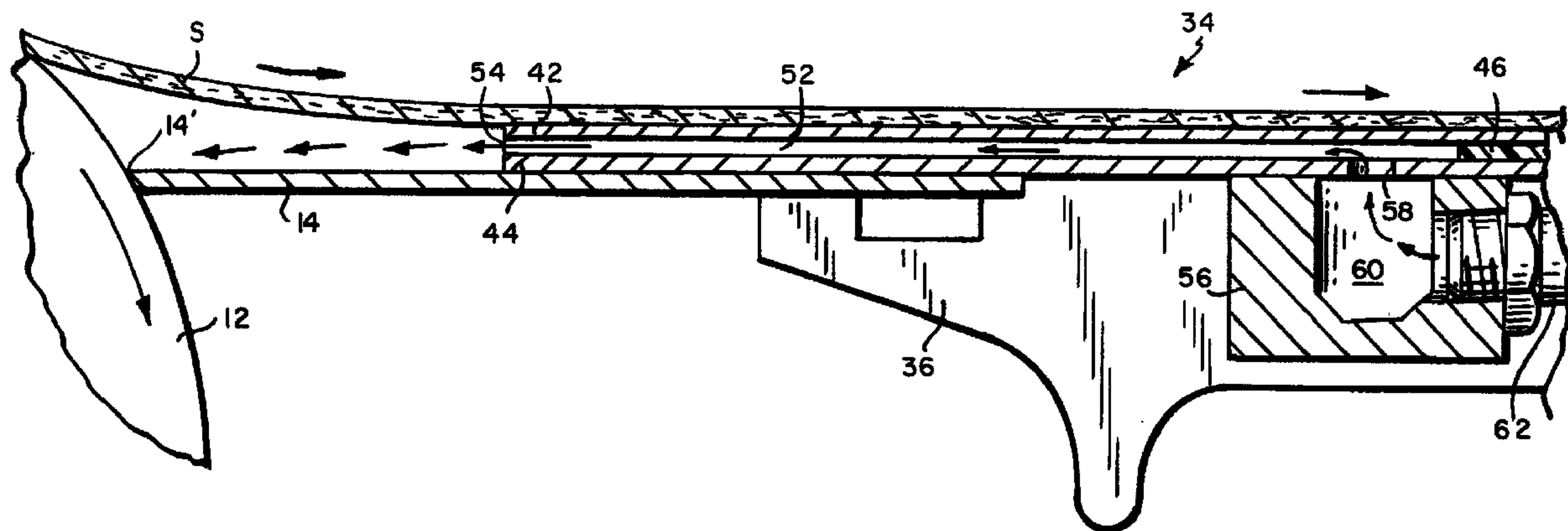




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(54) Titre : DOCTEUR ASSISTE PAR UN FLUIDE
(54) Title: FLUID ASSISTED DOCTOR



(57) **Abrégé/Abstract:**

A holder is disclosed for applying the working edge of a doctor blade (14) to a moving surface (12). The holder has upper and lower holder members (34, 36) constructed and arranged respectively to contact upper and lower surfaces of the doctor blade, with the doctor blade projecting forwardly to terminate at its working edge. One of the holder members comprises a composite of sandwiched elements enclosing one or more chambers (52) having forwardly directed outlets (54). A pressurized fluid is introduced into the chambers for forward application via the outlets and along a surface of said doctor blade onto the surface being doctored.



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(21) International Application Number: PCT/US99/01590 (22) International Filing Date: 26 January 1999 (26.01.99) (30) Priority Data: 60/072,708 27 January 1998 (27.01.98) US 09/229,433 13 January 1999 (13.01.99) US (71) Applicant: THERMO WEB SYSTEMS, INC. [US/US]; 35 Sword Street, Auburn, MA 01501 (US). (72) Inventors: DUBOIS, Sylvain; 1 Chemin de l'Herminette, Lac Beauport, Quebec G0A 2C0 (CA). MALLETTTE, Claude; 79 DesGeretes, Vaudruil, Quebec J7V 8P3 (CA). (74) Agents: GAUTHIER, Maurice, E. et al.; Samuels, Gauthier & Stevens, Suite 3300, 225 Franklin Street, Boston, MA 02110 (US).		(81) Designated States: BR, CA, JP, MX, NO, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>
(54) Title: FLUID ASSISTED DOCTOR		
(57) Abstract A holder is disclosed for applying the working edge of a doctor blade (14) to a moving surface (12). The holder has upper and lower holder members (34, 36) constructed and arranged respectively to contact upper and lower surfaces of the doctor blade, with the doctor blade projecting forwardly to terminate at its working edge. One of the holder members comprises a composite of sandwiched elements enclosing one or more chambers (52) having forwardly directed outlets (54). A pressurized fluid is introduced into the chambers for forward application via the outlets and along a surface of said doctor blade onto the surface being doctored.		

FLUID ASSISTED DOCTOR

BACKGROUND OF THE INVENTION1. Field of the Invention

5 This invention relates generally to doctor systems used to scrape the rotating rolls of papermachines, coaters, and web converting machines and the like for cleaning or dewatering purposes, and is concerned in particular with the provision of a fluid assisted doctor for such doctoring systems.

10 2. Description of the Prior Art

The three main components of a doctor system include a rigid doctor structure or beam, a doctor blade holder, and a doctor blade. The doctor system is adapted to be mounted in a papermachine, coater or web converting machine and is used to scrape the rotating rolls for cleaning or dewatering purposes. At some critical roll positions in a
15 papermachine, the doctor system is also used during the threading process to remove or "shed" either a full width sheet of paper or a narrower "tail".

In conventional doctoring, the working edge of the doctor blade is loaded against the surface of the rotating roll to provide the scraping or cleaning action. The loading force must be sufficient to hold the blade firmly against the roll surface.

20 In some cases, the rolls have grooves machined into their surfaces. This makes sheet shedding or cleaning of the roll surfaces with a single doctor difficult, if not impossible. Attempts to address this problem include increasing blade loading forces, which produces other attendant drawbacks, including increased frictional wear of the roll surfaces and doctor blades.

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SUMMARY OF THE INVENTION

The object of the present invention is to avoid or at least significantly minimize the above-mentioned problems by providing a fluid assisted doctor. In a preferred embodiment of the invention to be described hereinafter in greater detail, the fluid is a thin
30 jet of air directed along a surface of the doctor blade to impinge on the roll surface directly adjacent to the point of application of the doctor blade's working edge. This results in more efficient sheet shedding and/or cleaning of the roll surface, at lower blade

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-2-

loading levels. The air jet will penetrate into and efficiently clean debris from roll grooves, in addition to reducing the build-up of debris under the doctor blade.

It is known from DE-A-3941242, DE-A-4108167, DE-A-4303315 and US-A-5987777 to introduce air along a surface of a doctor blade to impinge on a roll surface. DE-A-3941242 describes the use of a clamping plate which overlies the doctor blade and has grooves for discharging air jets on the upper surface of the doctor blade.

As is known from DE-A-3941242 the present invention provides a holder for applying the working edge of a doctor blade to a moving surface, said holder comprising: upper and lower holder members constructed and arranged respectively to contact upper and lower surfaces of said doctor blade, with said doctor blade projecting forwardly beyond said holder members to terminate at said working edge and fluid supply means for supplying a pressurized fluid for forward application along a surface of said doctor blade onto said moving surface. In contrast to DE-A-3941242 and in accordance with the invention one of the holder members comprises a composite of sandwiched elements including top and bottom plates separated by a gasket, said gasket being configured to co-act with the top and bottom plates and to define therewith a plurality of chambers communicating with forwardly directed outlets for discharging the pressurized fluid along the surface of the doctor blade.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other objects, features and advantages of the present invention will now be described in greater detail with reference to the accompanying drawings, wherein:

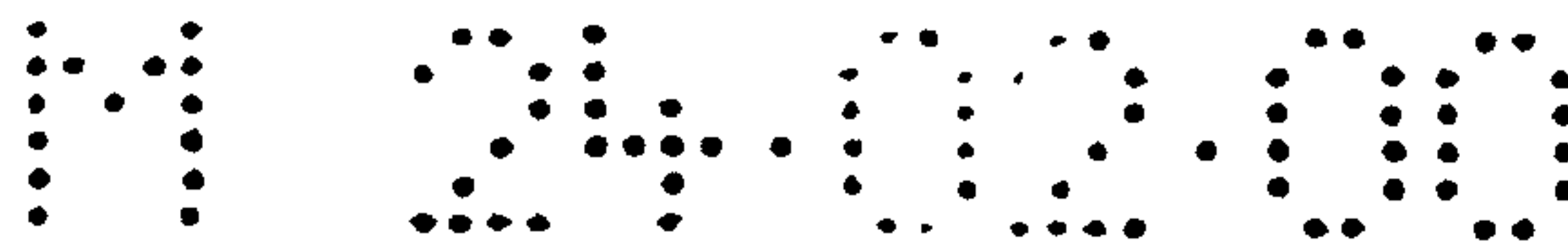
Figure 1 is a side view of a doctoring system incorporating a fluid assisted doctor blade holder in accordance with the present invention;

Figure 2 is a top plan view, on an enlarged scale, of the fluid assisted doctor blade holder depicted in Figure 1;

Figure 3 is a sectional view taken along line 3-3 of Figure 2; and

Figure 4 is an enlarged sectional view of a portion of the doctor blade holder depicted in Figure 3.

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-3-

DETAILED DESCRIPTION OF PREFERRED EMBODIMENT

With reference initially to Figure 1, a doctoring system is generally depicted at 10 adjacent to a papermachine roll 12. Roll 12 is driven by conventional means (not shown) for rotation about an axis A_1 extending in the cross-machine direction. The doctoring system includes a doctor blade 14, a blade holder 16, a doctor back 18, and a loading mechanism 20. The doctor back is mounted on the papermachine frame (not shown) for pivotal movement about an axis A_2 extending in the cross-machine direction parallel to the rotational axis A_1 of roll 12. The loading mechanism 20 includes a piston-cylinder unit 22 acting through lever arm 24 to pivot the doctor back 18 about its Axis A_2 in order to load the working edge 14N of the doctor blade 14 against the surface of the roll 12.

With reference additionally to Figures 2-4, it will be seen that the blade holder 16 includes a tray 26 with upstanding brackets 28 located between an unloading tube 30 and a loading tube 32. The doctor blade is removably received between and held by a planar upper holding member generally depicted at 34 and lower holding members comprising laterally spaced fingers 36. The fingers 36 overlie and extend transversally across the tubes 30, 32, and are provided with depending flanges 38 which are connected to the upstanding brackets 28 of the tray 26 by a rod 40, thereby accommodating independent pivotal movement of the fingers about a third axis A_3 parallel to Axis A_1 and A_2 .

The upper blade holding member 34 comprises a composite of sandwiched planar elements which, as can best be seen in Figure 4, includes a top plate 42, a bottom plate 44 and a gasket 46 interposed therebetween. The composite is held together by screws indicated typically at 48 which also serve to secure the composite to the underlying fingers 36.

The gasket 46 is notched as 50, or otherwise appropriately configured, to provide as shown in Figure 4, individual chambers 52 communicating with forwardly directed slot-shaped outlets 54.

Connecting blocks 56 are secured to the underside of the bottom plate 44 beneath the chambers 52. The bottom plate has inlets 58 connected by angled passages 60 in the connecting blocks 56 to branch conduits 62, which in turn are connected to a header 64 extending along the rear of the upper holding member 34.

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-4-

The header is supplied with fluid under pressure. Typically, the fluid will be air supplied at a pressure of about 13.789 N/m^2 – 275.790 N/m^2 (2 to 40 psig.) but other fluids including water may also be employed.

During the doctoring process, while the working edge 14N of the doctor blade is applied against the roll surface, pressurized fluid will flow from the header 64 via the branch conduits 60 and through the connecting passageways 60 and chambers 52 to exit the slot-shaped outlets 54 as thin jets which continue across and in parallel relationship with the upper surface of the doctor blade to impinge upon the roll surface directly adjacent to the point at which the working edge 14N of the doctor blade is being applied.

The impinging air jets assist in removing debris from the roll surface, and in preventing accumulation of debris on and around the doctor blade. In addition, where the doctor blade is being employed to shed a paper web from the roll surface, as shown in Figure 4, the impinging air jets assist and indeed may be primarily responsible for lifting the sheet "S" from the roll surface. If the roll surface is grooved, the impinging fluid jets will penetrate into and dislodge debris from the grooves, thereby providing an efficient cleaning action without having to increase blade loading.

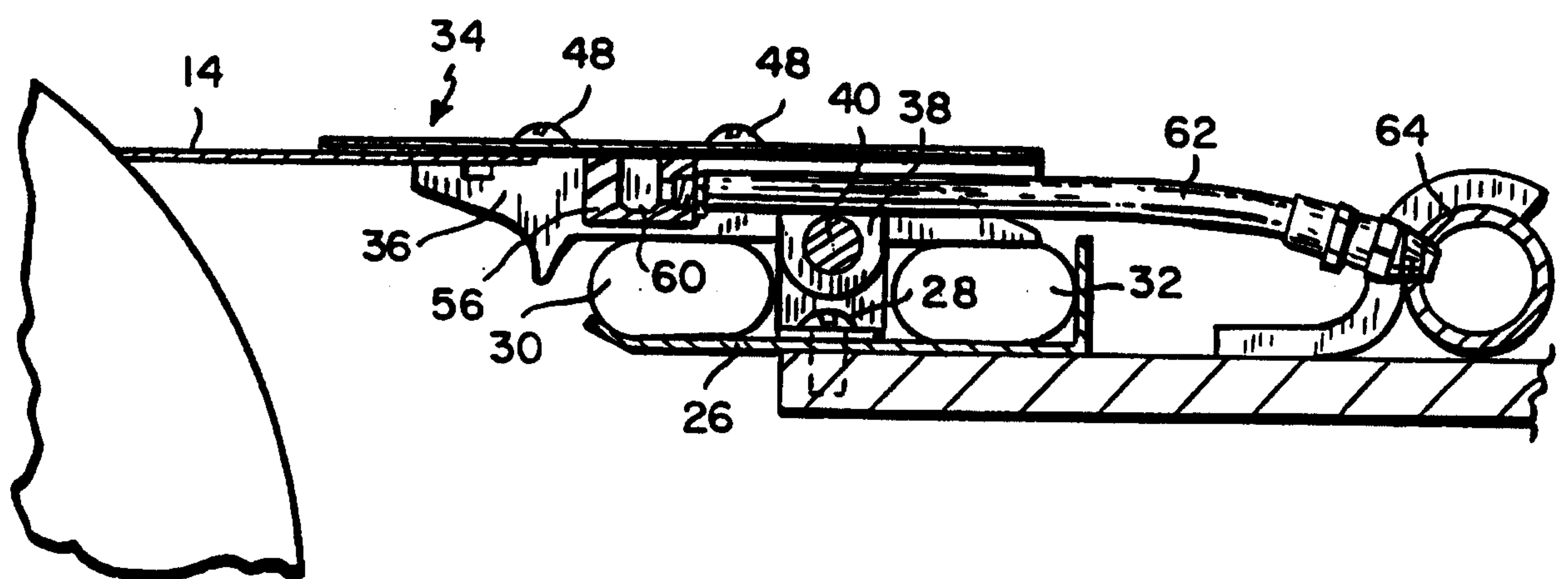
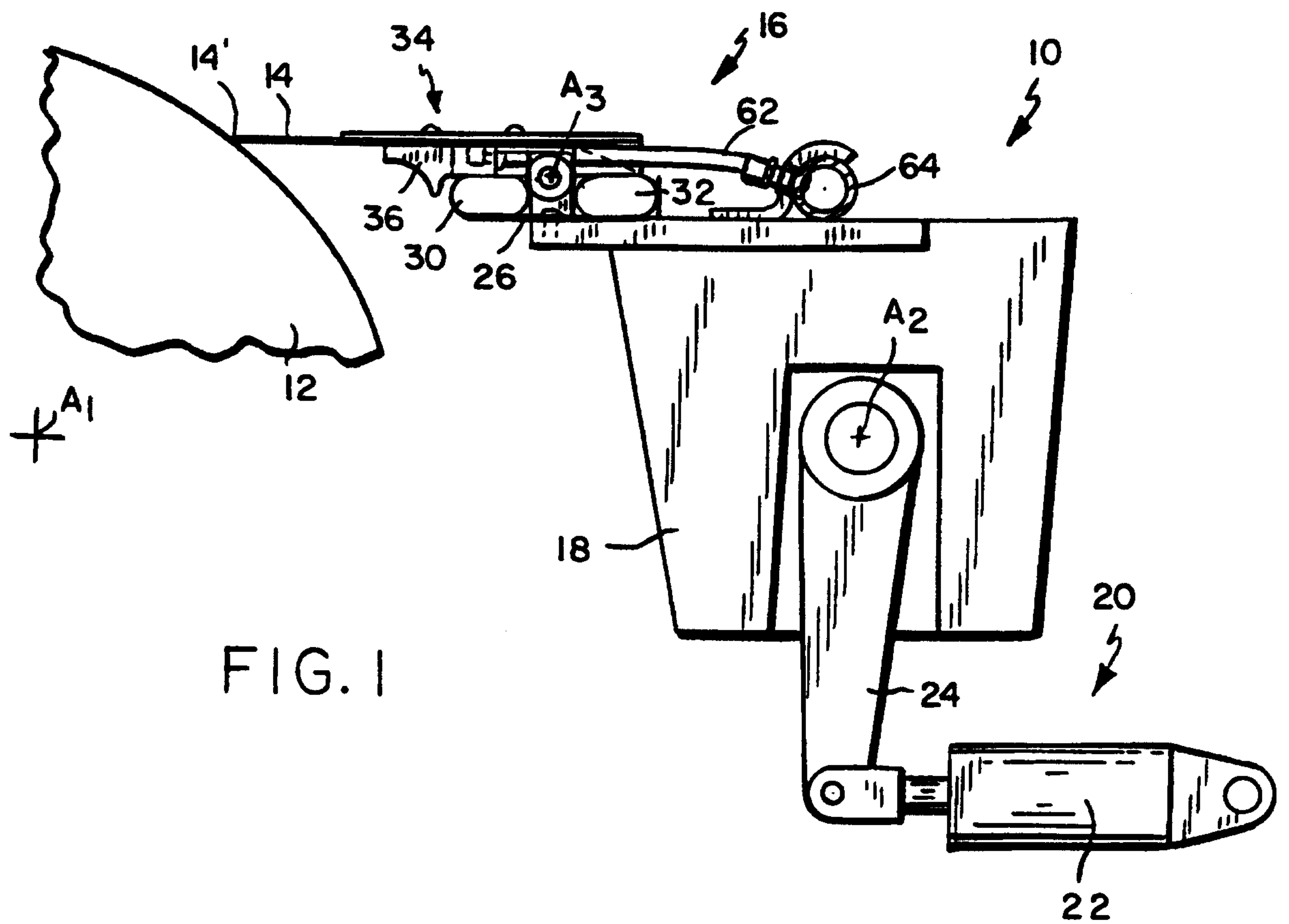
The slot-like outlets are configured to achieve optimum application of the pressurized fluid to the roll surface. Typically, when operating with air as the working fluid, the gasket 46 will be sized to produce a gap between the top and bottom plates 42, 44 at the outlets 54 of about 0.127 to 3.1750mm (0.005 to 0.125 inches). The existing flow of air will be substantially laminar, and directed along the top surface of the doctor blade.

In light of the foregoing, it will now be appreciated by those skilled in the art that various modifications may be made to the embodiment herein chosen for purposes of disclosure without departing from the scope of the invention as defined by the claims append hereto. For example, the composite planar upper blade holder and associated fluid supply components may be incorporated into blade holder designs other than those having unloading and loading tubes 30, 32. The working fluid can be air, water or any other conveniently available liquid or gas. Fluid application can be continuous or intermittent. The fluid outlets 54 can be arrayed over the entire length of the doctor blade, or only along selected segments thereof.

-1-

CLAIMS

1. A holder for applying the working edge of a doctor blade to a moving surface, said holder comprising: upper and lower holder members constructed and arranged
5 respectively to contact upper and lower surfaces of said doctor blade, with said doctor blade projecting forwardly beyond said holder members to terminate at said working edge and fluid supply means for supplying a pressurized fluid for forward application along a surface of said doctor blade onto said moving surface, characterized in that one of said holder members comprises a composite of sandwiched elements including top
10 and bottom plates separated by a gasket, said gasket being configured to co-act with the top and bottom plates and to define therewith a plurality of chambers communicating with forwardly directed outlets for discharging the pressurized fluid along the surface of the doctor blade.
- 15 2. A blade holder according to claim 1, wherein said fluid is air.
3. A blade holder according to claim 1, wherein said fluid is water.
4. A blade holder according to any one of claims 1 to 3, wherein said one holder
20 member is the upper holder member and said outlets are arranged to direct said fluid along the upper surface of said doctor blade.
5. A blade holder according to any one of claims 1 to 4, wherein said fluid supply
25 means comprises a fluid header located rearwardly of and extending in parallel relationship to said upper holder member, with branch connections leading from said fluid header to inlets communicating with said chambers and spaced along the composite of sandwiched elements.



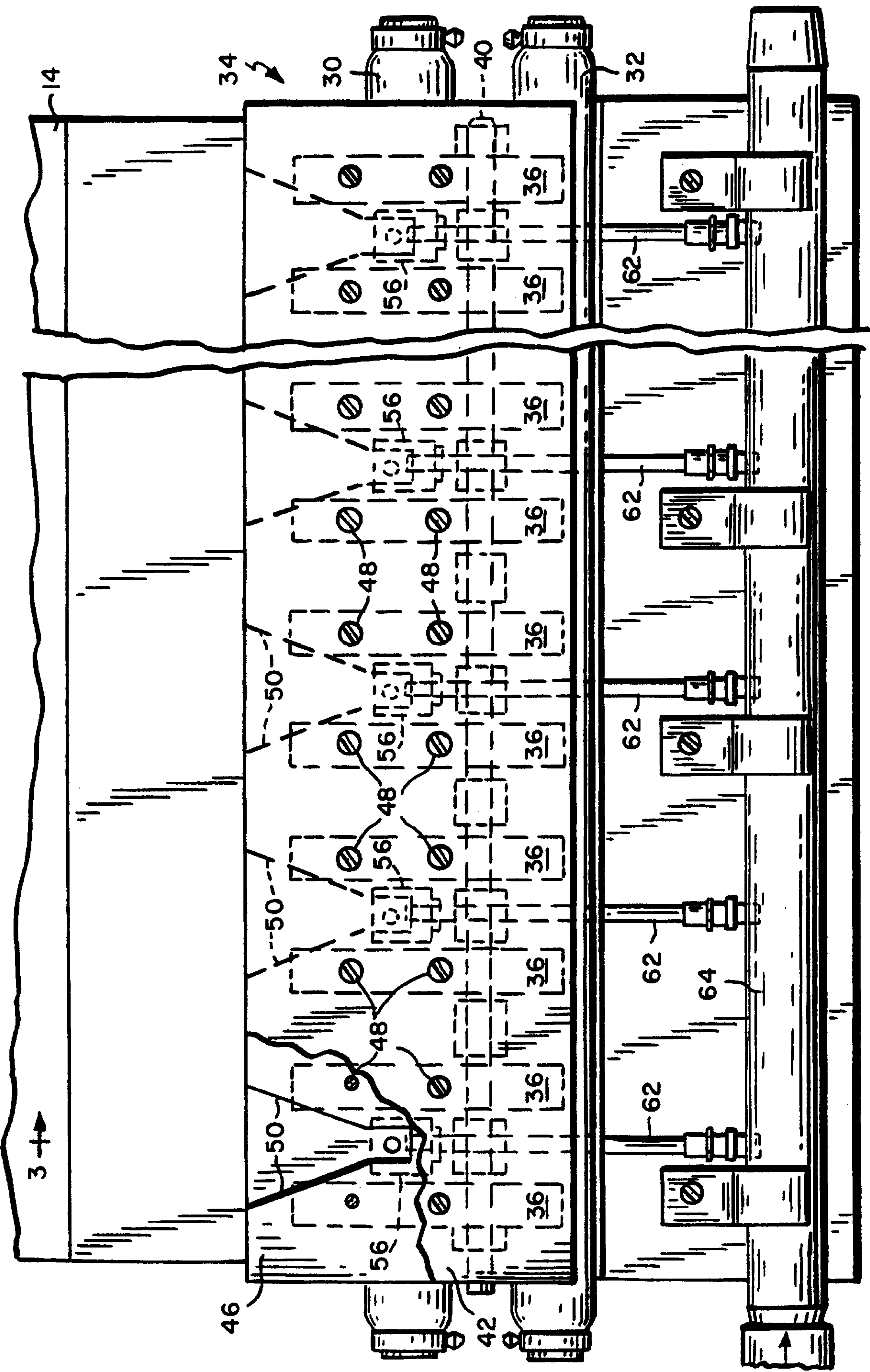


FIG. 2

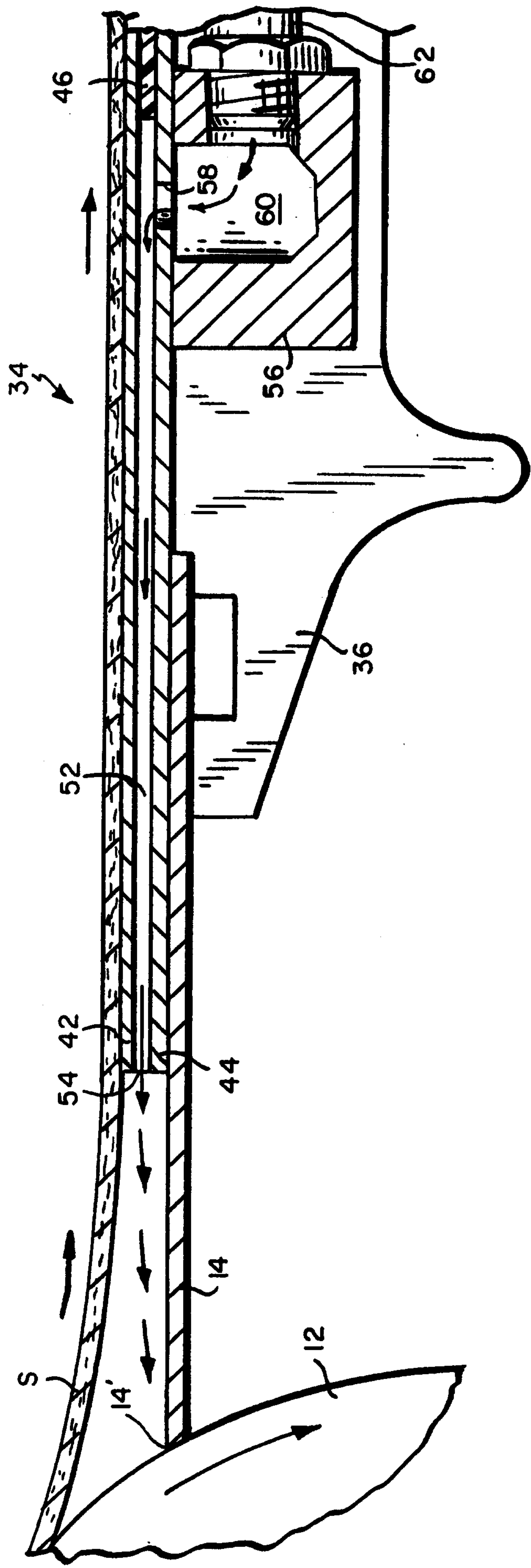


FIG. 4

