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J. M. BLUNK

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THROUGH FLOOR PIPE BUSHING

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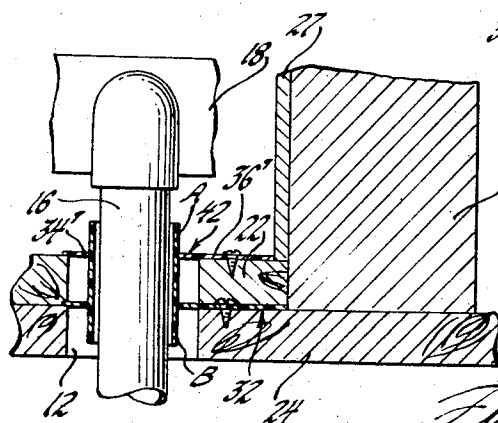
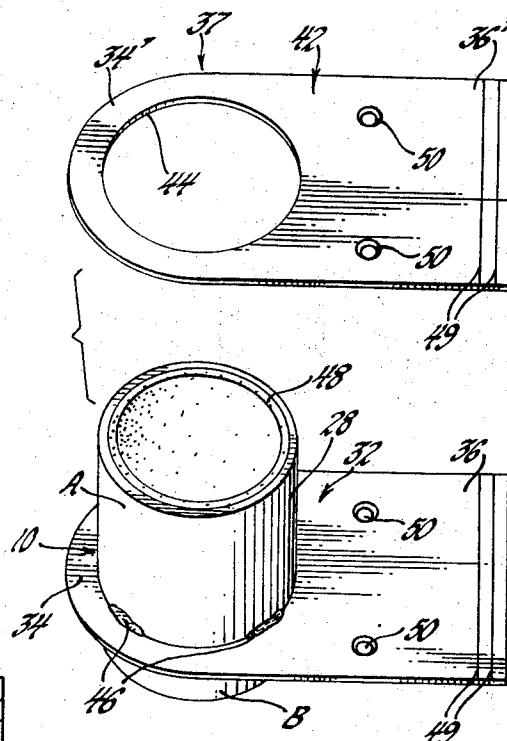
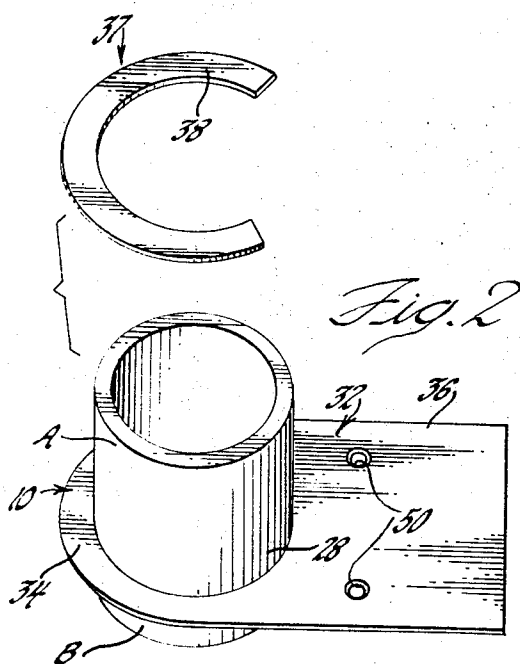
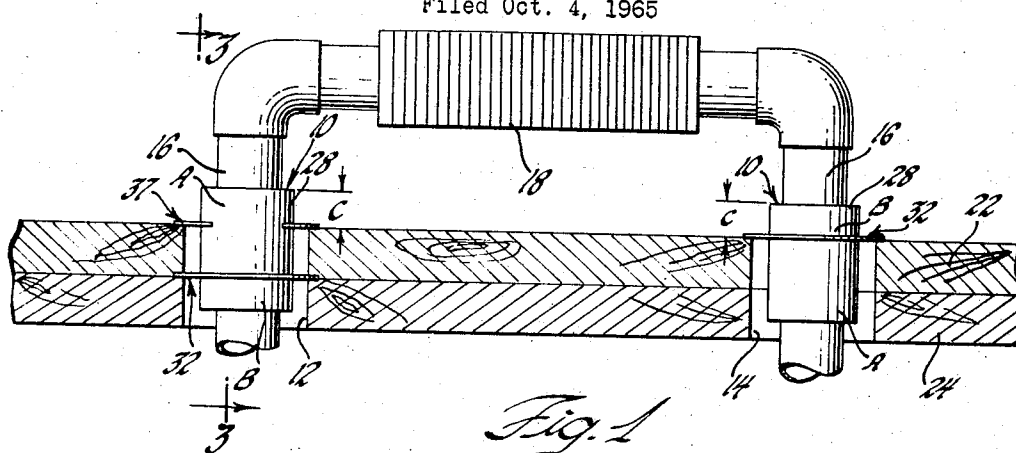


Fig. 4

INVENTOR

INVENTOR
John M. Blunk

Robert W. Smith

ATTORNEY

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THROUGH FLOOR PIPE BUSHING

John Madison Blunk, 511 Moorefield Road SW.,
Vienna, Va. 22180

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ABSTRACT OF THE DISCLOSURE

In a preferred form, a through floor pipe bushing is provided with a cylindrical bushing portion and an elongated thin mounting plate formed at a predetermined distance between the cylinder ends for mounting either on top or beneath a floor surface and the plate extends at a definite length from the center of the bushing for accurately positioning a pipe section relative to a reference point on the floor.

This invention relates to pipe bushings and more particularly to a through floor pipe bushing having an integral thin mounting plate for installation in various positions in conventional flooring structures.

It has been desired to have a bushing for use in house construction which is inexpensive, easy to use and adaptable for versatile support mountings. This has been recognized in the field of hot water baseboard heating installations, which has become increasingly popular in home heating facilities after only a few years since the first general use. In these installations, a supply line from a basement heating unit or boiler is run through the house flooring and connected to baseboard radiation units. Metal tubing is installed through holes or openings in the house flooring to conduct hot water to the radiation units. Heretofore, no satisfactory bushing has been used thereby leaving the floor opening uncovered and the metal tubing loose and unsecured. Uncovered floor openings have a distracting appearance and also provide an access from below the floor for dust, insects and rodents. Expansion and contraction of the unsecured conduit causes pipe movement and a scraping against the hole edges with a resulting noise which requires correction by costly service calls.

Accordingly, an object of the present invention is the provision of a through floor pipe bushing for cushioned retention of a metal tubing within a floor opening.

Another object is to provide a floor pipe bushing which can be mounted either on top of a floor surface or between flooring layers.

A further object of the invention is the provision of a through floor pipe bushing with a finished appearance to conceal and enclose irregular and objectionable appearances left by a floor opening.

Another object is to provide a combination bushing and cover plate in which the cover plate furnishes a template for uniform location of pipe openings.

A still further object is to provide a through floor pipe bushing particularly adapted for use with baseboard radiation heating installations being simple to install, inexpensive to manufacture and easily adapted to various supporting arrangements.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

FIGURE 1 shows a side elevation view, part in section, of a baseboard radiation heating unit installed with the through floor pipe bushing of this invention mounted in two alternate positions.

FIGURE 2 shows a perspective view of a molded

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plastic through floor pipe bushing of this invention and an associated cover plate.

FIGURE 3 shows an end view, in section, of the through floor pipe bushing structure of this invention looking in the direction of the arrows 3—3 of FIGURE 1.

FIGURE 4 shows a perspective view of a fabricated metal through floor pipe bushing of this invention with a cover plate having a configuration corresponding to a plate member of the bushing.

Referring now to the drawings, there is shown in FIGURE 1 through floor pipe bushing 10 of this invention installed in two floor openings 12 and 14 retaining and securing a pipe member, such as metal tubing 16. Metal tubing 16 is shown connected to a baseboard radiation unit 18 after being inserted through floor holes or openings 12 and 14. The pipe openings are made in conventional flooring structures having first and second floor layers 22 and 24, respectively. The first or finished layer 22 and second or subfloor layer 24 are of conventional wood lumber in accordance with conventional home or building flooring structures. The pipe or tubing 16, shown in FIGURES 1 and 3 is connected to the heat radiation unit 18 which is normally mounted along the baseboard portion of a wall partition 26, as shown in FIGURE 3. It is contemplated that the bushing 10 of this invention can also be utilized with wall or ceiling partitions or supporting joist members to retain other tubing, pipe or conduit connected to various plumbing or electrical devices.

The through floor pipe bushing 10 of this invention, shown in FIGURES 2 and 4, comprises a hollow cylindrical member 28 and a plate member 32. The cylindrical member 28 has an internal diameter sufficiently large to freely receive a pipe inserted therein and also to restrain movement of the pipe. It is standard practice in hot water baseboard installations to use 3/4-inch copper tubing and accordingly, the internal diameter of cylindrical member 28 is made 1 1/8 inches in a preferred embodiment to provide for normal movement while preventing lateral displacement within the floor opening.

The plate member 32 includes an arcuate flange portion 34 extending radially from one side of cylindrical member 28 forming a generally semicircular segment. The flange portion 34 provides a cover means as well as support for the cylindrical member. Plate member 32 also extends on the other semicircular side of cylindrical member 28 forming an elongated rectangular mounting portion 36. Mounting portion 36 has a width substantially equal to the outer width of the flange portion 32 and is a continuation therefrom for a predetermined distance. Plate member 32 is arranged intermediate the ends of the cylindrical member at fixed predetermined distances A and B, respectively, defining longer and shorter cylinder portions as is subsequently described. The elongated mounting portion 36 permits an alternate use as a pipe hanger in which bushing 10 is fastened vertically as to a floor joist member to support a pipe running beneath the floor.

The thickness of the plate 32 is required to be minimum while being sufficiently rigid to provide a secure mounting means. A minimum thickness permits plate 32 to be located between two floor layers as shown in FIGURES 1 and 3 without buckling or substantial separation of the layers 22 and 24. It has been determined that a plate thickness of 1/8 of an inch is an optimum dimension.

Installation of through floor bushing 10 on the subfloor layer 24 prior to laying of top floor layer 22 protects tubing 16 from lateral displacement before the building and flooring construction is completed. Sharp movement of the tubing causes damage to the heating installation and laying of the top layer 22 against tubing

16 forces the tubing out of position and also causes tubing scrape when the heating system is in use.

As noted above, plate member 32 divides cylindrical member 28 into longer and shorter cylinder portions A and B, respectively. Longer portion A is related to shorter portion B so that in either mounting of bushing 10, as between the floor layers, as in opening 12, or on top, as in opening 14, the upper exposed portion of cylindrical member 28 is the same distance C above the floor surface.

With plate member 32 mounted between the floor layers, the exposed portion of longer cylinder portion A is equal to distance C which is also the length of shorter cylinder portion B. As shown in the right hand portion of FIGURE 1, the shorter cylinder portion B is wholly exposed when plate 32 is mounted on the top surface of floor layer 22. The feature of mounting the cylindrical member in either of the two positions as described above provides a uniform appearance in the different mountings of floor bushing 10. In determining the length of cylindrical member 28, the shorter portion B is the length desired for extending above the floor surface, e.g. 1/2-inch. Longer cylinder portion A is equal to the combined length of portion B and the thickness of top flooring layer 22. The thickness of conventional flooring lumber is 3/4-inch and with a cylinder portion B of 1/2-inch, the longer cylinder portion A is accordingly 1 1/4 inches in one preferred embodiment.

A cover plate 37 is shown in FIGURES 2 and 4 for concealing and enclosing the top floor layer opening when the mounting plate is secured between the floor layers 22 and 24. The cover plate 37 shown in FIGURE 4 forms another feature of this invention in which the cover plate configuration 42 corresponds and is substantially identical in size to the bushing plate member 32. The portions 34' and 36' respectively correspond to the flange portion 34 and mounting portion 36 of plate member 32. The cover plate 42 includes an aperture 44 conforming to the outer surface of cylindrical member 28 so that it is fitted over an opening as shown in FIGURE 3. The length of the mounting portions 36 and 36' from the center axis of the cylindrical member 28 is substantially equal to the distance from the partition 26 to the center of the floor openings.

Location of a floor opening is determined by the distance pipe 16 is mounted from the partition 26 to make connection with radiation unit 18. Conventional baseboard radiation units are mounted on a finished baseboard wall portion 27 and connected to metal tubing at a standard distance from the baseboard finished wall, hence, cover plate 42 provides a template for uniformly locating floor openings such as 12 and 14 in addition to providing a cover means. In using cover plate 42 as a template, the floor openings are properly located parallel to the finished wall and properly aligned with the mounted radiation unit 18.

Thicknesses of wall surfacing materials vary, e.g. plywood panels, 1/4-inch; plaster board, 1/2-inch; and plastering work, 3/4-inch. Accordingly, the distance between the tubing and the rough wall varies by the thickness of the wall finishing material. FIGURE 3 shows cover plate 42 abutting the surface of finished baseboard wall 27, while the bushing mounting portion 32 abuts the rough wall portion of partition 26. The length of the mounting portions 36 and 36' may be respectively adjusted by breaking along scribed lines or grooves 49, which are approximately 1/4-inch apart to correspond to the differences in thickness of wall finishing materials as noted above. The cover plate 42 can be conveniently adapted for use in marking hole positions in either the top floor or the subfloor layers relative to a finished wall baseboard and a radiation unit mounted thereon.

Means for attaching the plate member 32 and cover plate 42 include holes 50 suitably placed for receiving fasteners such as screws or nails although other conventional attaching means are contemplated such as integral

tank projections or glue adhesives. The through floor bushing 10 can also be used in combination with a cover plate having varied configurations such as the conventional C-shaped cover plate 38 shown in FIGURE 2.

The bushing 10 is manufactured as an integral one piece molded plastic bushing, shown in FIGURE 2, or as a metal bushing assembly, shown in FIGURE 4. The metal pipe bushing includes a thin metal plate member 32 attached by welds 46 to cylindrical member 28 which is cut from metal tubing or pipe stock material. The plate 32 is also attached by any conventional metal fabrication technique including interlocking or frictional engagement with the outer surface of the cylindrical member. The cylindrical member 28 of metal includes a resilient insert 48 of heat resistant rubber, neoprene or the like to form a resilient cushion thereby preventing scraping of the pipe 16.

The one piece molded plastic through floor bushing of FIGURE 2 is produced by conventional molding techniques using a plastic material of polymeric amides and polyethylene type high polymers such as Teflon, nylon, polypropylene and the like. In a preferred embodiment polypropylene plastic is used although any of the above class of plastic materials can be used. These plastic materials include known properties of moldability, strength, heat resistance, resilience and self-lubrication. A cylindrical member 28 of the above plastic materials provides sufficient resilience so that slight movement of a supported pipe within the cylindrical member does not result in scraping. The self-lubricating properties of these plastics facilitates insertion of a pipe into the bushing as well as frictionless movement therebetween.

The plastic cylindrical member 28 and plate member 32 may be provided with an appropriately located dividing slit to allow resilient spreading to receive a pipe already installed in place. Other various modifications are contemplated and may obviously be resorted to by those skilled in the art without departing from the spirit and scope of the through floor bushing of this invention, as defined by the appended claims.

I claim:

1. The combination of a through floor pipe bushing having an integral mounting plate member and cover plate member comprising; a cylindrical member including an inner cylindrical resilient surface conforming and adaptable for slidably receiving a pipe member, said integral mounting plate member including a radial flange portion extending in a semicircular segment to one side of said cylindrical member and terminating in an elongated mounting plate portion, said plate portion continuing from the flange portion for a predetermined distance and having a width equal to the outer diameter of the radial flange, said cover plate member having substantially the same configuration and size as said integral mounting plate member and including a circular opening which is adaptable for slidably engaging the outer diameter of said cylindrical member so that with securing of said cylindrical member within the opening of a flooring board layer, said integral plate member and said cover plate member are aligned in parallel relationship along opposite sides of said flooring board layer.

2. In combination, a wall mounted apparatus extending above a two layer flooring structure and a through floor pipe bushing for retaining a pipe member connected to said apparatus, said through floor pipe bushing comprising, a hollow cylindrical member having a resilient inner cylindrical surface for receiving said pipe member and a thin mounting plate member, said plate member including a flange portion extending from one side of said cylindrical member and a rectangular mounting portion extending from the other cylindrical side, said plate member being receivable between the floor layers for securing said cylindrical member within a floor opening and extending from said other cylindrical side for a predetermined length to abut the wall having said appara-

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tus mounted thereon, whereby a pipe member being retained by said bushing member is aligned within a floor opening with respect to both the apparatus and the wall.

3. The combination of a through floor pipe bushing of moldable plastic material having an integral mounting plate member and a separate cover plate member for securing a pipe section within an opening of a floor board layer comprising; a cylindrical member including an inner cylindrical resilient surface conforming and adaptable for slidably receiving a pipe, said integral mounting plate member being located intermediate the ends of said cylindrical member and defining one cylindrical length portion which exceeds the other by the thickness of said flooring board layer, said integral mounting plate member having a radial flange portion extending in a semi-circular segment to one side of said cylindrical member and terminating in an elongated mounting plate portion, said plate portion continuing from the flange portion for a predetermined distance and having a width equal to the outer diameter of the radial flange, said cover plate member having substantially the same configuration and size as said integral mounting plate member and including a circular opening which is adaptable for slidably engaging the outer diameter of said cylindrical member so that with securing of said cylindrical member within the opening of a flooring board layer, said integral plate member and said cover plate member are aligned in parallel relationship along apposite sides of said flooring board layer.

4. In combination, a wall mounted apparatus extending above a two layer flooring structure and a molded plastic through floor pipe bushing for retaining a pipe member connected to said apparatus, said molded plastic through floor pipe bushing comprising; a hollow cylindrical member having an inner cylindrical surface for receiving said pipe member and a thin mounting plate member, said plate member being located intermediate the ends of said cylindrical member defining long and short cylindrical portion, said long cylindrical portion having a length equal to the combined length of said short cylindrical portion and the thickness of a floor layer, whereby said bushing is adaptable for mounting either on top or intermediate the two floor layers with the cylindrical portion extending the same distance above the flooring structure in either of the mounting positions, said plate member including a flange portion extending from one side of said cylindrical member and a rectangular mounting portion extending from the other cylindrical side, said plate member being receivable between the floor layers for securing said cylindrical member within a floor opening and extending from said other cylindrical side for a predetermined length to abut the wall having said apparatus mounted thereon, whereby a pipe member being retained by said bushing member is aligned within a floor opening with respect to both the apparatus and the wall.

5. In combination, a wall mounted apparatus extending above a two layer flooring structure and a through floor pipe bushing for retaining a pipe member connected to said apparatus, said through floor pipe bushing com-

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prising; a hollow cylindrical member having a resilient inner cylindrical surface for receiving said pipe member and a thin mounting plate member, said plate member being located intermediate the ends of said cylindrical member defining long and short cylindrical portions, said long cylindrical portion having a length equal to the combined length of said short cylindrical portion and the thickness of a floor layer, whereby said bushing is adaptable for mounting either on top or intermediate the two floor layers with the cylindrical portion extending the same distance above the flooring structure in either of the mounting positions, said plate member including a flange portion extending from one side of said cylindrical member and a rectangular mounting portion extending from the other cylindrical side, said plate member being receivable between the floor layers for securing said cylindrical member within a floor opening and extending from said other cylindrical side for a predetermined length, said rectangular mounting portion including a plurality of spaced grooved indicia parallel to the mounting portion end to adjust said predetermined length so that pipe bushing is adaptable for use with various finishing surfaces of the wall having said apparatus mounted thereon and a pipe member being retained by said bushing member is aligned within a floor opening with respect to both the apparatus and the wall.

6. The combination of claim 4 including a thin cover plate member having substantially the same configuration as said plate member including a corresponding flange portion and rectangular mounting portion, said cover plate having a substantially circular aperture conforming to the outer surface of said cylindrical member so that with the mounting portion of said cover plate rectangular mounting portion abutting the wall having said apparatus thereon said aperture is coaxial with said bushing cylindrical member.

7. The combination of claim 5 including a thin cover plate member having a substantially identical configuration of said bushing mounting plate member including a corresponding flange portion and rectangular mounting portion of predetermined length with spaced grooved indicia parallel to the mounting portion end, and said cover plate member including a substantially circular aperture conforming to the outer surface of said cylindrical member, whereby said cover plate member provides a floor opening enclosing means as well as a template means when the rectangular end of the cover plate member is abutting the wall with said apparatus mounted thereon, thereby positioning said aperture to locate a floor opening position to receive a pipe to be connected to said apparatus.

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JOHN PETO, *Primary Examiner.*

60 J. F. FOSS, *Assistant Examiner.*