April 27, 1965 W. MIKOLAJCZYK ETAL 3,180,099

PILE PROTECTOR

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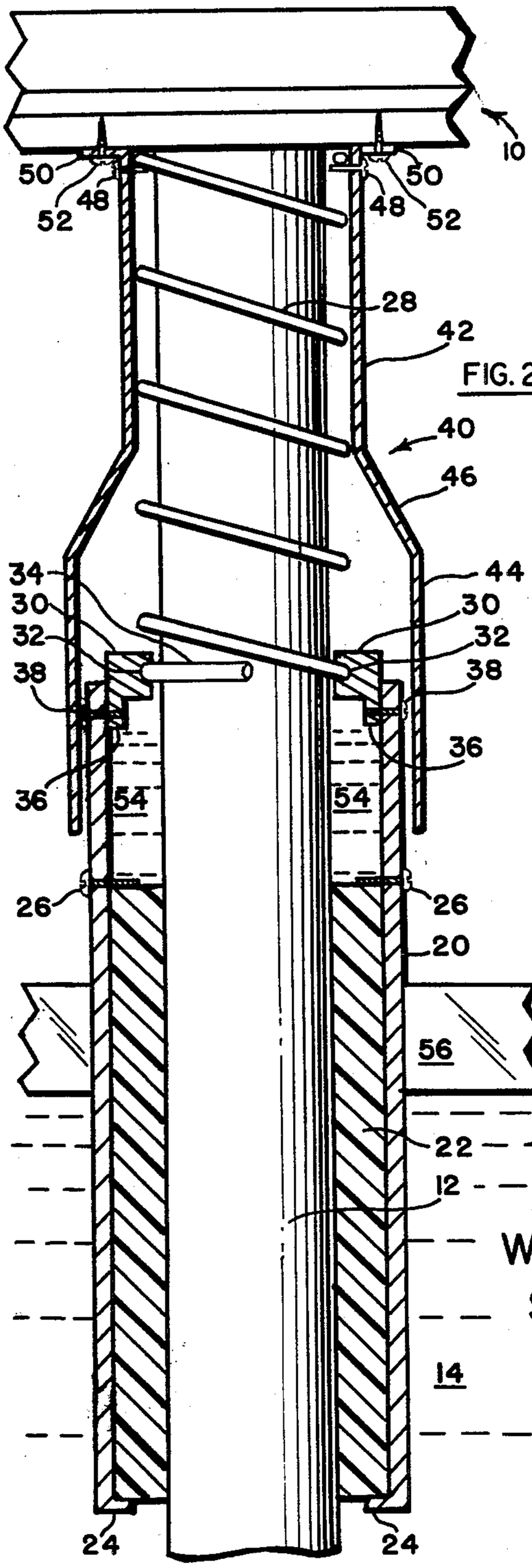

FIG. 2

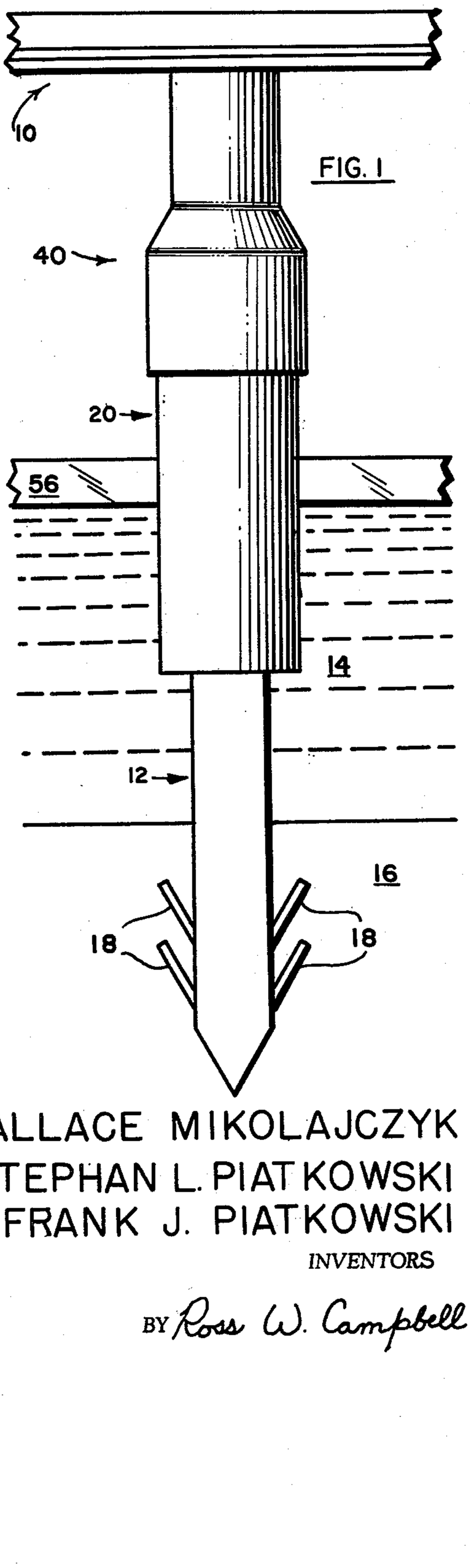

FIG. 1

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PILE PROTECTOR

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1 Claim. (Cl. 61—54)

The present invention relates to a device for protecting piles and more particularly to a device for preventing the elevation of a pile by ice surrounding said pile.

In northern climates, the water of lakes and streams is subject to seasonal freezing. The pilings of docks and other lakefront structures immersed in such bodies of water are firmly gripped about their circumferences by the layer of ice thus formed atop the body of water. Such ice, however, does not remain at a constant level while frozen but, instead, frequently rises as a result of a number of natural causes, such as, among others, a rise in the level of free water underlying the ice. When the ice for any reason thus rises, it necessarily heaves and elevates the pilings which are surrounded and gripped by the ice. Such heaving action forces the dock or other structure supported by the pilings out of level, warps, rocks and tears asunder parts of the structure, and sometimes even completely uproots the pilings. The damage thus done to such structures is an expensive, annual problem.

It is accordingly an object of the invention to provide means for preventing ice, formed atop a body of water, from elevating a pile which extends downwardly through said layer of ice and into said body of water.

A further object of the invention is to provide an improved sliding barrier intermediate a pile immersed in a body of water and ice formed atop said body of water and surrounding said pile.

The above and other objects of the invention which will later become apparent as the following description proceeds, are attained by the present invention, a preferred embodiment of which has been illustrated, by way of example only, in the accompanying drawing, forming a part of this specification in which like characters are employed to designate like parts throughout the same, and wherein:

FIGURE 1 is a front view of a pile, bearing a pile protector, and supporting a portion of a dock.

FIGURE 2 is sectional view of a pile protector operatively surrounding a pile.

Referring now more particularly to the drawing, a portion of a dock 10 is shown supported by a conventional pile 12 which extends downwardly through body of water 14 and, as best shown in FIGURE 1, into the bed 16 underlying said body of water. A plurality of barbs 18 may be provided at the lower end of pile 12 to anchor the pile within bed 16.

We provide a cylindrical sleeve 20 having a length substantially in excess of the greatest anticipated thickness to which ice may be expected to form atop the body of water 14, having an internal diameter greater than the external diameter of pile 12, and adapted to loosely surround said pile. Sleeve 20 is preferably formed of nonferrous material, such as brass, of sufficient strength to withstand the pressures which will be exerted thereon by ice but not susceptible to rusting. A liner 22, formed by a cylindrical second sleeve of plastic or neoprene foam impregnated with any conventional low temperature lubricant, is retained within sleeve 20 closely surrounding pile 12 by an annular flange 24 which surrounds and extends inwardly about the bottom of sleeve 20 and by a plurality of bolts 26 extending radially inward through and threadably engaged with sleeve 20.

A helical spring 28, having an internal diameter slightly greater than the external diameter of pile 12 and adapted

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to surround the pile, is connected to the upper portion of sleeve 20 by a collar 30. Collar 30 bears an annular channel 32 on the inner side thereof adapted to retain a coil 34 of spring 28, and also bears a downwardly projecting annular flange 36 adapted to fit within sleeve 20 and to be connected to the sleeve by a plurality of bolts 38. A hood, generally indicated at 40, surrounds spring 28 and the upper end of sleeve 20, and is comprised of a cylindrical upper portion 42 adapted to surround the upper portion of the spring, a lower cylindrical portion 44 of larger diameter adapted to surround sleeve 20 and the heads of bolts 38 and 26, and a flared connecting portion 46 intermediate said portions 42 and 44. Hood 40 is formed of brass or other nonferrous material resistant to rust and corrosion and extends sufficiently below the upper end of sleeve 20 when the sleeve is in its lowest position to prevent rain and snow from entering between the sleeve and pile 12. The upper end of hood 40 is adapted to retain the upper end of spring 28 therein, and to support the spring, collar 30, sleeve 20 and liner 22, in a position of rest with the top of the sleeve above the surface of body of water and the bottom of the sleeve disposed at a depth below the surface of said body of water beyond that to which ice will form in winter temperatures, by a plurality of bolts 48 extending radially inward and threadably engaged within the upper portion 42 of the hood. Hood 40 also bears an external flange 50 at the upper end thereof which is adapted to be secured to the underside of dock 10 by a plurality of screws 52, thereby supporting the entire device in proper position for use. To further prevent moisture from entering between sleeve 20 and pile 12, where it could freeze upon the pile and block free upward movement of liner 22 and the sleeve, the space between the sleeve and pile above the liner is filled with a conventional liquid anti-freeze solution 54.

In operation, the device is secured to the underside of dock 10 by screws 52, operatively surrounding pile 12, during warm weather. When, in winter, a layer of ice 56 forms atop body of water 14, such ice will surround and grip sleeve 20 firmly in the usual manner, but is prevented from contacting and seizing pile 12 by the mechanical barrier provided by sleeve 20 and snugly-fitting, lubricated liner 22. When ice 56 for any reason rises, it elevates sleeve 20 and liner 22. However, since ice 56 does not contact pile 12 and since liner 22 snugly but slideably surrounds the pile, such upward movement of the ice, sleeve 20, and the liner is not transmitted to the pile. The upward movement of sleeve 20 is, however, transmitted through collar 30 to spring 28, compressing the spring. When ice 56 is subsequently lowered to melts, spring 28 permits and assists sleeve 20 and liner 22 to resume their original position of rest approximately half immersed in the body of water 14, and supports them in such position.

It is to be understood that the form of the invention herewith shown and described is to be taken as a preferred embodiment of the same and that resort may be had to various changes in construction without departing from the scope of the subjoined claim.

What is claimed is:

A protective device for a cylindrical pile adapted standing in a vertical position partially immersed in a body of water and supporting a dock, said device comprising, a cylindrical sleeve bearing a foam liner impregnated with a lubricant and closely and slideably surrounding said pile from a point above the surface of said body of water to a point below the maximum depth to which ice will form below the surface of said body of water in winter temperatures, to provide a slideable waterproof barrier preventing said water from penetrating between said liner and pile and such ice from adhering to said pile, said sleeve extending above the upper end of said liner to form

a space intermediate said sleeve and pile, a liquid antifreeze solution substantially filling said space, said liner and sleeve being interengaged by a plurality of bolts threadably engaged with and extending radially inward through said sleeve immediately above the top of said liner and by an annular flange extending inwardly about the bottom of said sleeve and upon which the bottom of said liner rests, a helical spring surrounding said pile above said liner, a collar loosely surrounding said pile and a portion of said spring, said collar having an annular channel on the inner side thereof adapted to engage a coil of said spring and further having a downwardly projecting annular flange adapted to be surroundingly received by the upper end of said sleeve and connected thereto by a plurality of bolts extending radially inward through apertures in said sleeve and collar, to yieldingly suspend said barrier in operative, sliding engagement with and about said pile and between said points and to permit said barrier to be yieldingly elevated and lowered longitudinally with respect to said pile by ice adhering to said sleeve, a hood having a cylindrical upper portion surrounding the upper portion of said spring and pile, an enlarged cylin-

drical lower portion surrounding the upper portion of said sleeve, and a flared central portion interconnecting said upper and lower portions, said hood preventing water from entering into said space and between said sleeve and pile from above, a plurality of bolts threadably engaged with and extending radially inward through the upper portion of said hood and extending below a coil of said spring near the upper end thereof to support said spring, and an external flange borne by said hood at the upper end thereof and secured to the underside of said dock by a plurality of screws to suspend said device in operative position surrounding said pile, to prevent such ice from gripping and heaving said pile.

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