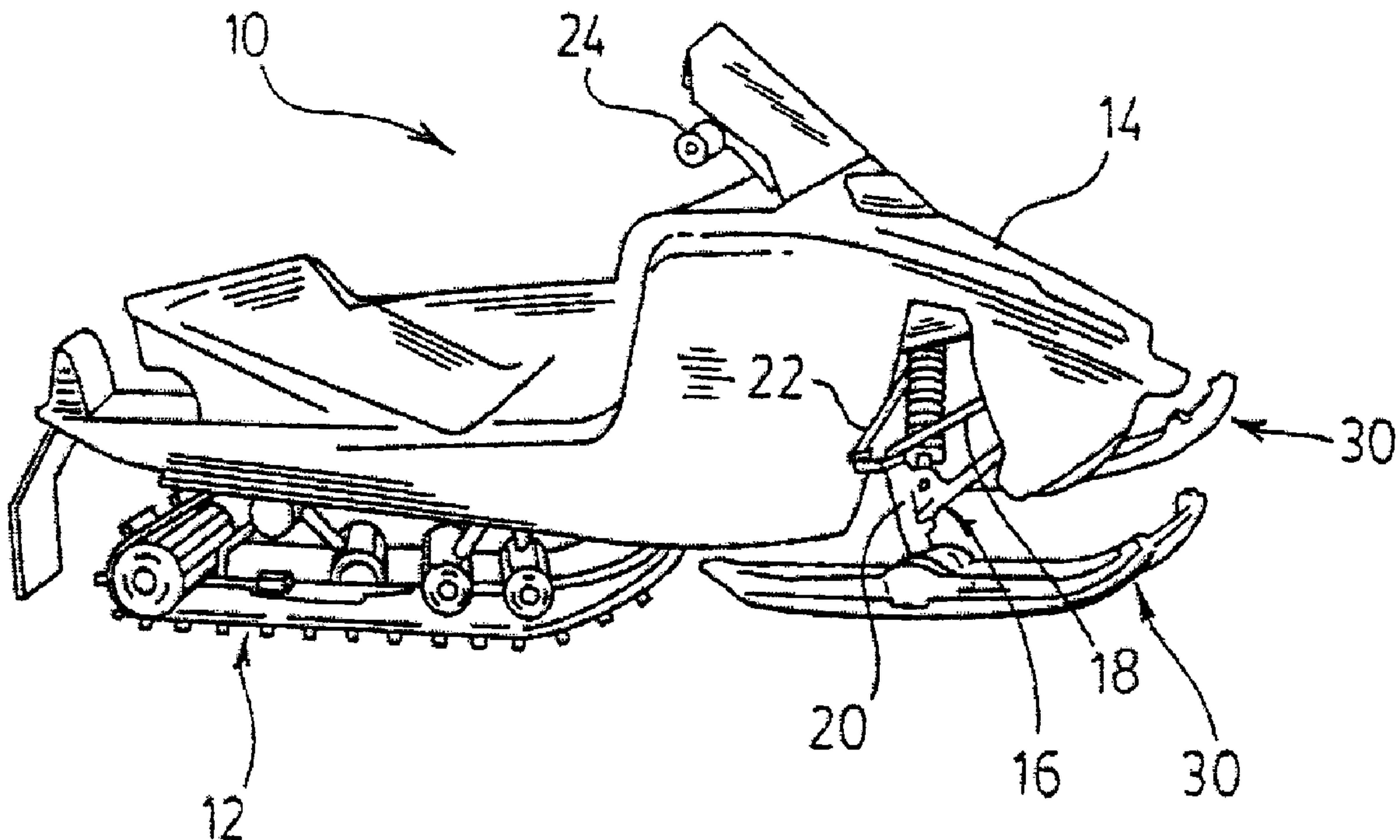




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(54) Titre : ENSEMBLE A SKI DE MOTONEIGE  
 (54) Title: SNOWMOBILE SKI ASSEMBLY



(57) Abrégé/Abstract:

A snowmobile ski comprises a body having a pair of rails laterally spaced from one another and interconnected at a tip. A mounting on the body secures the ski to a snowmobile.

1 ABSTRACT

2 A snowmobile ski comprises a body having a pair of rails laterally spaced from one another and  
3 interconnected at a tip. A mounting on the body secures the ski to a snowmobile.

## 1 SNOWMOBILE SKI ASSEMBLY

2

## 3 FIELD OF THE INVENTION

4 **[0001]** The present invention relates to snowmobiles in particular to skis for such  
5 snowmobiles.

6

## 7 DESCRIPTION OF THE PRIOR ART

8 **[0002]** The snowmobile is a well known class of machine and is used for transportation over  
9 snow. The snowmobiles typically have a belt to provide traction over the snow at the rear of the  
10 machine and a pair of ski's at the front of the machine. The ski's are steerable so that the  
11 operator can steer the snowmobile around the desired course.

12 **[0003]** Snowmobiles are used in a variety of conditions from ice to fresh snow. As the  
13 design of snowmobile has evolved, the skis have themselves become more sophisticated to  
14 match the higher performance expectations of the snowmobile. Initially, a single runner was  
15 utilized on the underside of the ski to improve lateral traction. However, it was found that a  
16 single runner tended to follow the track left by other machines, causing the snowmobile to  
17 "dart." A further development used a pair of parallel runners on the underside of the ski. Whilst  
18 this mitigates the darting, in certain conditions notably in powder snow, the skis are prone to  
19 floating which results in a loss of lateral traction and a resultant loss of steering. This is in part  
20 due to the tunnel structure used on the underside of the ski's with the parallel runners. In soft  
21 snow, the body of the ski may inhibit the runners from contacting the more solid snow and  
22 thereby limit the lateral resistance to that offered by the soft snow.

23 **[0004]** It is therefore an object of the present invention to provide a ski for a snowmobile in  
24 which the above disadvantages are obviated or mitigated.

25

## 26 SUMMARY OF THE INVENTION

27 **[0005]** In general terms, the present invention provides a snowmobile ski having a bifurcated  
28 body. The body is formed from a pair of laterally spaced rails which are interconnected at the tip  
29 into a unitary construction. Each of the rails has a runner on the underside. In use, the lateral

1 spacing between the rails permits the snow to pass between the rails and thereby inhibit  
2 excessive floating in soft or powder snow conditions.

3 [0006] Preferably, the ski is supported upon on a spindle whose lower portion is bifurcated to  
4 provide passage of the snow past the spindle.

5 [0007] As a further preference, the ski includes a stabilizer bar extending from the tip to a  
6 portion of each of the ski's forward of the spindle. The distal end of the stabilizer bar is  
7 bifurcated to facilitate the passage of snow past the stabilizer bar.

8

### 9 BRIEF DESCRIPTION OF THE DRAWINGS

10 [0008] An embodiment of the invention will now be described by way of example only with  
11 reference to the accompanying drawings in which:

12 [0009] Figure 1 is a side view of a snowmobile.

13 [0010] Figure 2 is an exploded perspective view of a ski assembly.

14 [0011] Figure 3 is a view from the underside of the ski assembly shown in Figure 2.

15 [0012] Figure 4 is a view on the line IV-IV of Figure 3.

16 [0013] Figure 5 is a view on the line V-V of Figure 3.

17 [0014] Figure 6 is a section of a portion of a spindle shown in Figure 2.

18 [0015] Figure 7 is a perspective view of a wheel assembly used with the ski assembly of  
19 Figure 2.

20

### 21 DETAILED DESCRIPTION OF THE INVENTION

22 [0016] Referring therefore to the drawings, a snowmobile generally indicated 10 includes a  
23 traction drive 12 supporting a superstructure 14. The forward portion of the superstructure 14 is  
24 supported on a suspension assembly 16 that includes suspension arm 18 connected to a spindle  
25 20. The spindle 20 is rotatable about a vertical axis relative to the suspension arm 18 and is  
26 connected through a steering link 22 to an operator control 24. The lower end of the spindle 20  
27 is connected to a ski assembly 30 shown in greater detail in Figures 2 through 5.

1 [0017] It will be appreciated that the ski assembly 30 is similar on each side of the  
2 snowmobile except as to hand, and therefore only one such ski assembly will be described in  
3 detail. The overall dimensions of the skis will vary from machine to machine but will generally  
4 be similar to those found on conventional higher performance snowmobiles and constructed from  
5 similar materials.

6 [0018] Referring therefore to Figure 2, the ski assembly 30 includes a ski 32 typically  
7 moulded from a plastics material. The ski 32 has a body 33 formed, a pair of rails 34, 36 that are  
8 laterally spaced from one another over substantially the entire length of the ski body 33. The  
9 rails 34, 36 are connected at the tip 38 to provide a unitary construction.

10 [0019] As shown in Figure 4, each of the rails 34, 36 has a under surface 40, 42 respectively  
11 that is formed with a concave cylindrical recess 44. The recess 44 is dimensioned to receive a  
12 steel runner 46 that is secured in the recess 44 by a bolt (not shown) extending through the body  
13 of the rail. The runner 46 has longitudinal slots 48 formed in its lower surface to receive a  
14 carbide insert 50. The carbide insert 50 provides a wear resistant insert to the runner 46.

15 [0020] As can best be seen in Figure 5, the runner 46 extends partially along the under  
16 surface 40, 42 of each of the rails 34, 36. The rails 34, 36 are formed with an aperture 52 which  
17 permits the runner 46 to pass through the rail from the lower surface to the upper surface. The  
18 runner 46 extends toward and across the tip 38 of the ski 32, as shown in dotted lines in Figure 3,  
19 so as to form a continuous runner along each of the rails 34, 36. The continuous runner enhances  
20 the strength for high performance.

21 [0021] As best seen in Figure 2, a stabilizer bar 54 is secured to the tip 38 through a  
22 universal joint assembly 56 and extends rearwardly for attachment to the ski. The stabilizer bar  
23 54 is bifurcated so as to provide a pair of arms 58, 60 that progressively diverge in a rearward  
24 direction. The distal end of each of the arms 58, 60 is formed with a bushing 62 that receives a  
25 connecting bolt 64. The bushing 62 may be elastomeric or steel bushings depending upon the  
26 application and the bolts 64 are received in holes 66 formed in an upstanding flange 70 formed  
27 on the upper surface of each of the rails 34, 36. The flange 70 extends from the tip 38 along the  
28 rails 34, 36 and includes a socket 72 to receive the spindle 20 and provide a mounting point for  
29 the ski body 33. The socket 72 has a pair of laterally spaced walls 74, 76 with reinforced holes  
30 78 integrally formed with the walls 74, 76.

1 [0022] The spindle 20 is bifurcated at its lower end to provide a pair of legs 80, 82 that are  
2 received in respective ones of the sockets 72 between the walls 74, 76. The legs 80, 82 have  
3 lateral bores 84 for alignment with the reinforced holes 78 to receive connecting bolts 86. The  
4 spindle 20 is connected to the suspension arms through mounting holes 90 in conventional  
5 manner.

6 [0023] As can best be seen in Figure 6, legs 80, 82 on spindle 20 terminate in a bore 92 that  
7 is asymmetric in cross section. As shown, the bore 92 is part cylindrical with a flat on one side  
8 to provide a D shaped cross section. A hole 94 extends through the walls of the bore 92. A  
9 wheel assembly indicated 100 in Figure 7 includes a wheel 102 supported on spindle 104 at the  
10 lower end of a vertical leg 106. The vertical leg 106 is dimensioned at its upper end to be  
11 received in the bore 92. A hole 110 extends through the leg 106 for alignment with the hole 94  
12 in the legs 80, 82 so that a securing pin 112 may hold the wheel 100 in situ such that the axle is  
13 perpendicular to the length of the ski. Vertical leg 106 has shoulders (not shown) mating with  
14 the spindle to support the weight of the machine on the ground, thereby decreasing stress on  
15 securing pin 112.

16 [0024] In use on snow, the laterally spaced ski rails 34, 36 provides support for the runner  
17 46. Flotation of the ski body 32 is inhibited by permitting the snow to pass between the ski rails  
18 34, 36 and thereby allow the runner 46 to descend through soft snow to a firmer stratum of  
19 packed snow. The bifurcation of the stabilizer bar 56 and the spindle 20 provides a clear passage  
20 for the snow through the ski assembly 32 to minimize build up of snow and drag.

21 [0025] The spindle 20 secures the two ski rails 34, 36 to one another whilst permitting  
22 limited independent flexure as the ski assembly passes over the snow. The runner 46 contributes  
23 to the torsional resilience and bending strength of the ski whilst providing an enhanced contact  
24 with the firm or packed snow. A continuous runner is preferred for improved performance but it  
25 will be appreciated that a pair of runners may be used, one on each rail 34, 36, for less arduous  
26 conditions.

27 [0026] If it is necessary to transport the snowmobile over open ground, the wheel assembly  
28 100 may be inserted between the rails 34, 36 and secured in the bore 92. The locking pin may  
29 then be inserted through the holes 94 and 110 to lock the wheels in position below the ski  
30 assembly. In this manner, the under side of the skis are elevated from the ground allowing the

- 1 machine to be rolled along the ground without damage to the skis. The D shaped cross section
- 2 inhibits rotation of the wheel about a vertical axis with the weight transferred along the spindle
- 3 20 so as not to load the locking pin 112.

1 CLAIMS

2

3 1. A spindle to connect a snowmobile ski to a snowmobile, said spindle having a body with a  
4 pair of laterally spaced legs for connection to said ski.

5

6 2. A spindle according to claim 1 wherein each of said legs are bored to receive a pin for  
7 pivotally connecting said spindle to said ski.

8

9 3. A spindle according to claim 1 or claim 2 wherein said spindle includes a bore in said body  
10 between said legs.

11

12 4. A spindle according to claim 3 wherein said bore is asymmetric.

13

14 5. A snowmobile ski comprising a body having a pair of rails laterally spaced from one another  
15 and interconnected at a tip, and a mounting on said body to secure said ski to a snowmobile.

16

17 6. A snowmobile ski assembly comprising a body having a pair of rails laterally spaced from one  
18 another and interconnected at a tip, a mounting on said body and a spindle connected to said  
19 mounting to secure said ski assembly to a snowmobile.

20

21 7. A runner for placement on a snowmobile ski having a pair of rails laterally spaced from one  
22 another and interconnected at a tip, said runner comprising a body adapted to extend along one  
23 of said rails, across said interconnected tip, and along the other of said rails, said body having at  
24 least one longitudinal slot formed on a lower surface of said body to receive a hardened insert.

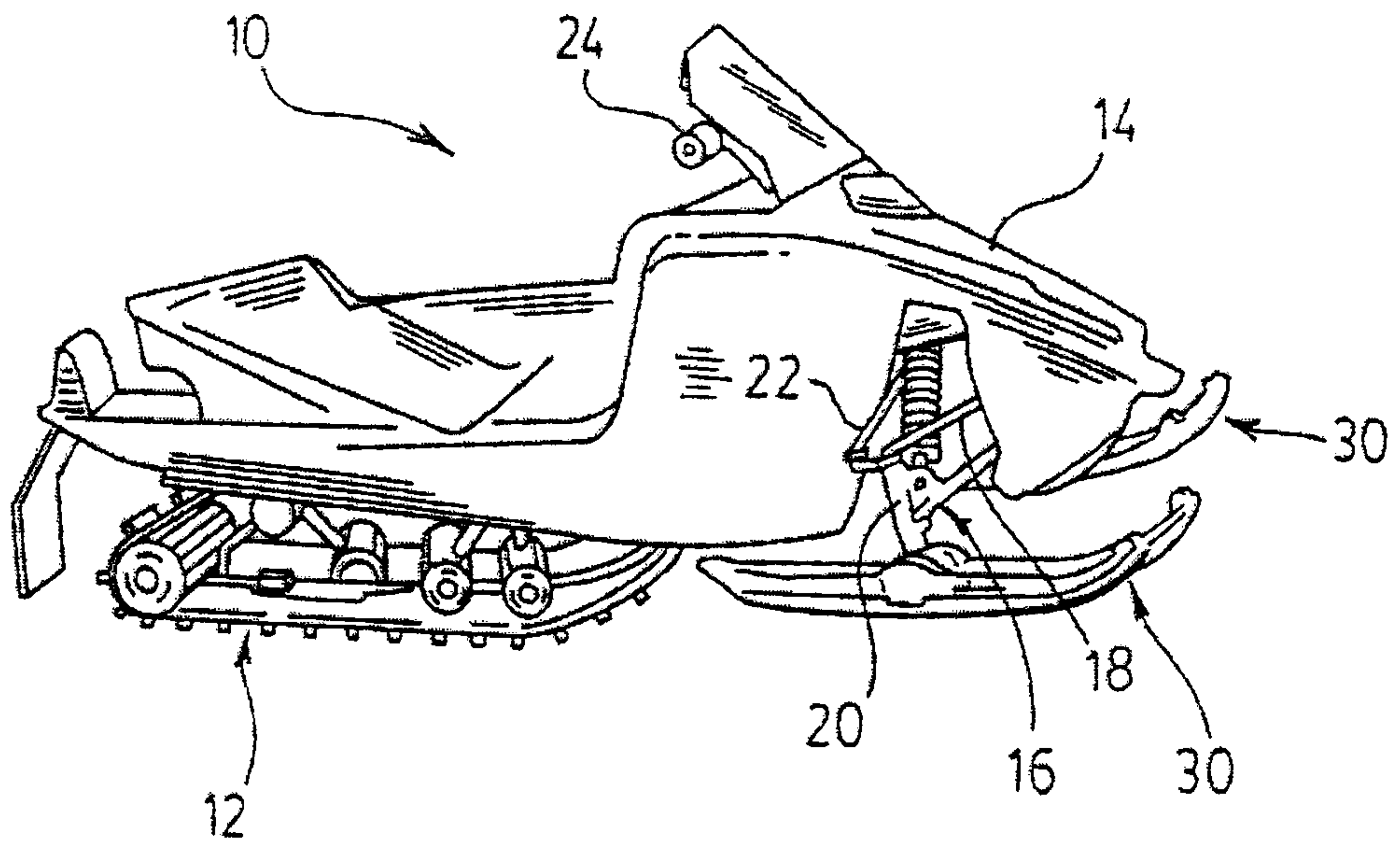


FIG. 1.

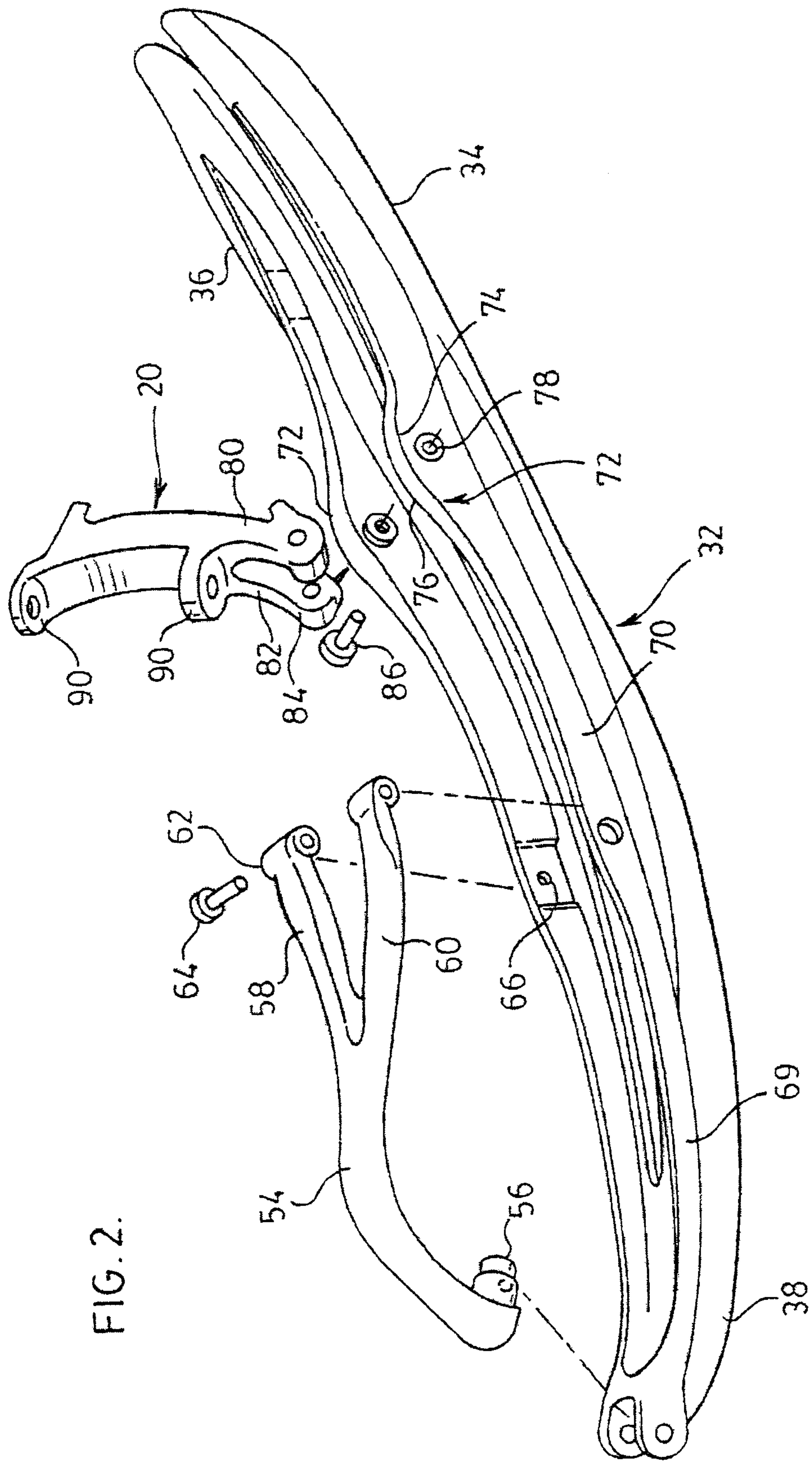


FIG. 2.

FIG. 3.

