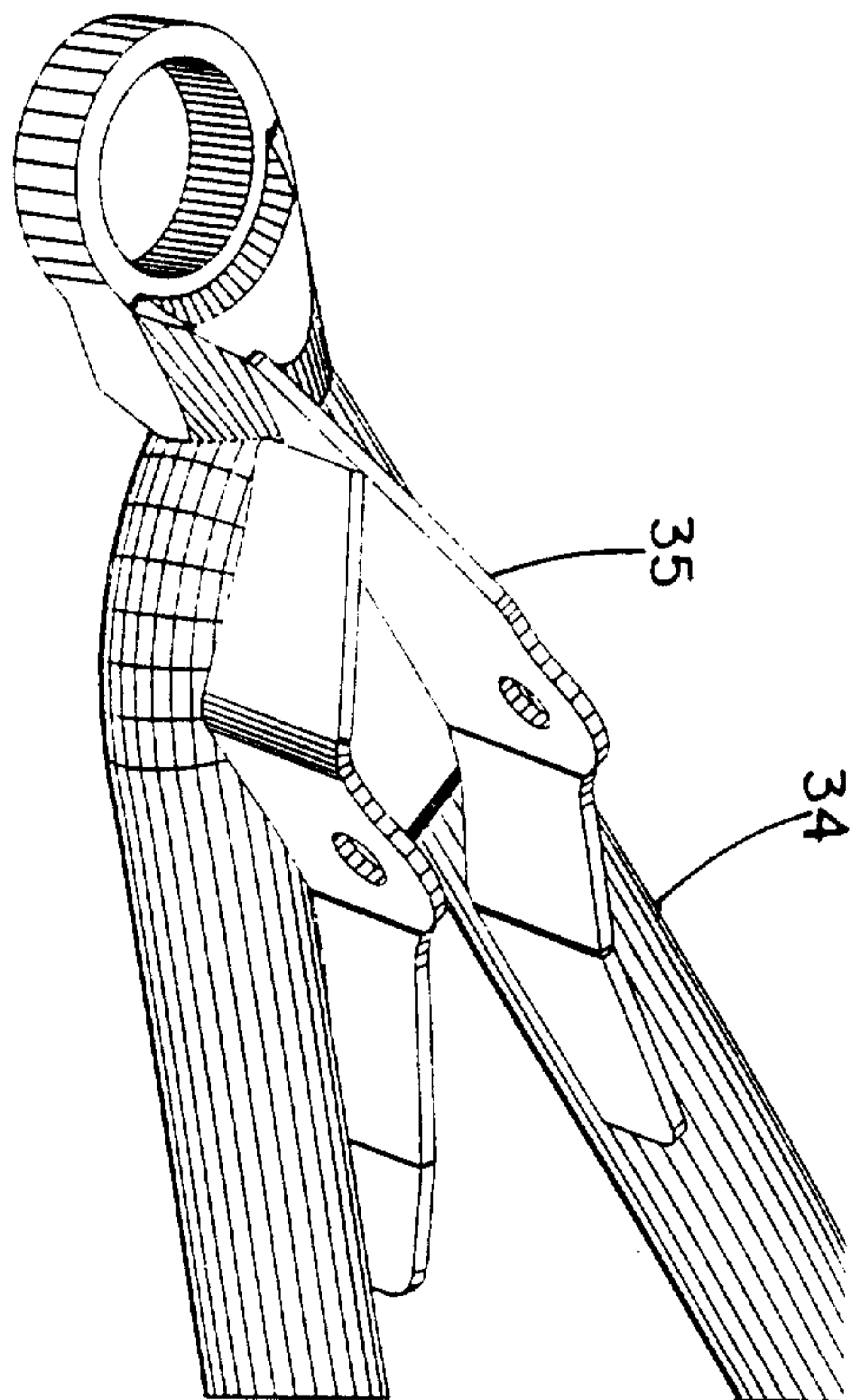
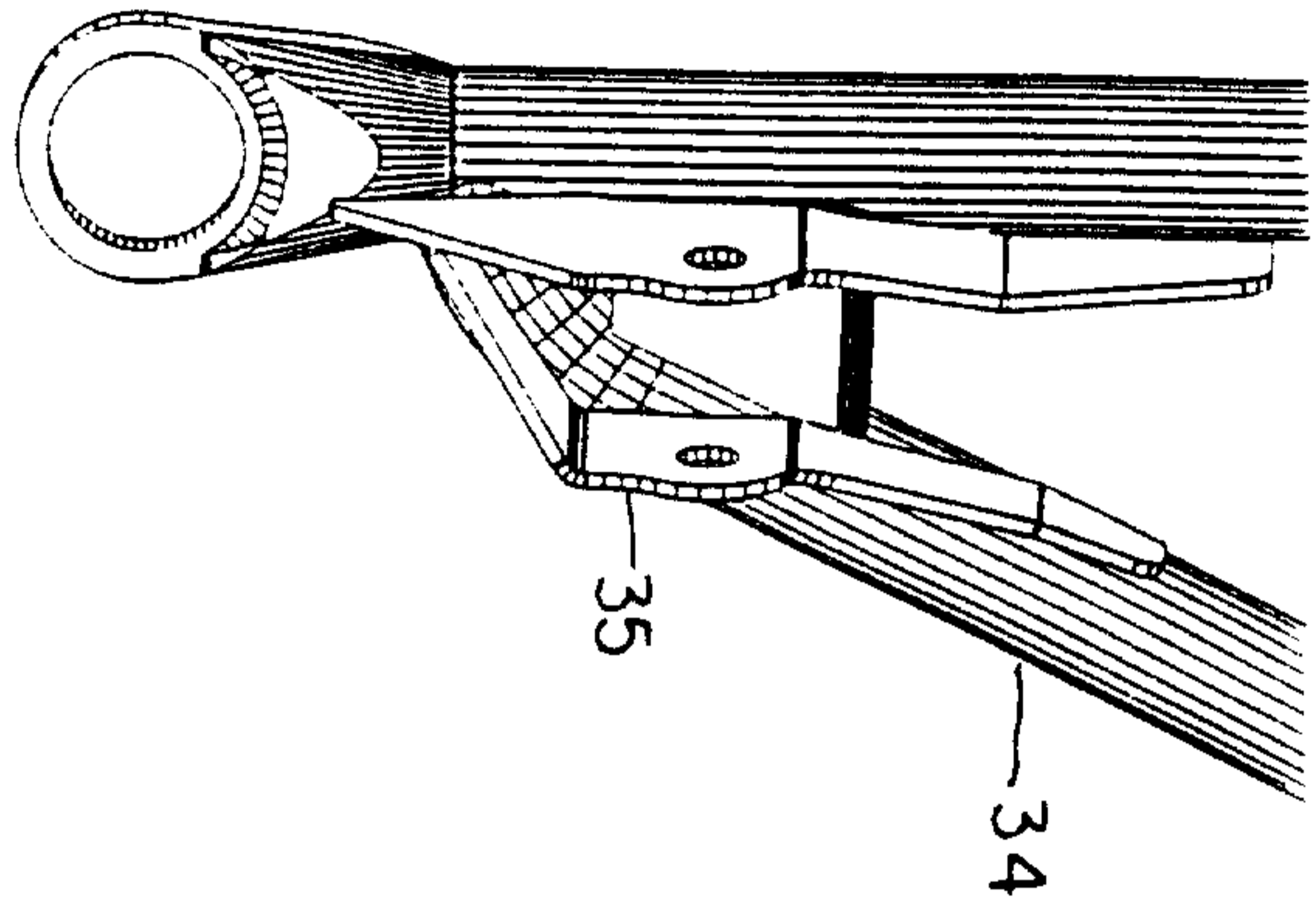
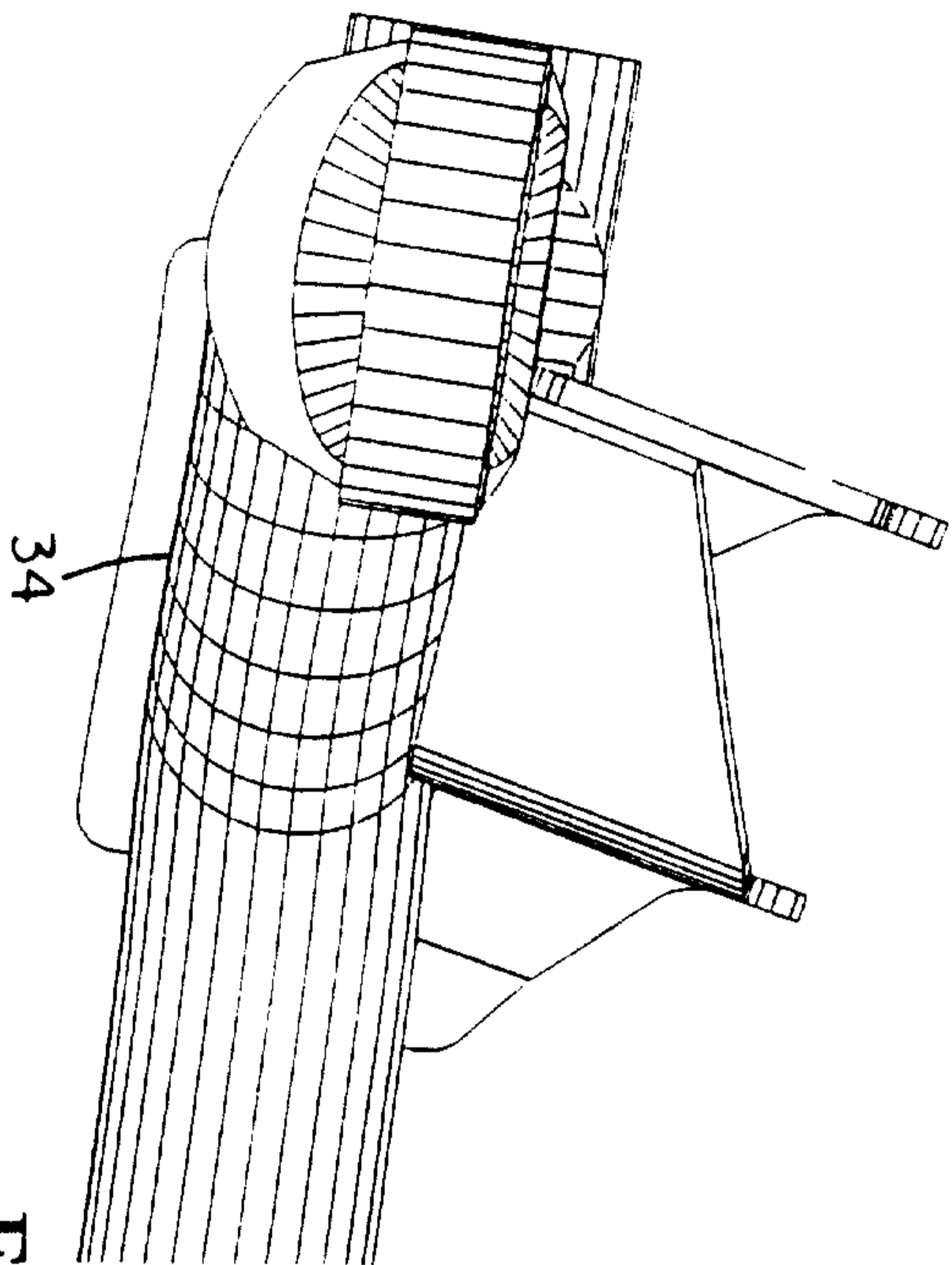


FIG. 15

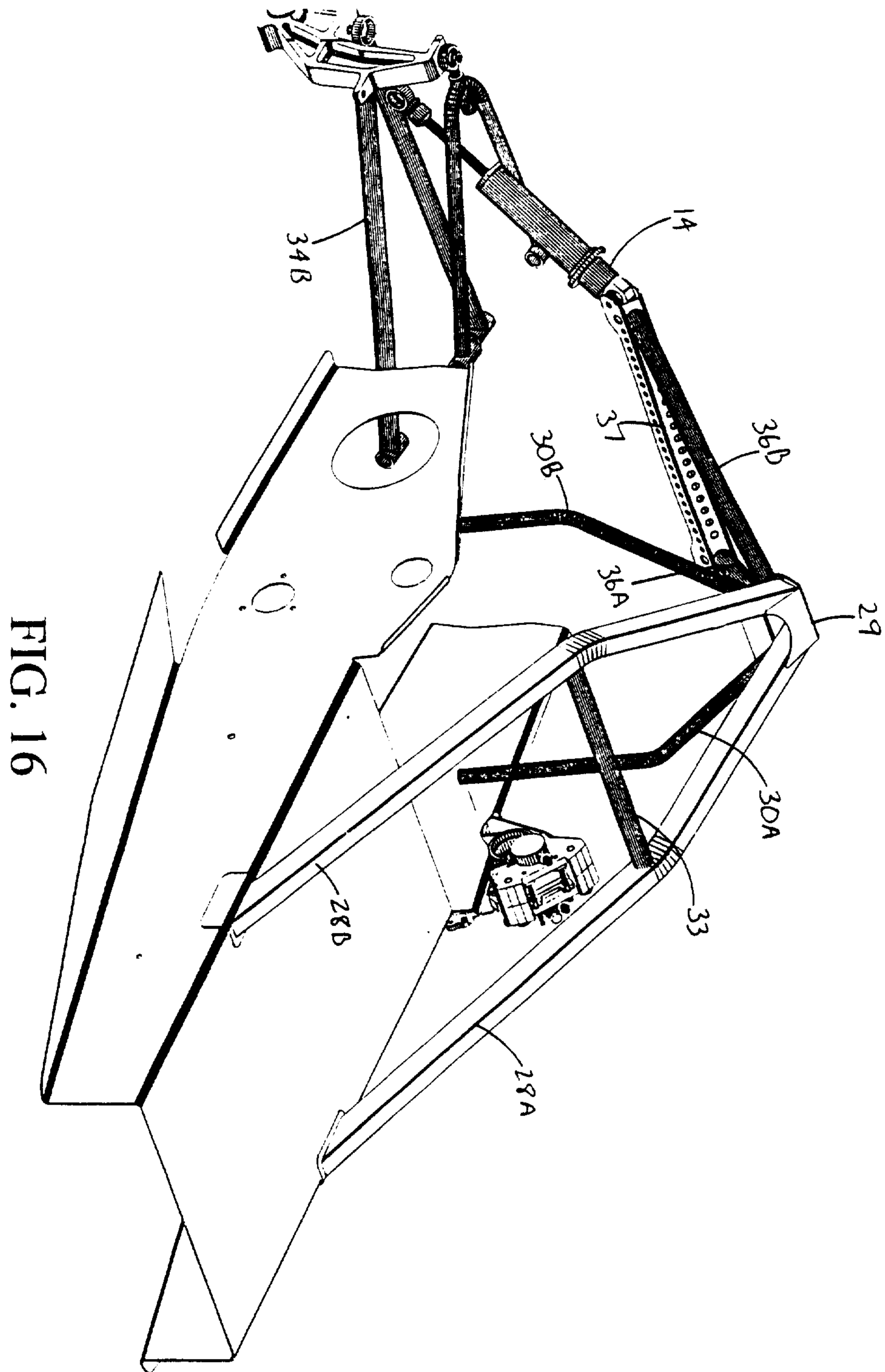


FIG. 16

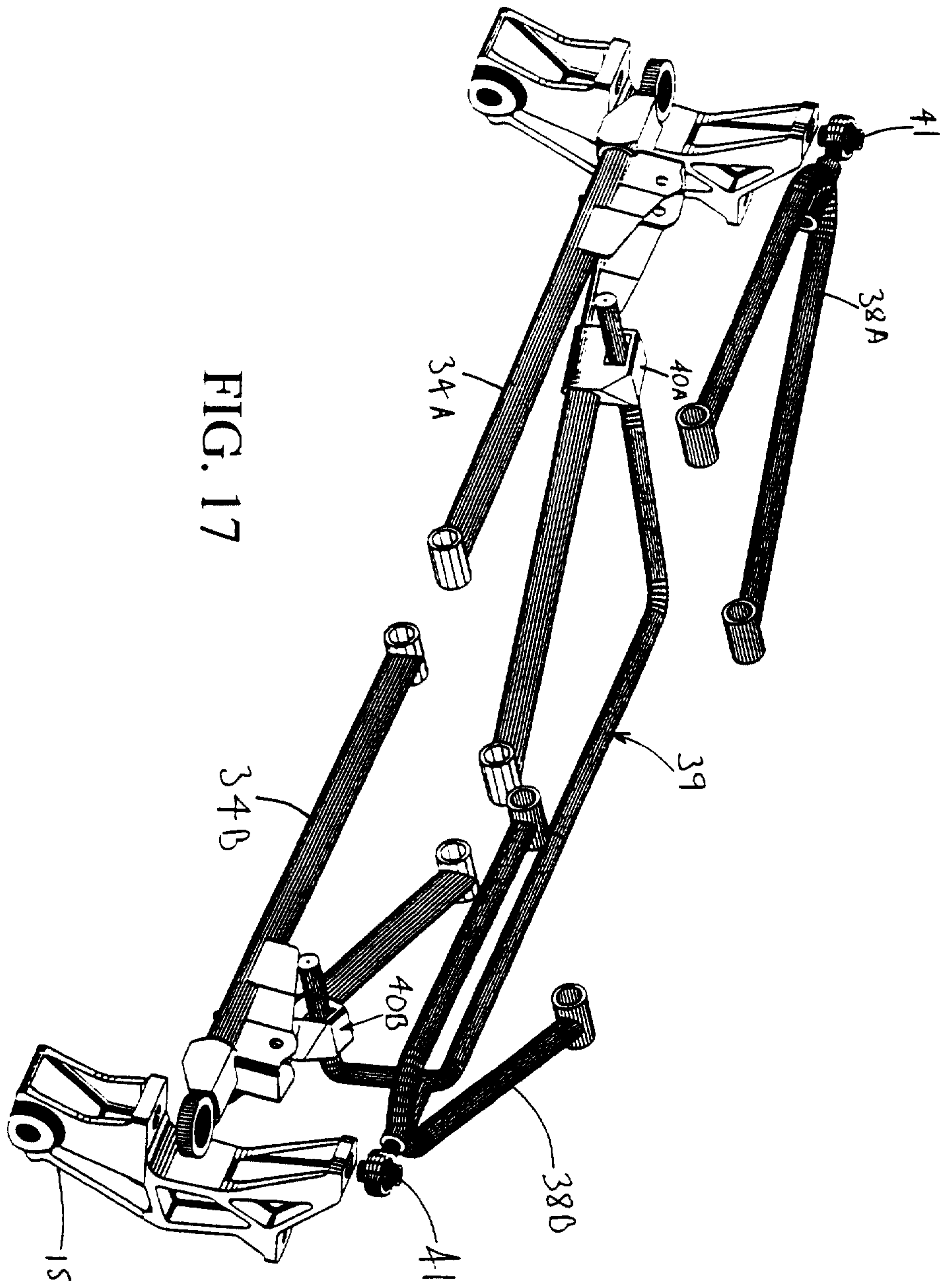


FIG. 17

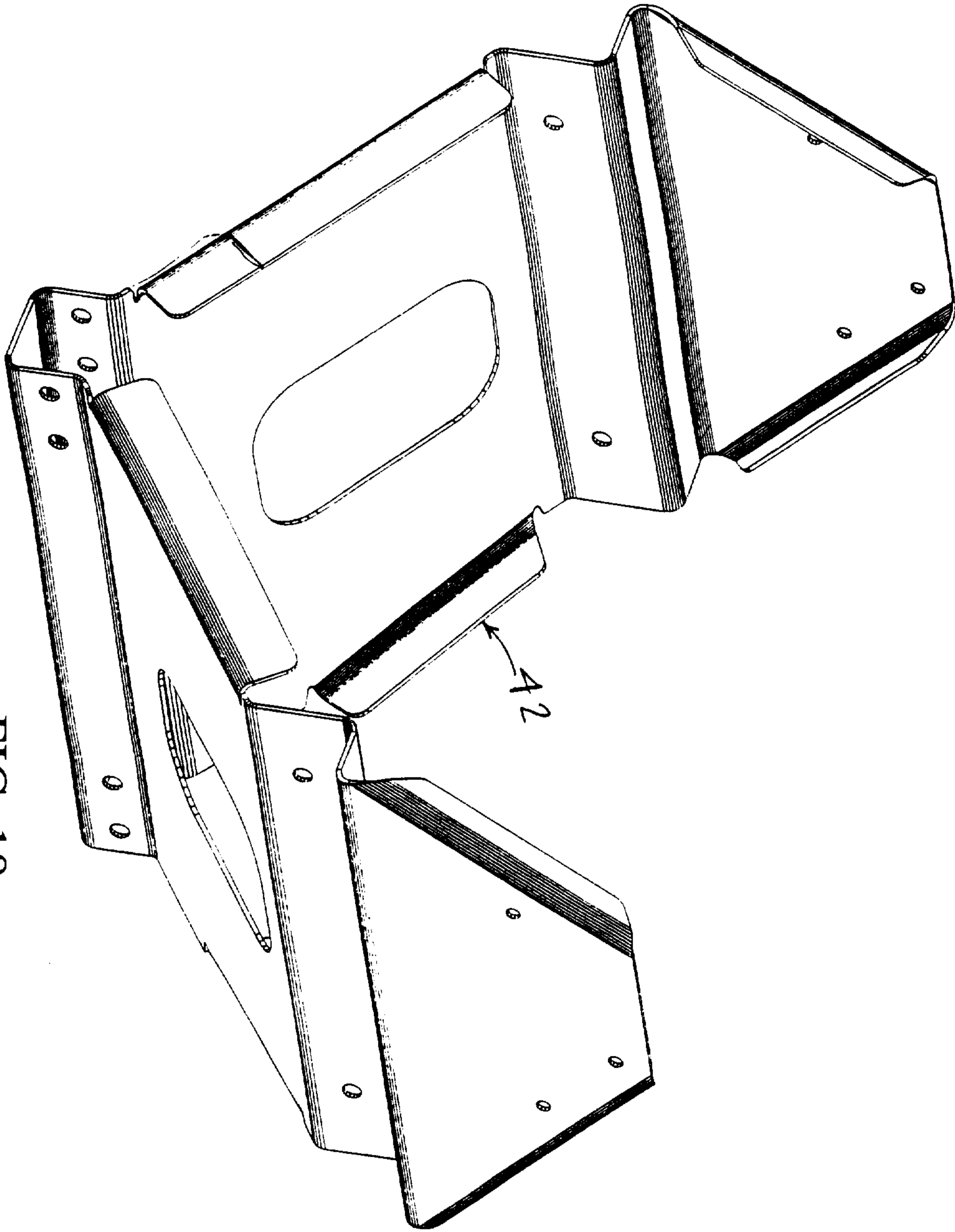


FIG. 18

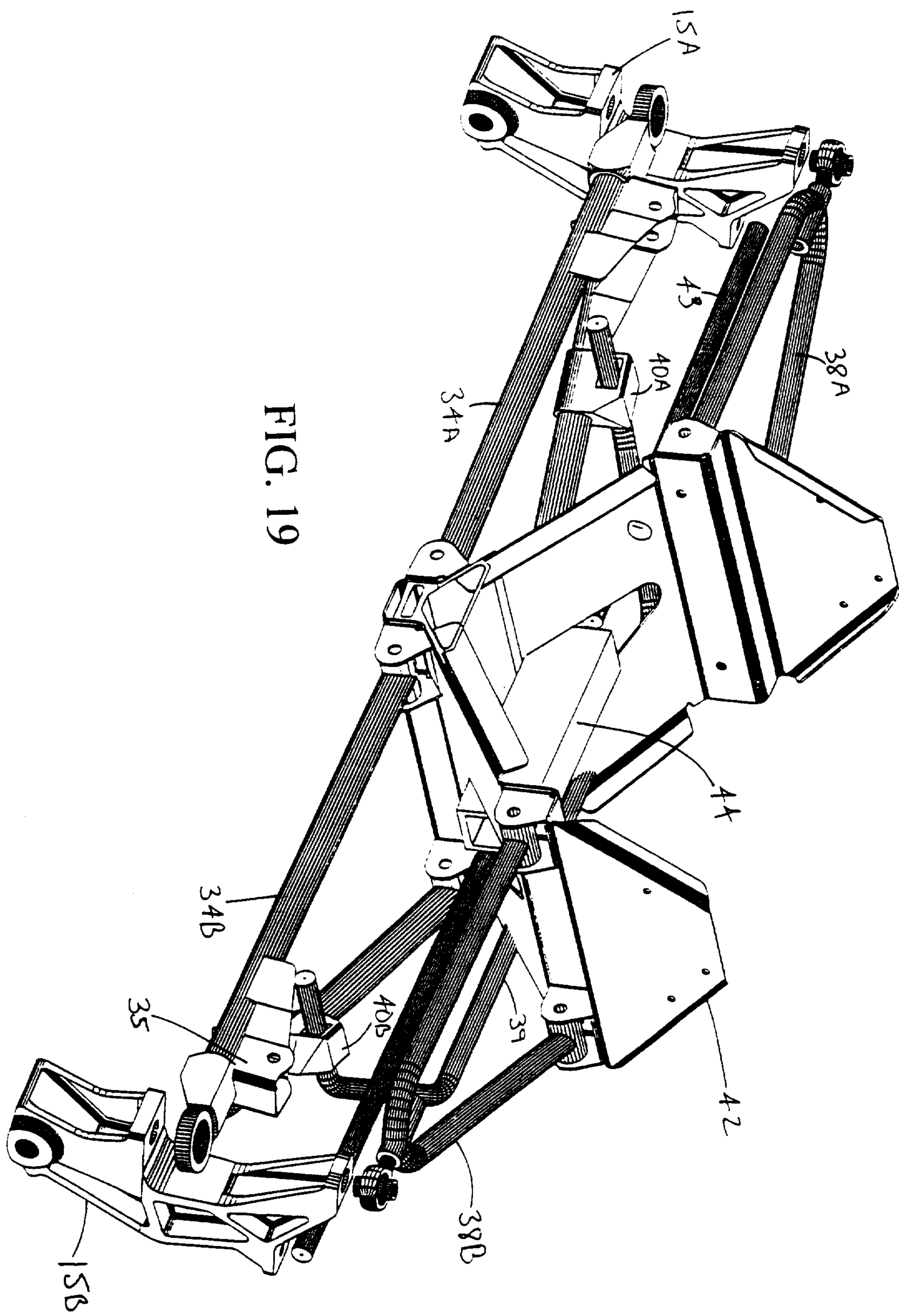


FIG. 19

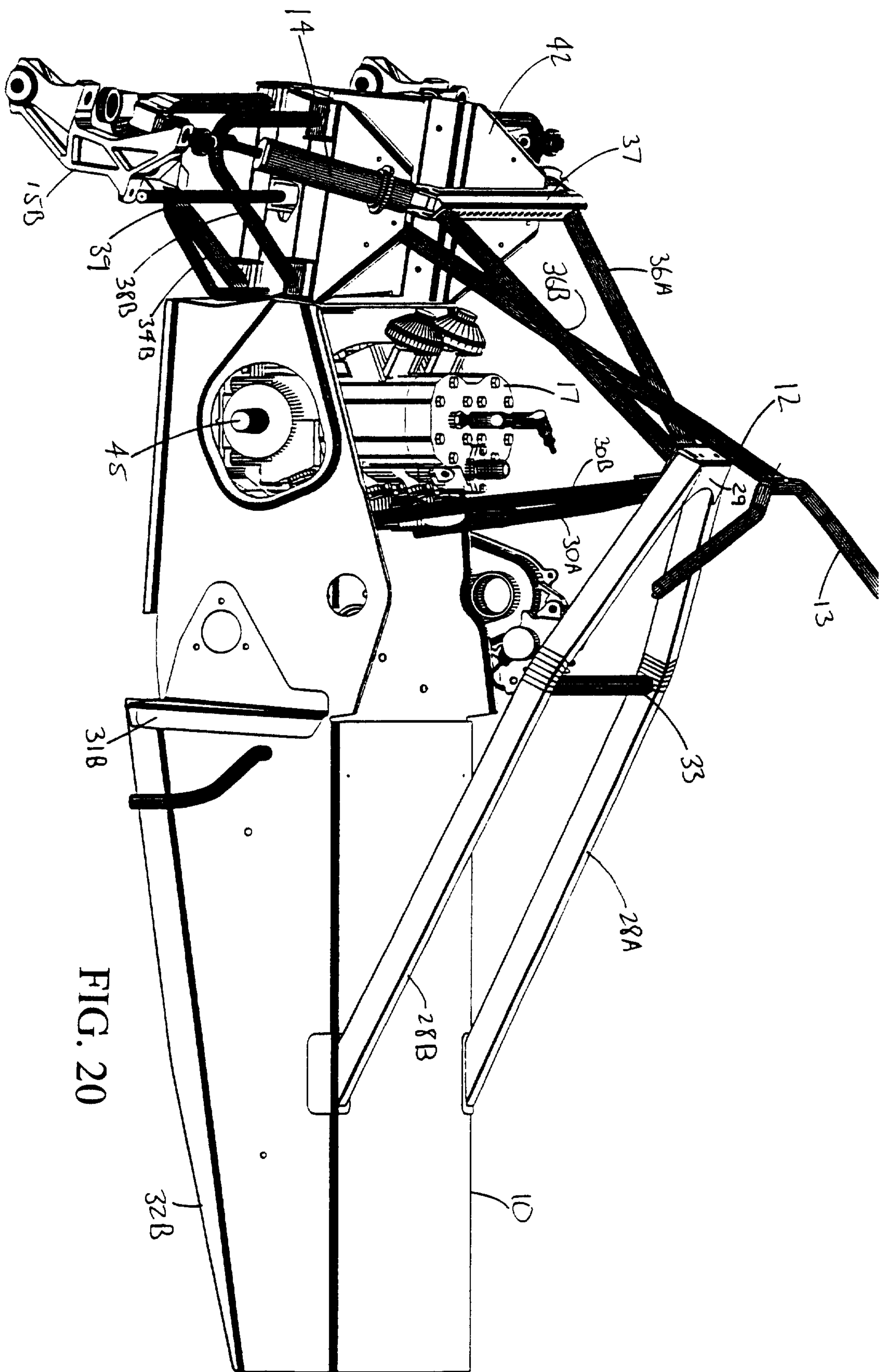


FIG. 20

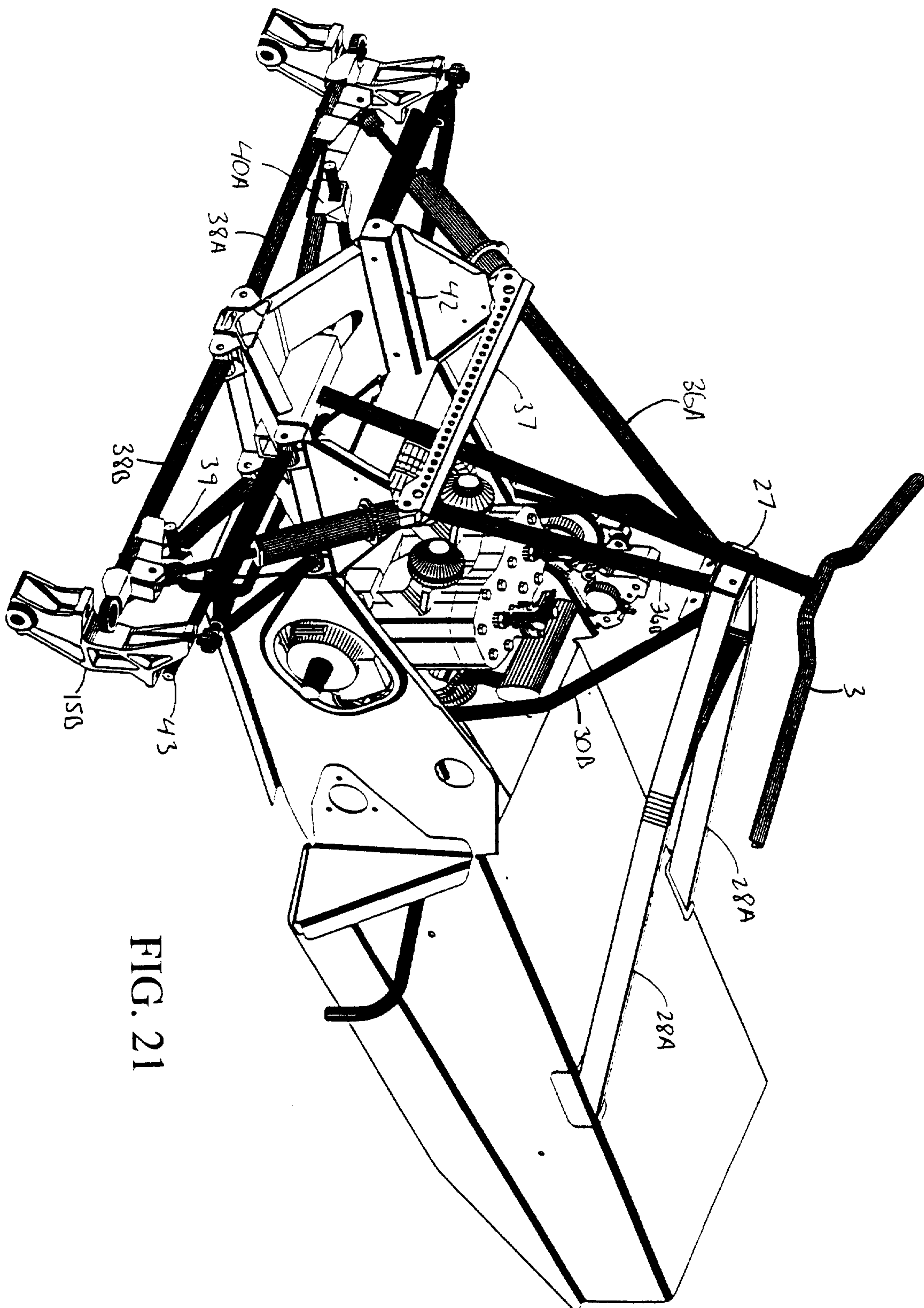


FIG. 21

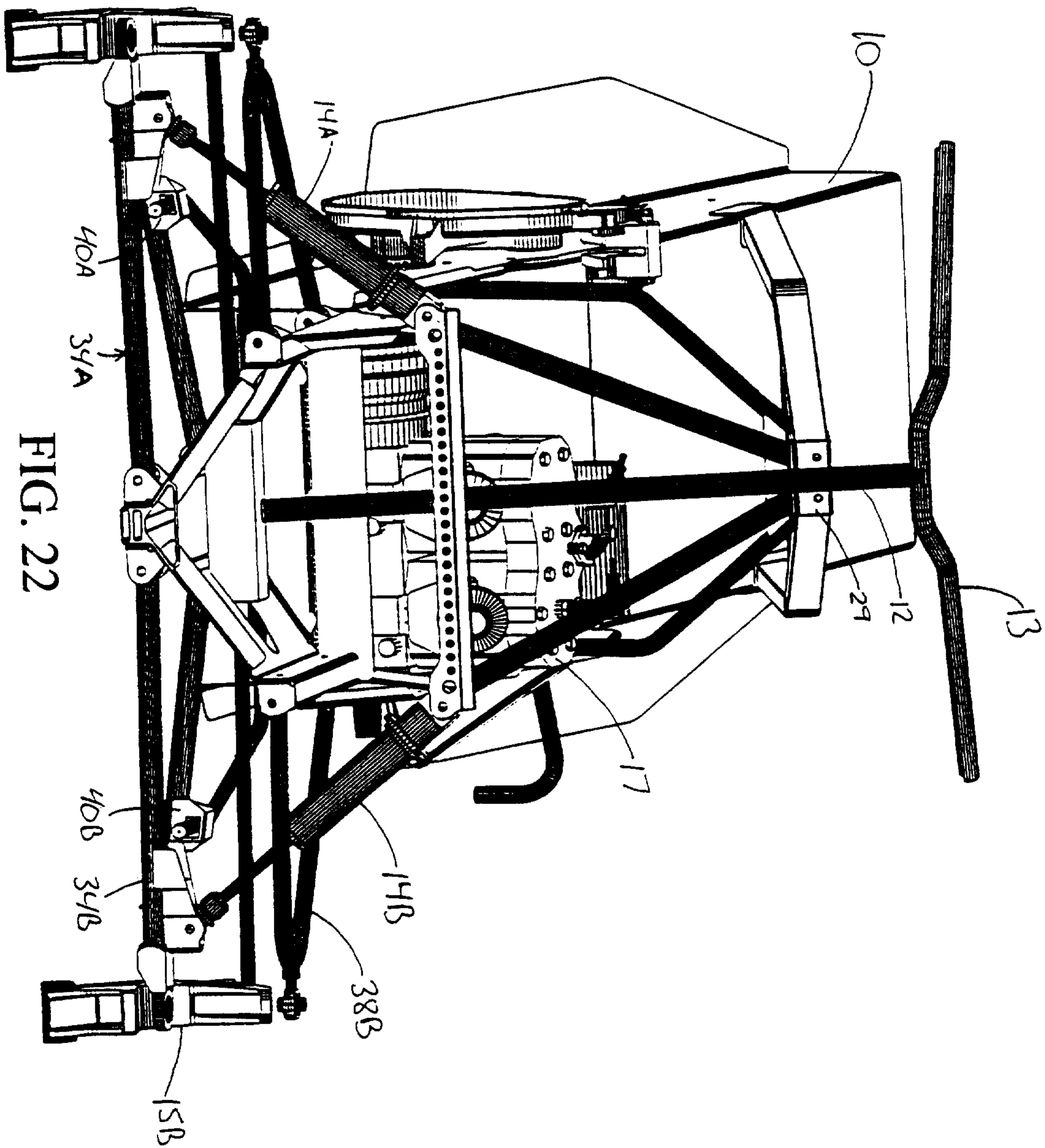


FIG. 22

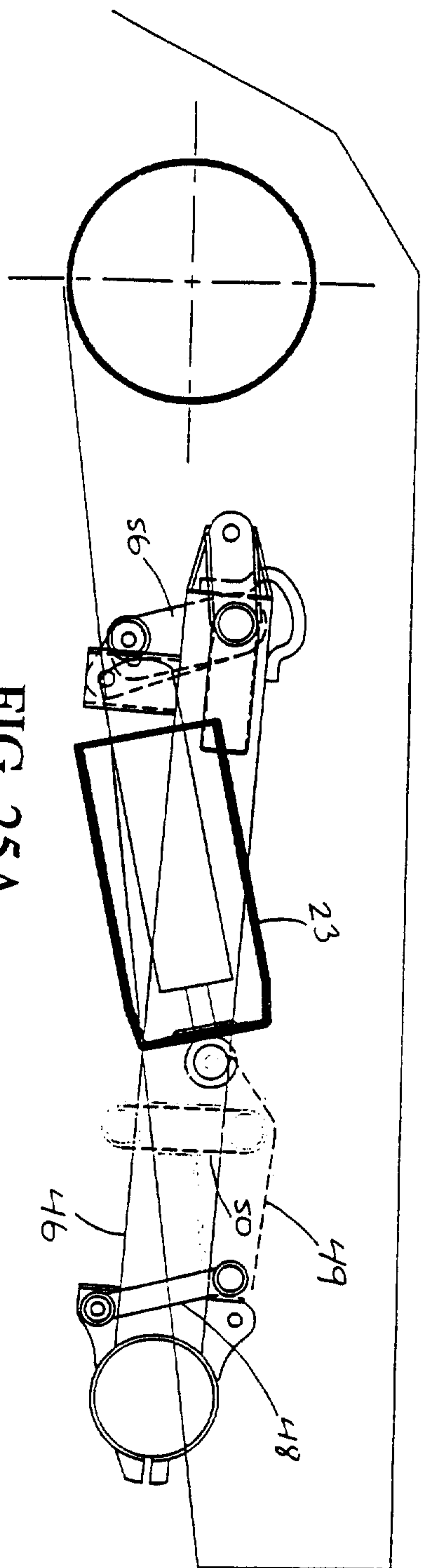


FIG. 25A

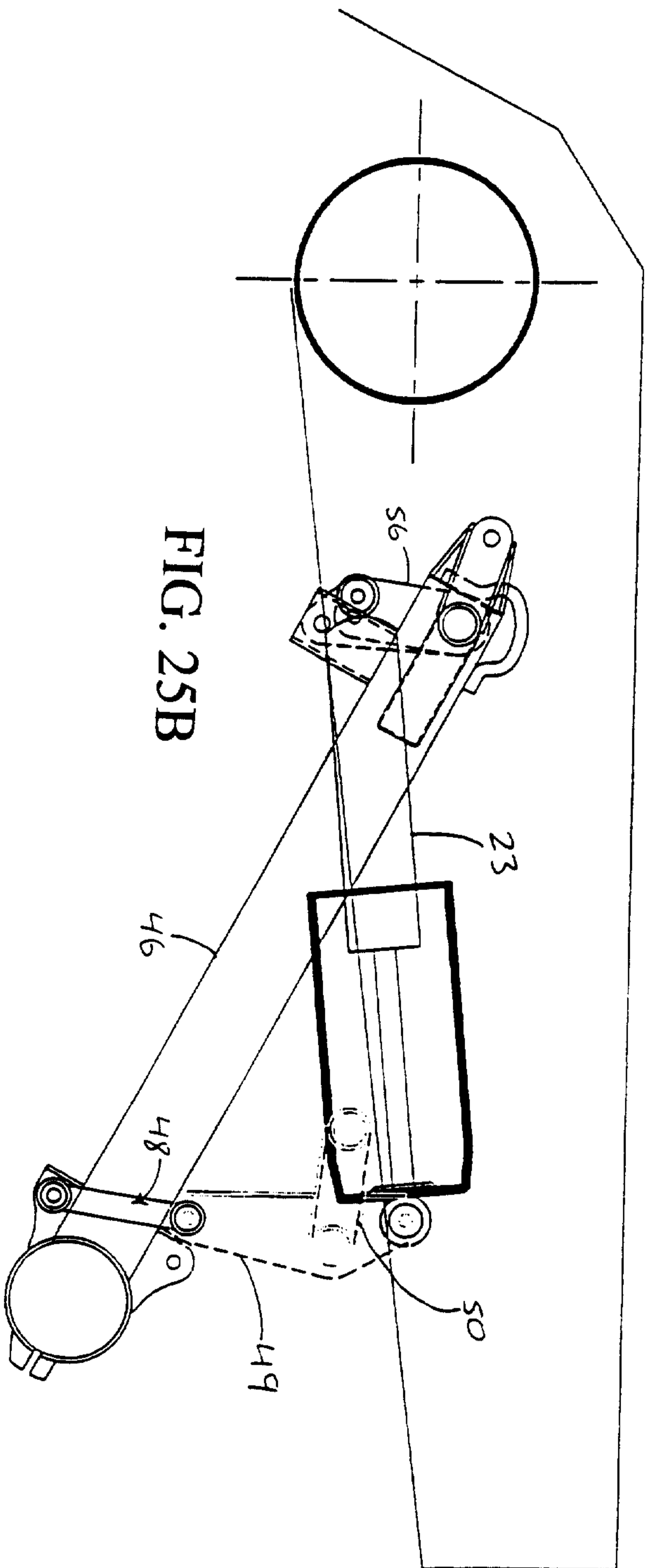
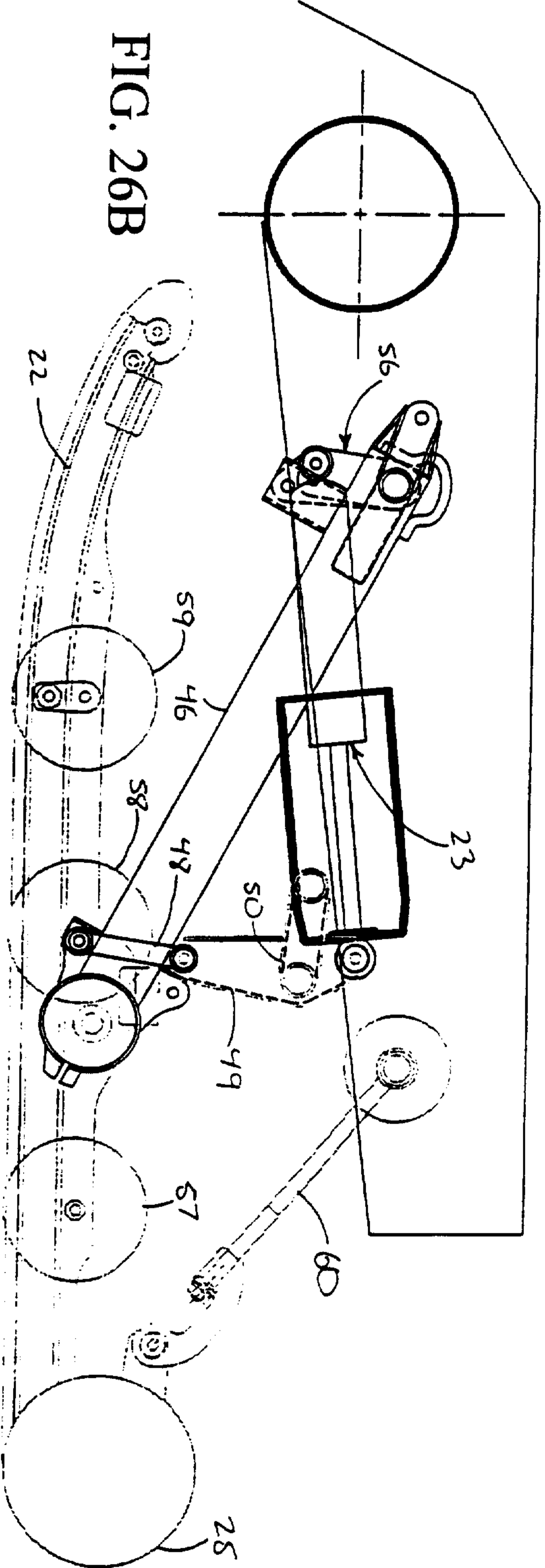
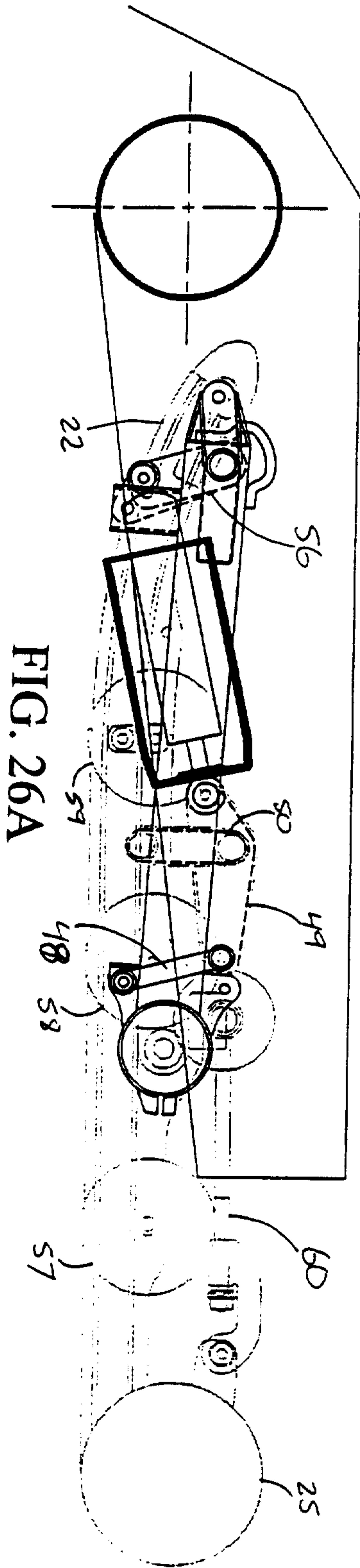


FIG. 25B



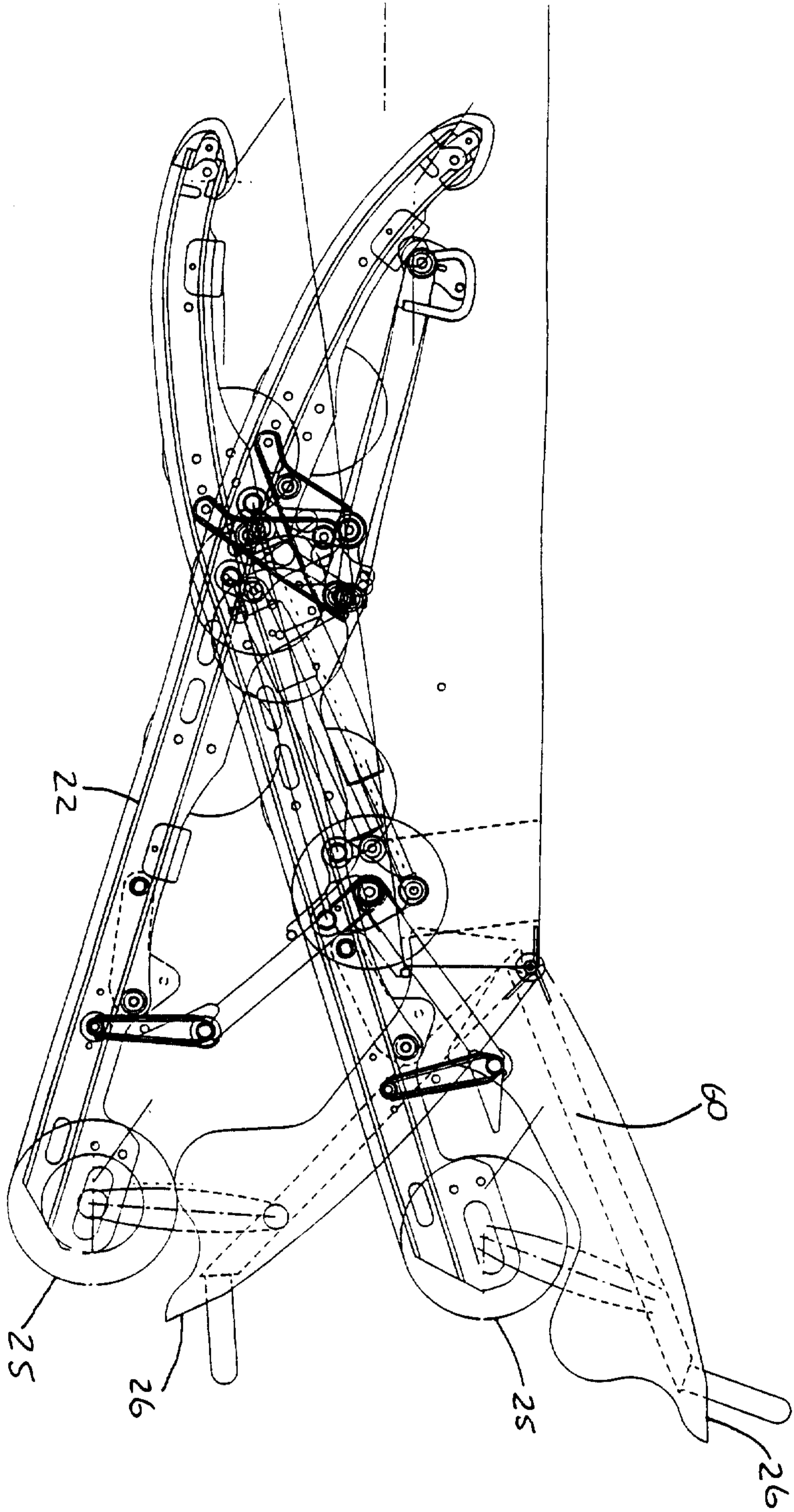


FIG. 27

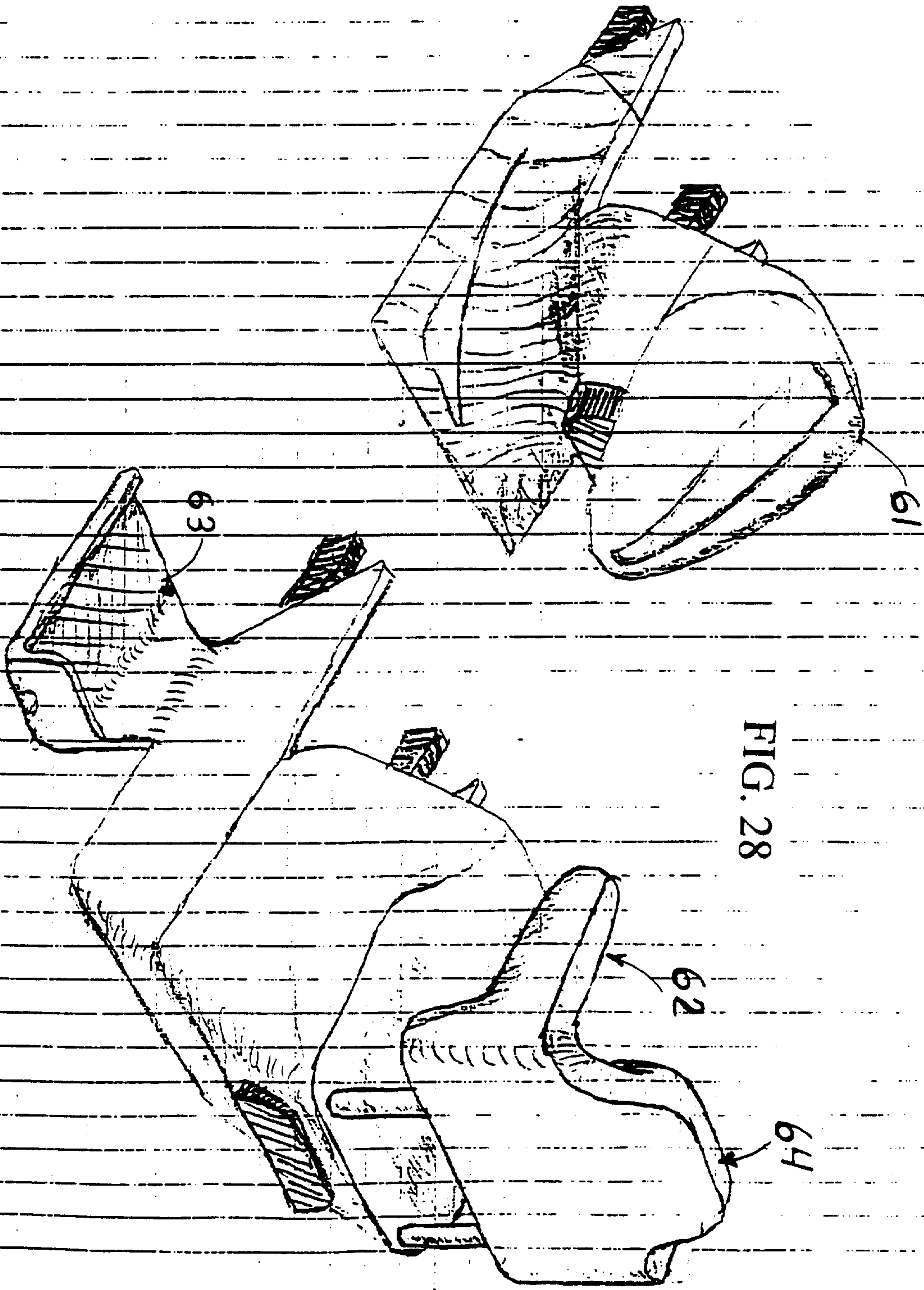


FIG. 28