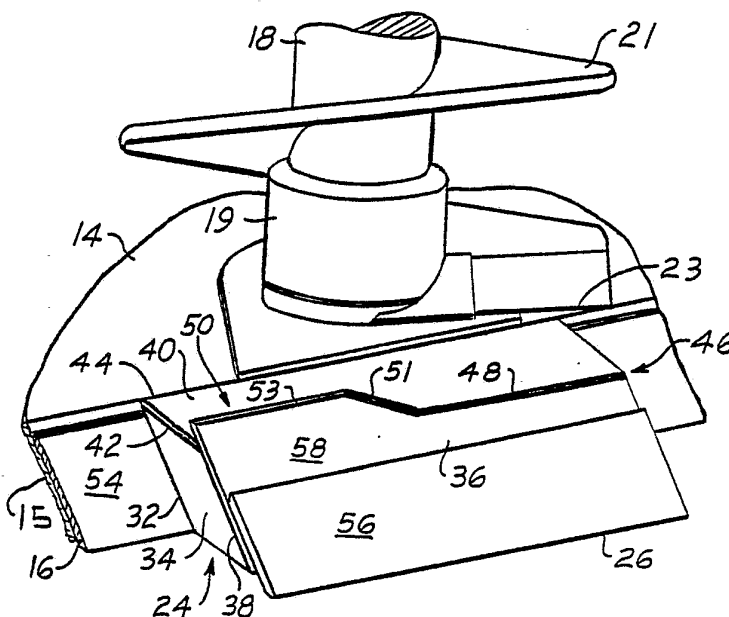


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(54) Title: MATERIAL DIRECTING DEVICE FOR AN AUGER SCRAPER



(57) Abstract

A scraper (10) has a bowl (12) and a floor (14) and is constructed to receive an auger (18). Material moving up the cutting edge (16) and pushing against a diverter requires greater force to load the scraper. Apparatus (24) having a substantially smooth inclined surfaces are provided for moving material into the bowl (12) past a compaction zone (52) onto the spiral flight (21) of an auger (18) and also block incoming material from the compaction zone (52) and lodging between the leading edge (23) of the auger (18) and the bowl floor (14).

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DescriptionMaterial Directing Device for an Auger Scraper

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Technical Field

This invention relates generally to an auger scraper and more particularly to a device for maintaining the auger free of rocks, debris and the like which could restrict the rotation of the auger.

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Background Art

Scrapers are used to load and transport large volumes of earth or other material. A scraper typically has a cutting edge for cutting through the material and a bowl for holding and transporting the cut material. To effectively utilize the loading of the scraper, an auger is provided to lift and distribute the material as it enters the bowl. Such auger scrapers are disclosed in U.S. Patent No. 3,857,190 which issued on December 31, 1974 to James E. Gee and Robert N. Stedman and in U.S. Patent No. 4,167,825 which issued on September 18, 1979 to James E. Gee, Edward J. Ohms and Craig W. Riediger.

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In U.S. Patent No. 3,857,190 the leading edge of the auger is positioned close to the bowl floor to reduce the possibility of material being lodged between the auger and floor. However, the leading edge of the auger extends outwardly over the bowl cutting edge. As the auger rotates, material such as large rocks and other debris is met by the leading edge and is sometimes trapped in a compaction zone between the leading edge and the bowl floor. The leading edge pushes the material and traps it in the compaction zone

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which sometimes damages the leading edge or stops the rotation of the auger. The trapped material has to be removed before the loading can continue.

5 It is therefore desirable to have an auger scraper which diverts cut material away from the compaction zone which exists between the floor and auger and which prevents material from lodging between the leading edge of the auger and bowl floor without interfering with the effectiveness of the auger.

10 In U.S. Patent No. 4,167,825 an apparatus is disclosed for diverting incoming material and preventing the lodging of material between the auger and the bowl floor during rotational movement of the auger relative to the bowl floor. This diverter,
15 however, requires incoming material to change direction when contacting the diverter which provides some resistance to the flow of material up the cutting edge into the scraper bowl. On higher horsepower auger scrapers, where there is sufficient power to overcome
20 the resistance that may occur as the material moves up the cutting edge, the diverter has functioned well. But in lower horsepower auger scrapers, it would be preferred to eliminate this resistance.

Accordingly, what is needed is a device which
25 will minimize the resistance to material flow and direct the material up a substantially uniform inclined path past the compaction zone and onto the auger for distribution into the bowl.

The present invention is directed to
30 overcoming the problems as set forth above.

Disclosure of the Invention

In one aspect of the invention, a material directing device for an auger scraper is provided. The
35 scraper includes a material receiving bowl providing a

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floor terminating at a forward end of the bowl with a screw auger rotatably mounted in substantially vertically disposed or upstanding relation within the bowl. The auger has a spiral flight providing a lower leading edge located in closely spaced relation to the bowl floor and in overhanging relation to the forward end of the bowl defining a material compaction zone between the lower leading edge of the auger and the bowl floor as the leading edge sweeps along the forward end of the bowl and rearwardly into the bowl. The material directing device includes a cutting edge and a structure for mounting the cutting edge in a forwardly spaced longitudinally aligned relation to the auger. The structure includes a guide apparatus for directing material uniformly upwardly past the compaction zone and onto the flight of the auger above the lower leading edge.

Brief Description of the Drawing

Fig. 1 is a diagrammatic top view of a portion of an auger scraper illustrating the present invention; Fig. 2 is a partial sectional view taken along line II-II of Fig. 1, and Fig. 3 is an isometric view of the present invention.

Best Mode for Carrying out the Invention

Referring to the drawings, an earthmoving scraper 10 has a material receiving bowl 12 with a floor 14, a cutting edge support 15, and a main cutting edge 16. The scraper 10 is constructed for receiving an auger 18 in a bearing 19 mounted on the floor 14 and in an upper support structure (not shown) mounted to the bowl 12. A motor (not shown) normally rotates the auger 18 about a substantially vertical axis 20. The

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auger 18 has a continuous spiral flight 21 having an outer periphery 22. The spiral flight 21 has a leading edge 23.

5 A mounting structure 24 for locating an auxiliary cutting edge 26 forward of the main cutting edge 16 is provided. A rear plate 28 of the mounting structure 24 has a plurality of holes 29 for receiving a plurality of bolts, one of which is indicated by the reference numeral 30. The rear plate 28 is bolted to
10 the cutting edge support 15. A first edge 32 of a gusset 34 is welded to the plate 28. A front plate 36 is welded to a second edge 38 of the gusset 34. An upper plate 40 is welded between the rear plate 28 and the front plate 36, and also welded to an end 42 of the
15 gusset. The upper plate 40 has a rearward edge 44 which abuts the bowl floor and a transversely extended forward edge 45 spaced below the leading edge 23 of the auger 18. The front plate 36 has a profiled upper border 46 including a first edge 48 that is coextensive
20 with and on the same horizontal elevation as the bowl floor 14 and the upper plate 40. A guide apparatus or flange 50 defines an upwardly inclined transition edge or second edge 51 and a top horizontally extending edge or third edge 53 to provide the remainder of the
25 profiled border. In the instant embodiment the guide flange extends integrally upwardly from the front plate 36 and rearwardly past the forward edge 45 of the upper plate 40 in material blocking relation to a compaction zone 52 between the leading edge 23 of the auger 18 and
30 the bowl floor 14. The cutting edges 16, 26 and front plate 36 have respective inclined surfaces 54, 56 and 58 which are parallel.

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Industrial Applicability

In operation as the scraper 10 is propelled forward, the cutting edge 16 and auxiliary cutting edge 26 cut the material. The cut material travels up the cutting edges 16,26 toward the scraper bowl. The forward motion of the auxiliary cutting edge 26 directs material upwardly and rearwardly onto the spiral flight 21 of the auger 18 to be lifted and deposited into the scraper bowl 12. Cut material moving up the surface 54 of the cutting edge 16 is free to pass on either side of the auger 18 into the scraper bowl 12.

As the auger 18 rotates and the leading edge 23 sweeps through an arc toward profiled border 46 any large material, such as rocks, which could damage the auger 18, are pushed forward and out of the way to prevent the material from lodging between the leading edge 23 and the bowl floor 14. As the leading edge 23 sweeps across profiled border 46, the guide flange 50 of the plate 36 blocks the large material from the compaction zone and lodging between the leading edge 23 of the auger 18 and the bowl floor 14.

Thus, the present invention has less resistance to material flow by moving material up a substantially uniform surface into the bowl 12.

The present invention also moves incoming material past the compaction zone 52 onto the spiral flight 21 of the auger 18, and also blocks large material from the compaction zone 52, to prevent material from lodging between the leading edge 23 of the auger 18 and the bowl floor 14.

Other aspects, objects and advantages can be obtained from a study of the disclosure, drawing and appended claims.

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Claims

1. A material directing device for an auger scraper (10) including a bowl (12) having a floor (14) terminating at a forward end of the bowl with at least one screw auger (18) rotatably mounted in upstanding relation within the bowl (12), said auger (18) having a spiral flight (21) providing a lower leading edge (23) located in closely spaced relation to said bowl floor (14) and in overhanging relation to said forward end of the bowl which defines a material compaction zone (52) between said lower leading edge (23) of the auger (18) and said bowl floor (14) as the leading edge (23) sweeps along the forward end of the bowl and rearwardly into the bowl, the material directing device comprising;
a cutting edge (16); and
means (24) for mounting said cutting edge (16) on the bowl floor (14) in forwardly spaced longitudinally aligned relation to said auger (18) including means (50) for directing material uniformly upwardly past said compaction zone (52) and onto the flight (21) of the auger (18) above said lower leading edge (23).

2. A material directing device for an auger scraper including a bowl (12) providing a floor (14) having an elongated transversely oriented main cutting edge (16) with at least one screw auger (18) rotatably mounted in upstanding relation within the bowl (12), said auger (18) having a spiral flight (21) providing a lower leading edge (23) located in closely spaced relation to said bowl floor (14) and in overhanging relation to said main cutting edge (16) which defines a material compaction zone (52) between said lower

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leading edge (23) of the auger (18) and said bowl floor (14) as the leading edge (23) sweeps along the main cutting edge (16) and rearwardly into the bowl (12), the material directing device comprising;

5 an auxiliary cutting edge (26); and
 means (24) for mounting said auxiliary cutting edge (26) in forwardly spaced longitudinally aligned relation to said auger (18) for directing material uniformly upwardly past said compaction zone (52) and
10 onto the flight (21) of the auger (18) above said lower leading edge (23).

3. The material directing device of claim 2 in which said mounting means (24) locates said
15 auxiliary cutting edge (26) in forwardly spaced relation to said main cutting edge (16).

4. The material directing device of claim 3 in which said mounting means (24) provides an extension
20 (40) of said bowl floor (14) forwardly beneath said flight (21) of the auger (18).

5. The material directing device of claim 4 including material guiding means (50) on said mounting
25 means (24) between said main cutting edge (16) and said auxiliary cutting edge (26) with the guiding means (50) extending above said bowl floor extension (40) in material blocking relation to said compaction zone (52).

30 6. The material directing device of claim 5 wherein said main cutting edge (16) is forwardly and angularly downwardly extended from said bowl floor (14);

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and said mounting means (24) provides a support frame mounted in forwardly extended relation from said main cutting edge (16) supporting said auxiliary cutting edge (26) in forwardly spaced
5 substantially parallel relation to said main cutting edge (16) in an upwardly rearwardly inclined attitude immediately ahead of said auger (18).

7. The material directing device of claim 6
10 in which said support frame (24) has a top plate (40) forming said bowl floor extension which has a transversely extended forward edge (45) spaced below said leading edge (23) of the auger (18).

15 8. The material directing device of claim 7 wherein said support frame (24) includes a front plate (36) supporting said auxiliary cutting edge (26) and has an upper edge (48) coextensive with said forward edge (45) of said top plate (40),

20 and a material guiding flange (50) integrally upwardly extended from said upper edge (48) of the front plate (36) past said forward edge (45) of the top plate (40) in material blocking relation to said compaction zone (52) beneath the auger (18).

25 9. The material directing device of claim 8 in which said upper edge (48) of said front plate (36) coextensive with the forward edge (45) of said top plate (40) is located immediately ahead of the
30 forwardly rotating portion of the auger flights (21), and said guide flange (50) is disposed immediately ahead of said rearwardly rotating portion of the auger flights (21) to preclude ingress of material into said compaction zone (52).

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AMENDED CLAIMS

[received by the International Bureau on 17 June 1985 (17.06.85);
original claims 1, 4 and 7 cancelled; claim 10 added; remaining claims unchanged (3 pages)]

1. (Cancelled)

5 2. A material directing device for an auger
scraper including a bowl (12) providing a floor (14)
having an elongated transversely oriented main cutting
edge (16) with at least one screw auger (18) rotatably
10 said auger (18) having a spiral flight (21) providing a
lower leading edge (23) located in closely spaced
relation to said bowl floor (14) and in overhanging
relation to said main cutting edge (16) which defines a
material compaction zone (52) between said lower
15 leading edge (23) of the auger (18) and said bowl floor
(14) as the leading edge (23) sweeps along the main
cutting edge (16) and rearwardly into the bowl (12),
the material directing device comprising;
 an auxiliary cutting edge (26); and
20 a mounting structure (24) between said
auxiliary cutting edge (26) and said main cutting edge
(16) in forwardly spaced longitudinally aligned
relation to said auger (18) for directing material
uniformly upwardly past said compaction zone (52) and
25 onto the flight (21) of the auger (18) above said lower
leading edge (23).

 3. The material directing device of claim 2
in which said mounting structure (24) provides an
30 extension (40) of said bowl floor (14) and locates said
auxiliary cutting edge (26) in forwardly spaced
relation to said main cutting edge (16).

4. (Cancelled)

5 5. The material directing device of claim 3 including material guiding means (50) on said mounting structure (24) between said main cutting edge (16) and said auxiliary cutting edge (26) and being parallel to said cutting edges (16,26) with the guiding means (50) extending above said bowl floor extension (40) in material blocking relation to said compaction zone (52).

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 6. The material directing device of claim 5 wherein said main cutting edge (16) is forwardly and angularly downwardly extended from said bowl floor (14); and said mounting structure (24) provides a
15 support frame having a top plate (40) and being mounted in forwardly extended relation from said main cutting edge (16) supporting said auxiliary cutting edge (26) in forwardly spaced substantially parallel relation to said main cutting edge (16) in an upwardly rearwardly
20 inclined attitude immediately ahead of and in forwardly spaced relation to said auger (18).

7. (Cancelled)

25 8. The material directing device of claim 6 wherein said support frame (24) includes a front plate (36) supporting said auxiliary cutting edge (26) and has an upper edge (48) coextensive with said forward edge (45) of said top plate (40),

30 and a material guiding flange (50) integrally upwardly extended from said upper edge (48) of the front plate (36) past said forward edge (45) of the top plate (40) in material blocking relation to said compaction zone (52) beneath the auger (18).

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9. The material directing device of claim 8 in which said upper edge (48) of said front plate (36) coextensive with the forward edge (45) of said top plate (40) is located immediately ahead of the forwardly rotating portion of the auger flights (21), and said guide flange (50) is disposed immediately ahead of said rearwardly rotating portion of the auger flights (21) to preclude ingress of material into said compaction zone (52).

10. (New) A material directing device for an auger scraper (10) comprising;

a bowl (12);

a bowl floor (14);

an auger (18), said auger having a continuous spiral flight (21) having a predetermined outer periphery (22);

a main cutting edge (16);

an auxiliary cutting edge (26), said auxiliary cutting edge (26) having a width which is narrower than said outer periphery (22) of the auger (18);

a mounting structure (24) having a bowl floor extension (40); said mounting structure (24) locates said auxiliary cutting edge (26) in forwardly spaced longitudinally aligned relation to said auger (18);

a compaction zone (52); and

a material guiding means (50) for guiding material uniformly upwardly past the compaction zone (52) onto said flight (21) of the auger (18) and extending above the bowl floor (14) extension (40) in material blocking relation.

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FIG. 1

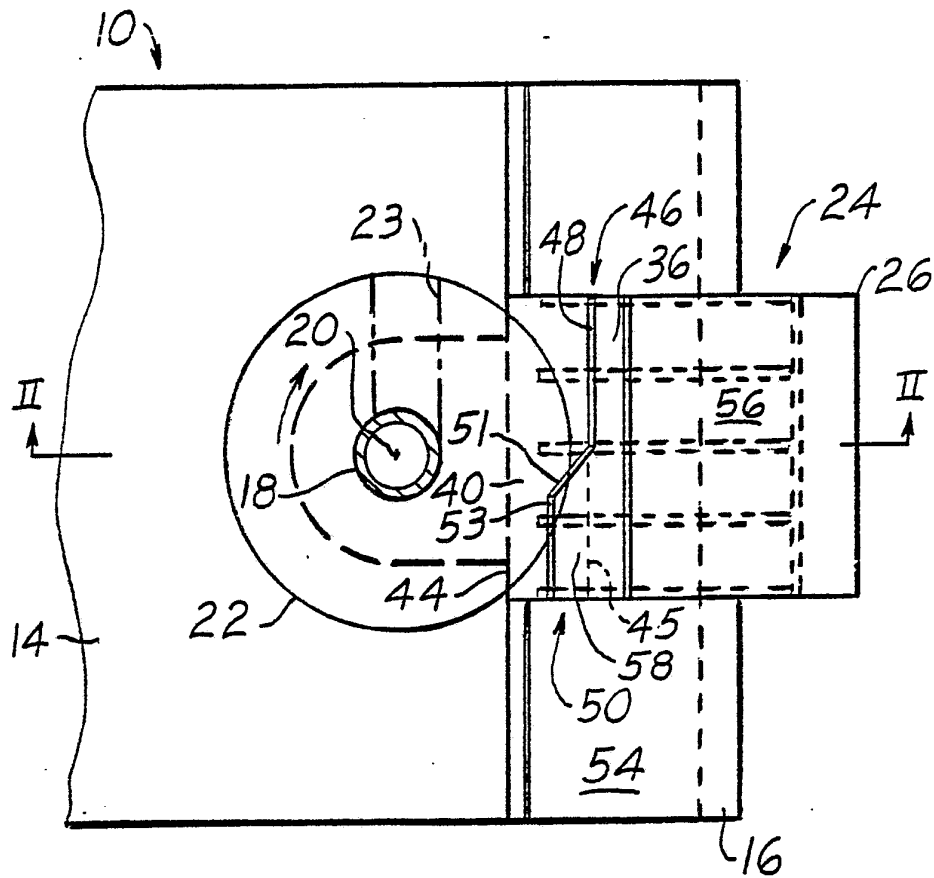
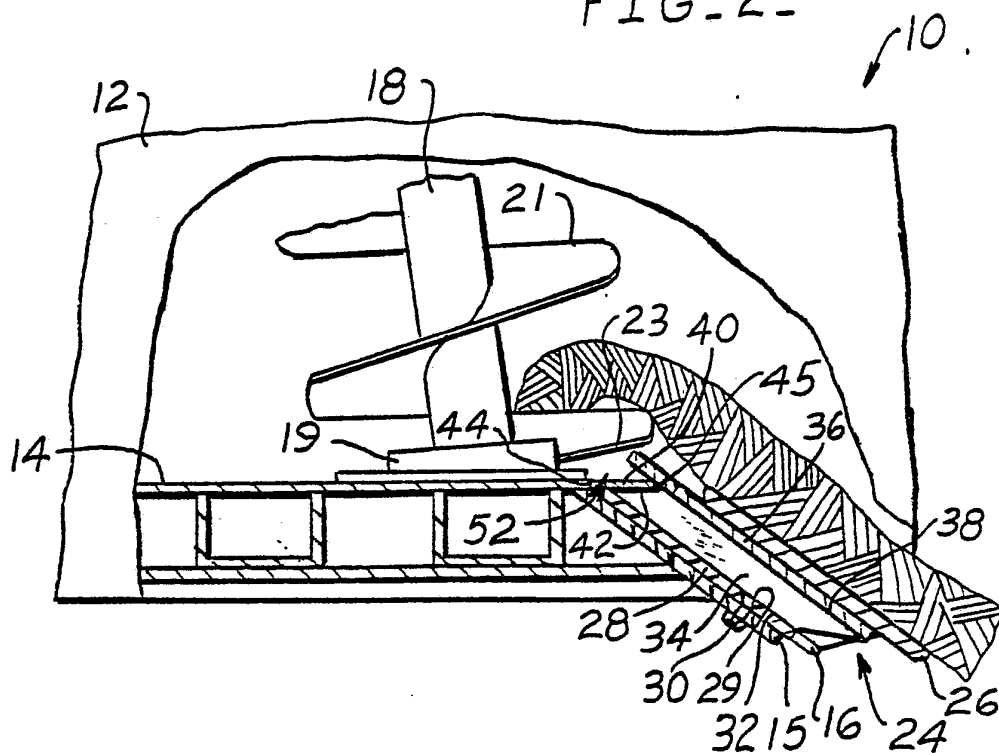
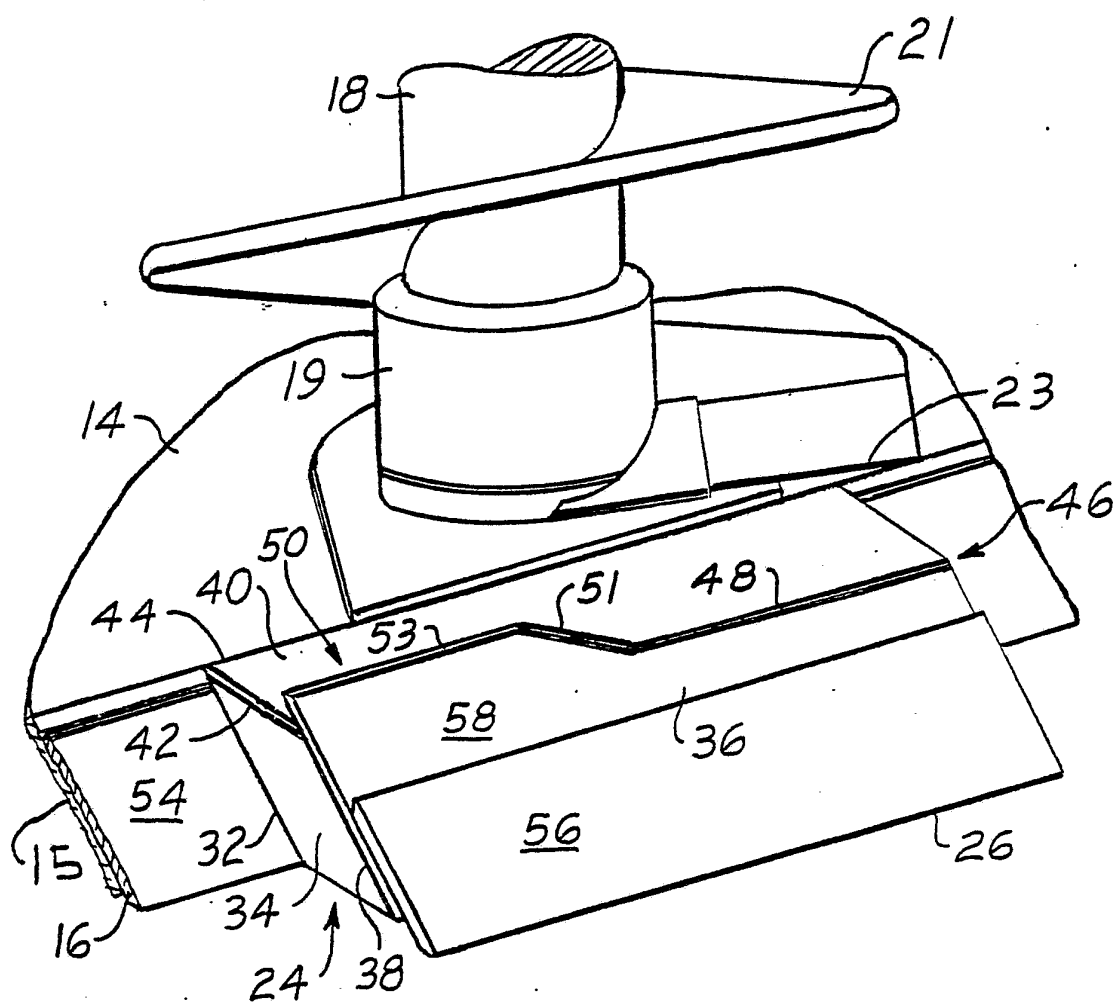


FIG. 2



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FIG. 3.



INTERNATIONAL SEARCH REPORT

International Application No **PCT/US85/00254**

I. CLASSIFICATION OF SUBJECT MATTER (If several classification symbols apply, indicate all) *		
According to International Patent Classification (IPC) or to both National Classification and IPC		
INT. Cl. 3 E02F 3/62		
U.S. Cl. 37/4		
II. FIELDS SEARCHED		
Minimum Documentation Searched *		
Classification System	Classification Symbols	
U.S.	37/4,8 198/213,657,662,671,674,675,676,677 414/526	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched *		
III. DOCUMENTS CONSIDERED TO BE RELEVANT 14		
Category *	Citation of Document, 16 with indication, where appropriate, of the relevant passages 17	Relevant to Claim No. 18
Y	US, A, 2,330,113 21 September 1943, DANIELS	6
Y	US, A, 2,564,486 14 August 1951, MACDONALD	8,9
A	US, A, 2,626,469 27 January 1953, ARMINGTON	1,2
A	US, A, 3,059,791 23 October 1962, STRATTON	1,2
A	US, A, 3,574,960 13 April 1971, PETERSON et al	1,2
A	US, A, 3,722,114 27 March 1973, KNELL ET AL	1,2
Y	US, A, 3,859,741 14 January 1975 REINHARDT	7
A	US, A, 3,885,332 27 May 1975 HOLLAND	1,2
X	US, A, 4,167,825 18 September 1979 GEE ETAL	1,2
P	US, A, 4,456,305 26 June 1984 YOSHIKAWA.	1,2
* Special categories of cited documents: 15 "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. "&" document member of the same patent family		
IV. CERTIFICATION		
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31 January 1985	27 MAR 1985	
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