United States Patent [19]

Whipps

[11] **3,760,593**

[45] **Sept. 25, 1973**

[54] **SLIDE GATE**

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[73] Assignee: **Rodney Hunt Company,** Orange, Mass.

[22] Filed: **Sept. 14, 1972**

[21] Appl. No.: **289,176**

[52] **U.S. Cl.** **61/28,** 137/315, 251/147, 251/266, 251/326

[51] **Int. Cl.** **E02b 7/28**

[58] **Field of Search** 61/28, 29, 22, 27; 251/326, 147, 266, 267; 137/315

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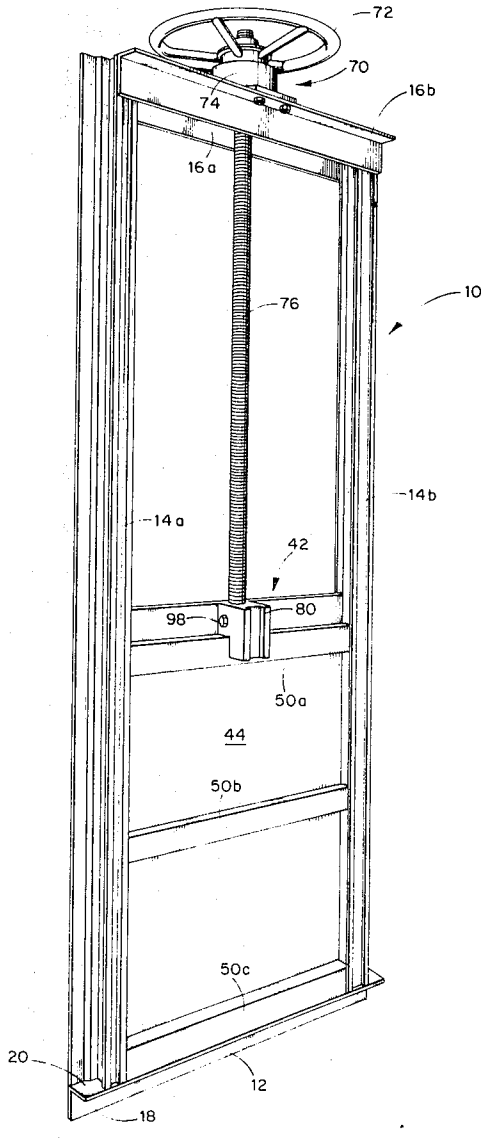
Primary Examiner—Mervin Stein
Assistant Examiner—Philip C. Kannan
Attorney—C. Yardley Chittick et al.

[57] **ABSTRACT**

A slide gate for mounting over a wall opening or in a channel. The gate includes a frame assembly which surrounds the wall opening, or which is fixed in the channel, a slide assembly mounted within the frame assembly for vertical movement between an open and a closed position, and operating means carried by the frame assembly. The operating means, which is connected to the slide assembly by a stem, operates to impart vertical movement to the slide assembly. The slide assembly includes a flat plate or disc reinforced by vertically spaced horizontal ribs. At least the lowermost rib is specially adapted to hold a resilient seal, the latter cooperating with the bottom member of the frame assembly when the slide assembly is closed. The side members of the frame assembly each provide parallel grooves into which the side edges of the flat plate or disc and the ends of the horizontal reinforcing ribs protrude. The upper ends of the frame side members are permanently interconnected by yoke members which are adapted to support the operating means, and which are laterally spaced to permit the slide assembly and its connecting stem to be removed from the frame assembly as a single unit.

10 Claims, 9 Drawing Figures

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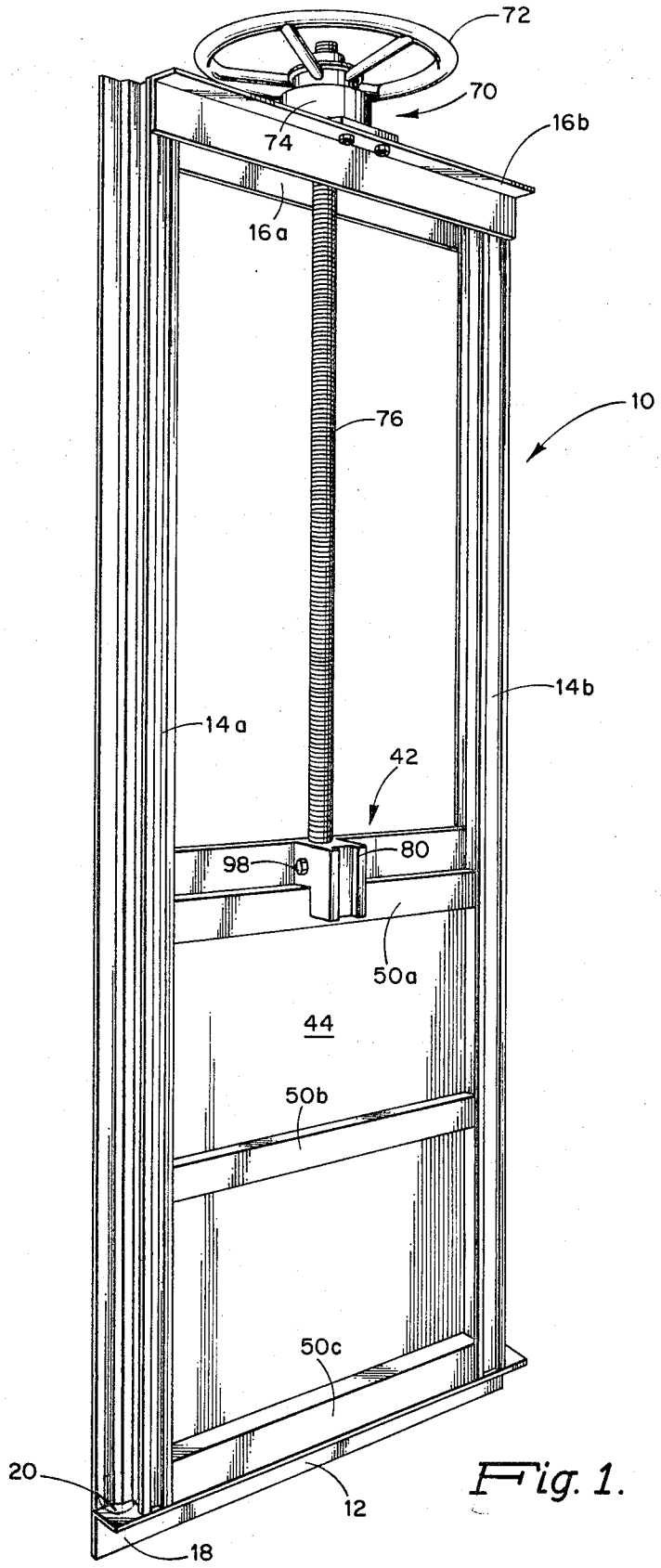


Fig. 1.

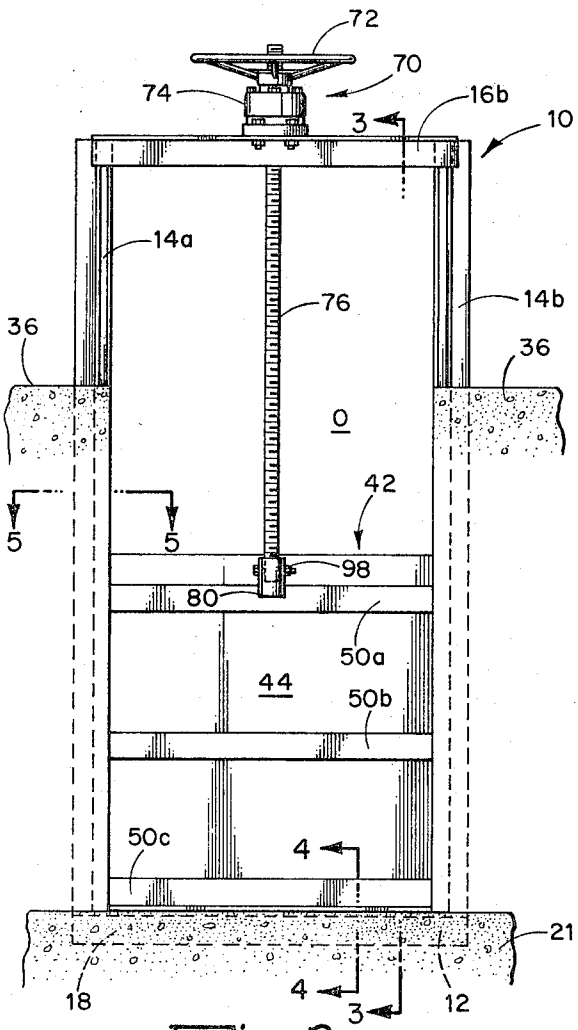


Fig. 2.

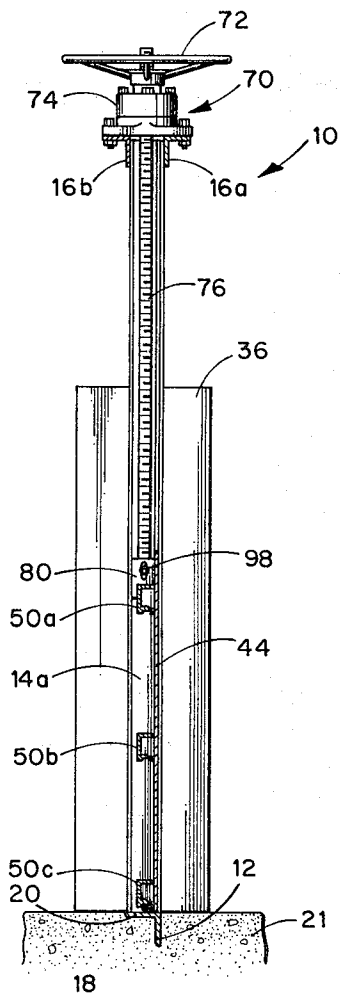


Fig. 3.

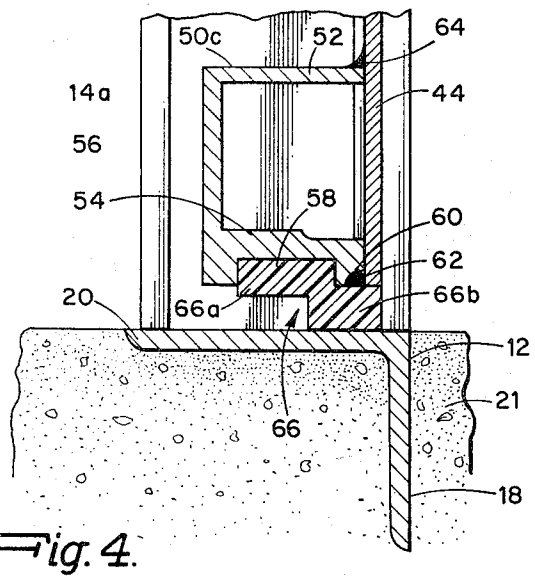


Fig. 4.

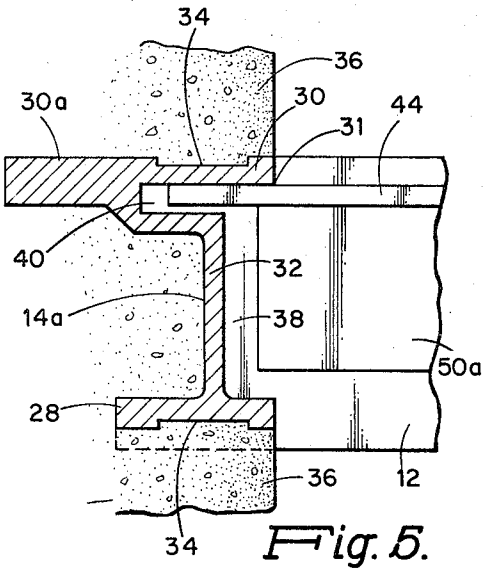


Fig. 5.

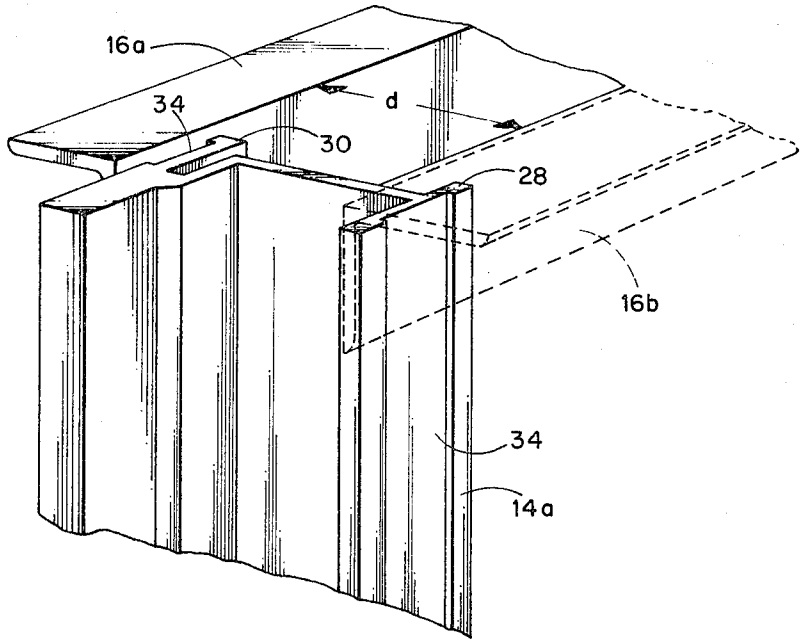


Fig. 6.

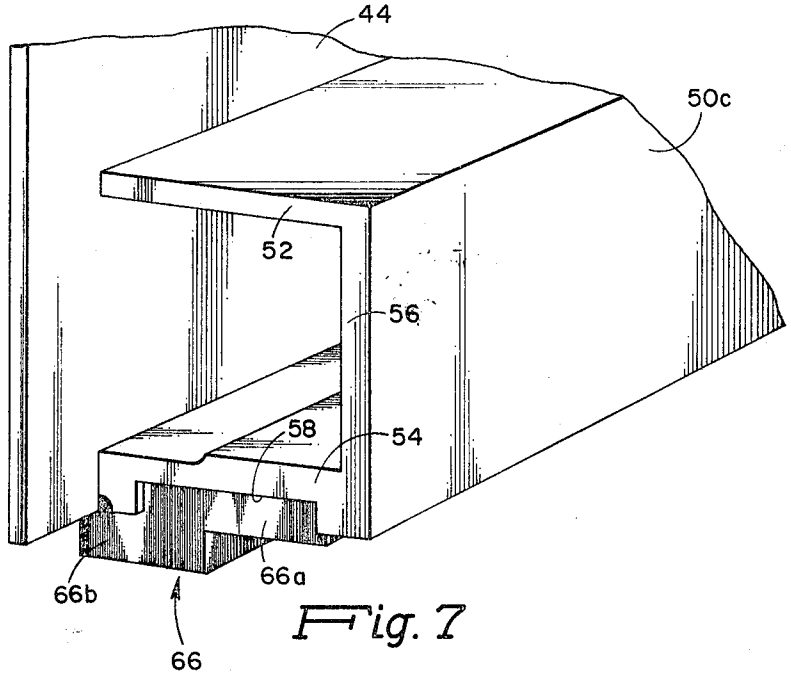


Fig. 7

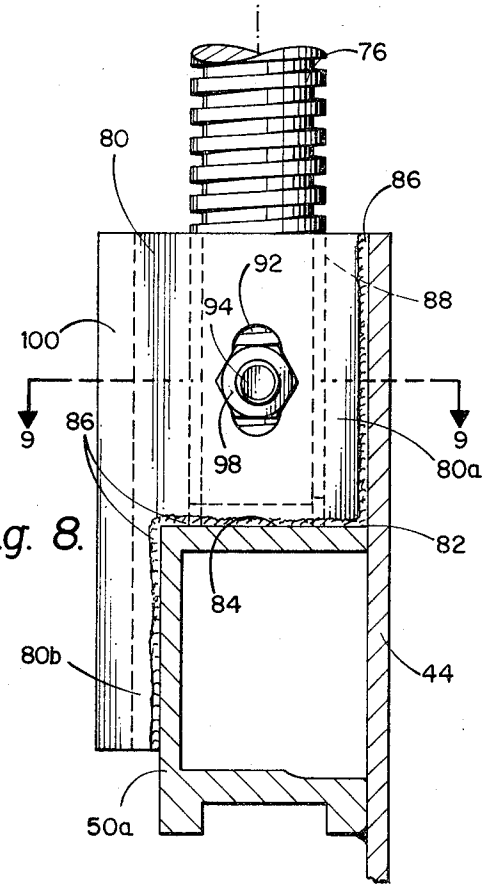

76
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92
94
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100
9
9
86
98
80a
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84
80b
44
50a

Fig. 8.

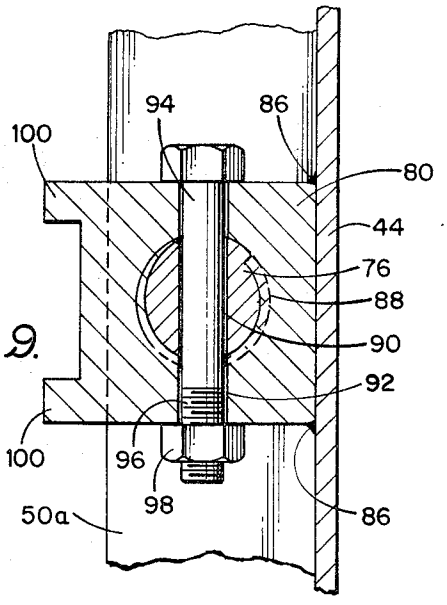

94
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Fig. 9.

SLIDE GATE

DESCRIPTION OF THE INVENTION

This invention relates generally to closures for openings, and is particularly concerned with a fabricated slide gate construction for open channel flow or for wall mounted light seating head applications.

An important object of the present invention is the provision of an improved gate construction having a frame assembly and a slide assembly which cooperate to provide greater overall strength and rigidity. To this end, the frame assembly includes extruded side members, each forming a pair of inwardly facing guide slots. The slide assembly includes a flat plate or disc reinforced by vertically spaced horizontal ribs. The side edges of the plate protrude laterally into one of the guide slots, and the reinforcing ribs protrude laterally into the other guide slot. This arrangement provides for an excellent transfer of stresses from the slide assembly to the frame assembly, and thus problems arising from shear stress loading are considerably minimized if not completely eliminated.

Another object of the present invention is the provision of an improved sealing arrangement between the bottom of the frame assembly and the bottom edge of the flat plate or disc of the slide assembly. More particularly, at least the bottom reinforcing rib on the disc is mounted flush with the bottom edge of the disc with its lowermost surface specially adapted to receive a resilient seal which extends forwardly beneath the bottom edge of the disc. The resilient seal also protrudes laterally into one of the guide grooves in each of the frame side members and thus cooperates with the frame bottom and sides to provide an extremely tight seal when the slide assembly is lowered to the closed position.

A further object of the present invention is the provision of improved means for embedding the frame side members in a concrete wall. To this end, the extruded frame side members are each provided with oppositely disposed shallow grooves which provide an interlocking relationship with the concrete wall, thereby materially increasing the strength and rigidity of the overall structure.

A still further object of the present invention is the provision of laterally spaced yoke members for permanently interconnecting the upper ends of the frame side members. The yoke members are adapted to support the operating means employed to raise the lower the slide assembly, and the lateral spacing between the yoke members is sufficient to permit vertical removal of the slide assembly and its connecting stem while allowing the frame assembly to remain intact.

These and other objects and advantages of the present invention will become more apparent as the description proceeds with the aid of the accompanying drawings, wherein:

FIG. 1 is a view in perspective of a gate construction embodying the concepts of the present invention;

FIG. 2 is a front elevational view on a reduced scale, showing the gate construction of FIG. 1 mounted over an opening in a concrete wall;

FIGS. 3, 4 and 5 are sectional views, the latter two views being on an enlarged scale, taken along lines 3—3, 4—4 and 5—5 of FIG. 1;

FIG. 6 is a partial perspective view on an enlarged scale, showing the attachment of the laterally spaced yoke members to the upper ends of the frame side members;

FIG. 7 is an enlarged partial perspective view of the bottom of the slide assembly;

FIG. 8 is an enlarged side view of the spindle connector; and,

FIG. 9 is a sectional view taken along lines 9—9 of FIG. 8.

Referring now to the drawings, there is shown a slide gate construction in accordance with the present invention generally indicated at 10. The gate construction includes a frame assembly made up of a bottom member 12, side members 14*a* and 14*b*, and upper yoke members 16*a* and 16*b*. The bottom member 12 is preferably although not necessarily a structural angle having a vertically depending flange 18 which can be embedded in a concrete floor 20, and a horizontal flange 22 which, as will hereinafter be described, acts as a sealing surface for a resilient seal carried by the slide assembly.

The side members 14*a* and 14*b* are specially extruded structural elements having identical cross-sectional configurations. As best shown in FIG. 5, each side member includes the following features: a front flange 28; a thicker gauge rear flange 30; and an intermediate web portion 32 joining the front and rear flanges. Both the flanges 28 and 30 are provided with oppositely disposed shallow grooves 34 which are adapted to receive and interlock with the concrete wall 36. The rear flange 30 is preferably further provided with a lateral extension 30a which may be drilled at suitable intervals to receive bolts in the event that the side members are to be secured to the face of a wall, rather than being embedded in the wall as herein illustrated.

A first guide groove 38 is defined by the intermediate web position 32 and the front flange 28. A second guide groove 40 extends into the rear flange 30. The purpose of these guide grooves will hereinafter be described in more detail.

As indicated in FIGS. 2 and 3, when the gate construction is installed in its operative position, the side members 14*a* and 14*b* of the frame assembly preferably extend vertically above the side walls 36 which form the opening "0." The upper ends of the frame side members are interconnected by the yoke members 16*a* and 16*b*, the latter as is best shown in FIG. 6 being spaced by a distance "*d*." The yoke members 16*a* and 16*b* preferably although not necessarily consist of structural angles which are permanently attached, as by welding, to the front and rear flanges 28 and 30 of each frame side member.

The slide assembly, which is generally indicated in the drawings by the reference numeral 42, is comprised basically of a flat plate or disc 44 having its side edges slidably received in the guide grooves 40 of the frame side members. The plate 44 is reinforced by a plurality of vertically spaced horizontal ribs 50*a*, 50*b* and 50*c*, the ends of which protrude past the inside edge 31 of groove 40 into the guide grooves 38 in the frame side members. By allowing the ends of the reinforcing ribs to extend into the guide grooves 38, an improved transfer of stresses is provided, and problems relating to shear stress loadings are eliminated. The number and/or vertical spacing of the reinforcing ribs will of course vary depending on the size of the gate and the operating conditions to which it is exposed.

As is best shown in FIGS. 4 and 6, the lowermost reinforcing rib 50*c* is provided with a generally channel-shaped cross section having upper and lower flanges 52 and 54 joined by an intermediate web section 56. The lower flange 54 is grooved as at 58 and is relieved at 60. With the rib 50*c* positioned flush with the bottom edge of the plate 44, a weld 62 is recessed into the relieved area 60, and another weld is applied as at 64. By conveniently recessing the weld 62, a flush surface between the bottom edge of the plate 44 and the bottom surface of the rib 50*c* is provided with little or no weld finishing being required. Conveniently, although not necessarily, as herein depicted, the other reinforcing ribs 50*a* and 50*b* can be identical to the lowermost rib 50*c*.

A resilient seal 66 is provided along the bottom of the gate assembly. As viewed in cross-section, the seal has a rectangular section 66*a* partially embedded in groove 58, and another rectangular section 66*b* which extends beneath the bottom edge of the flat plate 44. The length of the seal 66 is equal to or perhaps only slightly less than that of the reinforcing rib 50*c*, and hence the ends of the seal also extend into the guide grooves 38 in the frame side members 14*a* and 14*b*. Since the seal is flush with the face of the flat plate of disc 44 (see FIG. 4), seal extension into the guide groove provides a much tighter corner seal. The seal 66 is supported on four surfaces (the three surfaces of groove 58 and the flush surface made up of the bottom flange 54, the recessed weld 62 and the bottom edge of plate 44). This makes possible very accurate location of the seal, and also enables the seal to be glued in place instead of relying on conventional fasteners, retaining strips, etc. If fasteners are required, a fewer number can be employed with washers instead of a conventional retaining strip. The bottom flange 54 of stiffener 50c is purposely thickened to accommodate groove 58, and also to accommodate tapped holes in the event that screw-type fasteners are employed.

An operating means, which may be of any conventional design and which is generally indicated at 70, is mounted centrally on the yoke members 16*a* and 16*b*. As herein depicted, the operating means comprises a handwheel 72 which is connected to a nut (not shown) journalled for rotation in housing 74. A threaded stem or spindle 76 extends through the nut in housing 74. Spindle 76 is connected at its lower end to the slide assembly 42 by means of a connector 80. As is best shown in FIGS. 8 and 9, the connector 80 is of a one piece cast design having an upper portion 80*a* adapted to fit in the corner 82 defined by flat plate or disc 44 and the upper surface 84 of the uppermost reinforcing rib 50*a*. The connector 80 is further provided with a depending or tail portion 80*b* which overlaps the reinforcing rib 50*a*. This relationship thus provides ample welding area as at 86 along all mating edges between the connector and the disc 44 and upper reinforcing rib 50*a*.

The connector is further provided with a vertically extending cast-in threaded passageway 88 for receiving the lower end of the threaded spindle 76. Both the spindle 76 and the connector 80 are provided respectively with transverse passageways 90 and 92 which when aligned, receive a locking pin 94. The end of pin 94 is preferably threaded as at 96 to receive a nut 98 in threaded engagement thereon. Passageway 92 is purposely vertically elongated to avoid the necessity for drilling the connector during assembly. Th connector 80 is further provided with vertically extending reinforcing ribs 100 which strengthen the tail portion 80b.

Having thus described a preferred embodiment of a slide gate construction in accordance with the present invention, the improvements and advantageous features incorporated therein will now be more apparent to those skilled in the art. More particularly, it will be seen that the entire gate may be prefabricated by a manufacturer and shipped as a single unit to a construction site. The grooves 34 on the specially extruded side members 14*a* and 14*b* enable the frame assembly to be securely embedded in a concrete wall without the necessity of resorting to bolts, pins or other like fastening devices. However, where the gate construction is to be attached to the face of a wall, the rugged lateral extensions 30*a* on each side member can be drilled to accept bolts. The frame side members 14*a* and 14*b* further provide dual guide slots 38 and 40 which receive both the edges of the flat disc 44 and its reinforcing members 50, thereby providing an improved transfer of stresses from the gate assembly 42 to the surrounding frame assembly. The specially extruded cross-sectional configuration of the lowermost reinforcing rib 50*c* facilitates attachment in an improved manner of a resilient seal 66. The lateral spacing of the permanently attached yoke members 16*a* and 16*b* permits the gate assembly 42 and its threaded connecting stem 76 to be rapidly removed as a unit without in any way disturbing the frame assembly.

It is my intention to cover all changes and modifications to the embodiment herein chosen for purposes of disclosure which do not depart from the spirit and scope of the invention as defined by the following claims.

I claim:

1. A slide gate adapted for mounting in an opening in a wall, said gate comprising: a frame assembly having a bottom member extending along the bottom of the opening, a pair of side members connected to and extending upwardly from said bottom member along the sides of the opening, said side members defining guide means facing inwardly towards the center of the opening, and yoke members interconnecting the upper ends of said side members, said yoke members being permanently and directly attached to and laterally spaced by said side members; a slide assembly located between said side members for vertical movement in relation thereto towards and away from said bottom member, said slide assembly including a flat disc member reinforced by a plurality of vertically spaced reinforcing ribs, the edges of said flat disc member and the ends of said reinforcing ribs protruding laterally into said guide means; operating means removably mounted on said yoke members; and connecting means connecting said operating means to said gate assembly, said operating means being operable to adjust the vertical position of said slide assembly relative to the bottom member of said frame assembly, the lateral spacing between said yoke members being sufficient to permit vertical removal from said frame assembly of said connecting means and said slide assembly following disconnection of said operating means from said yoke members.

2. The apparatus as claimed in claim 1 wherein said side members are each provided along the lengths thereof with front and rear laterally extending flanges interconnected by an intermediate web portion, each of said flanges being further provided with elongated

grooves which provide an interlocking feature when the side members are embedded in concrete.

3. The apparatus as claimed in claim 2 wherein said guide means is comprised of a pair of grooves, one of said grooves being defined by said intermediate web portion and said rear flange, the other of said grooves located in said front flange and being substantlally narrower in width than said first groove.

4. The apparatus as claimed in claim 3 wherein at least the lowest of said reinforcing ribs is provided with a bottom flange which is undercut adjacent the end thereof to provide a welding groove when the reinforcing rib is attached to said flat disc.

5. The apparatus as claimed in claim 4 wherein the bottom flange of the lowermost of said reinforcing ribs is further provided with a downwardly facing groove located rearwardly of said welding groove.

6. The apparatus as claimed in claim 5 wherein the bottom flange of the lowest of said reinforcing ribs is flush with the bottom edge of said flat disc, there being further provided a resilient seal member attached to said bottom flange, said resilient seal having a portion received in the downwardly facing groove in said bottom flange, and another portion extending forwardly beneath the bottom edge of said flat disc.

7. The apparatus as claimed in claim 1 wherein said connecting means includes a threaded stem extending downwardly from said operating means, the lower end of said stem being threaded in a stem connector attached to said slide assembly.

8. The apparatus as claimed in claim 7 wherein said stem connector is provided with an upper section adapted to fit in the corner defined by said flat disc member and the upper surface of the uppermost reinforcing rib, said stem connector being further provided with a depending tail portion which overlaps said uppermost reinforcing member.

9. The apparatus as claimed in claim 8 wherein said stem connector is further provided with laterally spaced reinforcing ribs which extend vertically along said upper section and the tail portion depending downwardly therefrom.

10. The apparatus as claimed in claim 9 further characterized by a first transverse passageway in said threaded stem adjacent to the lower end thereof, a second passageway extending transversally through said stem connection, said second passageway being elongated vertically, and a locking pin extending through said first and second passageways to prevent rotation of said threaded stem relative to said stem connector.

* * * * *

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,760,593 Dated September 25, 1973

Inventor(s) George E. Whipps

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Col. 1,	line 49,	delete "the" (2nd occurrence) and insert therefor --and--;
Col. 2,	line 23,	after "As" insert --is--;
Col. 3,	line 67,	after "th_" insert --e--;
Col. 4,	lines 36, & 37,	delete "opening in a wall" and insert therefor --open space defined for example by the edges of a wall opening or the bottom and side walls of an open channel,--
Col. 4,	line 39,	delete "opening" and insert therefor --open space--;
Col. 4,	line 41,	delete "opening" and insert therefor --open space--;
Col. 4,	line 42,	delete "opening" and insert therefor --open space--.

Signed and sealed this 2nd day of April 1974.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents

FORM PO-1050 (10-69)

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