April 8, 1930. H. PALTROWITZ 1,753,386

PIPE SLEEVE

Filed Sept. 6, 1927

FIGURE 1

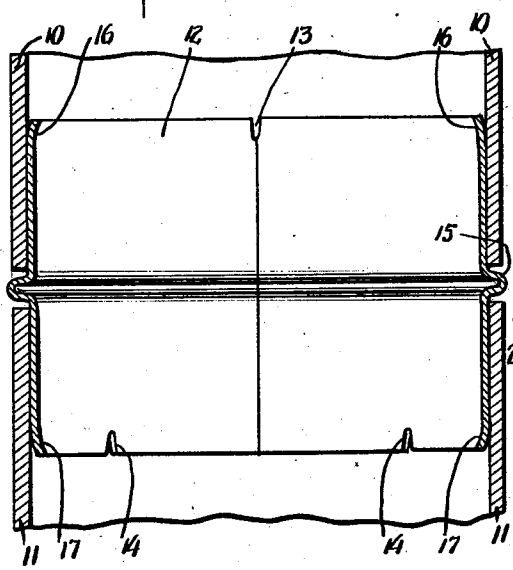


FIGURE 3

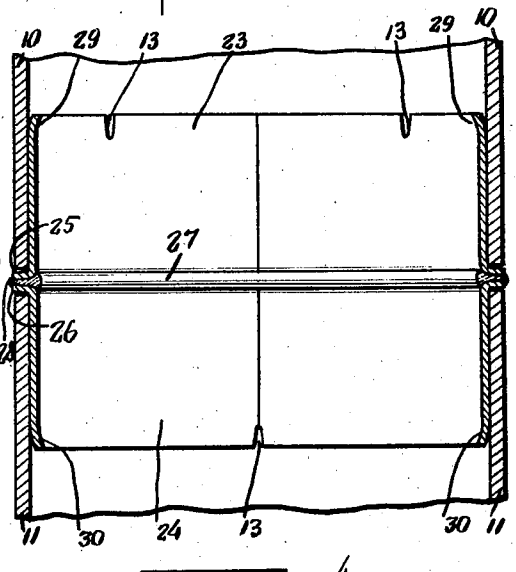


FIGURE 2

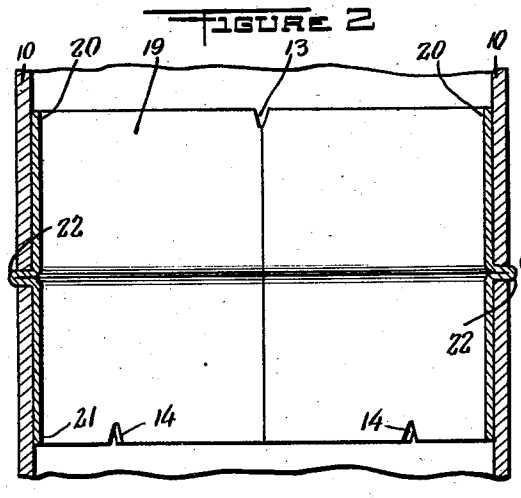


FIGURE 4

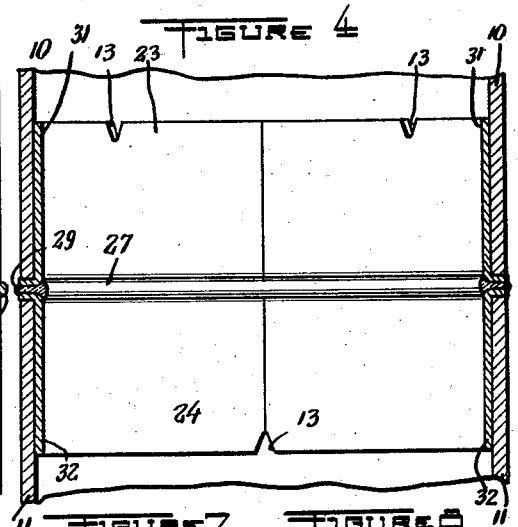


FIGURE 5

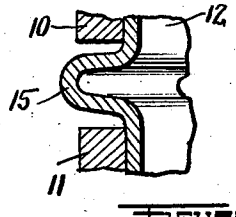


FIGURE 6

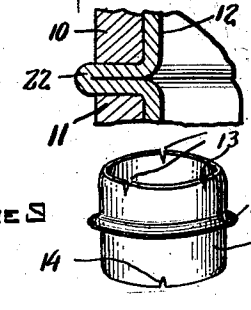


FIGURE 7

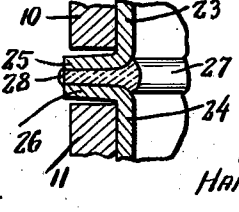


FIGURE 8

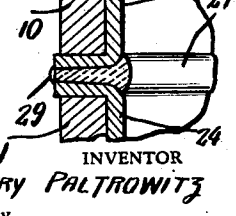


FIGURE 9

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Patented Apr. 8, 1930 1,753,386

UNITED STATES PATENT OFFICE

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PIPE SLEEVE

Application filed September 6, 1927. Serial No. 217,588.

My invention relates to pipe sleeves, of the kind employed in connecting up successive pipe sections, for use in building concrete piles, or in the construction of supporting posts, or the like; such, for instance, as are commonly used in the preparation of foundations for large buildings, bridges and the like.

As is well known in this art, very long piles are made by driving a pipe section into the ground, then connecting to its upper end another pipe section, and driving that section down in the ground so as to push the first mentioned section below it, then connecting up a third pipe section to extend upwardly from the top of the second pipe section and thus to form, section by section, a continuous pipe extending deep into the ground, as far as the finished pile is to extend. This done, any dirt or water within the pipe is next removed therefrom by discharging into the pipe a suitable quantity of air under high pressure. Finally, the finished pipe is filled with concrete material in plastic form, which thereafter sets and hardens, the concrete pile being thereby completed. In this manner, concrete piles of any reasonable length may be made. In practice these concrete piles are extended down to bed rock, or at least to a sufficient depth to give them a firm support at the bottom. They are tested in the manner well known in this art, to ascertain when they have a sufficiently firm footing.

My invention relates to the pipe sleeve used for connecting any given pipe section with the next successive pipe section, my purpose being to give the various parts such form and arrangement that the finished pipe, containing my improved pipe sleeve as an essential part thereof, is rendered water tight, strong, firm, durable and of increased efficiency as compared with pipes of the prior art, used for similar purposes.

The pipe formed by aid of my improved pipe sleeve may be forced down by either jacking or driving. Heretofore in this art it has been difficult to obtain a pipe sleeve which was well adapted for the formation of a pipe to be forced into the ground by the alternative of either jacking or driving, as the needs of a particular case might require.

My improved pipe sleeve is so constructed and arranged as to present a number of distinct structural features possessing advantages, all as hereinafter described and pointed out in the appended claim.

Reference is made to the accompanying drawing forming a part of this specification, and in which like reference characters indicate like parts throughout the several figures.

Figure 1 is a fragmentary vertical section through one form of my improved pipe sleeve, showing it as used to connect together two consecutive pipe sections, but in which the connection is not quite finished.

Figure 2 is a fragmentary vertical section showing the same pipe sleeve as Figure 1, but as it appears in the finished pipe.

Figure 3 is a fragmentary vertical section of another form of my improved pipe sleeve as used to connect two pipe sections, but in which the connection is as yet incomplete.

Figure 4 is a fragmentary vertical section showing the same sleeve as Figure 3, but as it appears in the finished pipe.

Figure 5 is a small fragmentary section, showing in detail a bead forming a part of the form of the pipe sleeve illustrated in Figure 1, as this bead appears shortly before the connection between the two consecutive pipe sections is completed.

Figure 6 is a small fragmentary section, indicating the form and construction of the bead after the connection is completed.

Figure 7 is a small fragmentary section, corresponding to the left middle portion of Figure 3, and showing the bead used in that form of my device, as such bead appears just before the connection is completed.

Figure 8 is a fragmentary section corresponding to the left middle portion of Figure 4, and showing the bead as it appears after the completion of the connection between the pipe sections.

Figure 9 is a perspective, showing the form of pipe sleeve indicated in Figure 1, as an article of manufacture.

A pair of successive pipe sections are shown at 10, 11.

One form of my improved pipe sleeve appears at 12. It consists of a substantially

cylindrical member, made of sheet steel and provided at its ends with V-notches 13, 14, as shown. There are three notches 13 at the upper edge of the sleeve, and three notches 14 at the lower edge thereof, so that each notch 14 is midway between two notches 13. In other words, the notches 14 are staggered relatively to the notches 13.

The sleeve 12 is further provided with a bead 15, swelled outwardly and completely encircling the sleeve, after the manner of an equator. This bead is integral with the body portion of the sleeve, and so formed and arranged as to extend out between the two pipe sections 11, 12, preferably a little past the peripheral surfaces thereof, as indicated in Figure 1.

The pipe sleeve is further provided at its upper edge with an edge portion 16 and at its lower end with an edge portion 17, these edge portions being curved or bent slightly inward, as shown. Thus the sleeve is at its top and bottom provided with bull nose ends. This is to facilitate the entrance of the ends into the pipe sections.

The thickness of the sleeve may vary to a considerable extent, depending upon the thickness of the walls of the pipe sections, and also to some extent upon practical conditions of operation. I find, for instance, that where the material of the pipe section is from three-eights of an inch to half an inch thick, the wall of the sleeve may be about three-sixteenths of an inch thick. However, it works well if somewhat thicker or thinner than as just indicated.

Referring to Figure 1, assume that the pipe section 11 has been driven into the ground, with its top portion protruding upwardly therefrom. The sleeve 12 is now fitted into the upper end of the pipe section 11, the inwardly extending edge portion 17 or the sleeve facilitating this purpose. Next the pipe section 10 is lowered from above, being properly braced and guided, so as to fit over and around the inwardly extending edge portion 16 of the sleeve.

Then the pipe section 10 is forced downwardly, preferably by being tapped upon its upper end by one or more wooden mauls, operated by hand. By a few strokes the sleeve 12 is moved downwardly and the parts assume the relative positions indicated for them in Figure 1; that is, with the bead extending outwardly between the adjacent end portions of the pipe sections, but these end portions are not yet in direct engagement with the bead, and the bead still being open or uncompressed, as may be understood by contrasting Figure 1 with Figure 2.

Next, a power hammer is applied to the pipe section 10, in a manner which need not here be explained in detail, because well known in this art. Under the action of the power hammer the pipe section 10 is forced down hard. One immediate effect is, to flatten the bead 15 and give it the form indicated at 22, in Figure 2. In doing this the ends of the pipe sections creep slightly in relation to the upper and lower halves of the sleeve. This action, which is found in practice to be positive and well defined, appears due to a tendency for the pipe sections, in approaching each other, to travel a trifle faster than the upper and lower portions of the sleeve. Hence there is set up, as between the sleeve and pipe sections, a peculiar shearing stress. The result is that the top and bottom portions of the sleeve are subjected to a torque, so that the inwardly bent edge portions 16 and 17, shown in Figure 1, are forced outwardly, and caused to press hard against the adjacent internal surfaces of the pipe sections, and are rendered truly cylindrical, as shown at 20 and 21, in Figure 2.

This completes the connection between the pipe sections 10 and 11, and the result is a finished pipe shown in Figure 2.

In this finished pipe the slots 13 and 14 of the pipe sleeve are found to be splayed or widened out, as indicated in Figure 2. In fact the appearance of the sleeve within the finished pipe, and now forming a part thereof, is much the same as if a direct pressure had been exerted radially outward against the upper and lower portions of the sleeve, causing them to bind very tightly against the adjacent inner surfaces of the pipe sections, the sleeve as a whole appearing as indicated at 19, in Figure 2.

In the form of pipe sleeve shown in Figure 3 I make use of two short cylindrical portions 23, 24, provided with outwardly extending flanges 25, 26 of annular form, these flanges being welded integrally upon opposite sides of a ring 27, all of these parts being of metal, preferably steel. The sleeve thus made up is provided at its top and bottom with V-notches 13 and 14, as above described with reference to the sleeve 12 shown in Figure 1.

Except as otherwise above stated, the structure and action of the pipe sleeve shown in Figure 3 are like that of the other pipe sleeve. When the connection is completed, as shown in Figure 4, the sleeve is essentially a part of the pipe, and appears as shown at 23, the upper and lower edges 31 and 32 being truly cylindrical, and pressing hard against the adjacent internal surfaces of the pipe.

While the connection remains incomplete, as indicated in Figure 3, the outer peripheral edge portion of the steel ring 27 presents a bead 28 of annular form, and when the connection is completed this bead appears as shown in Figure 8, at 29.

I find that each of my two pipe sleeves above described is very adaptable, and that the finished pipe in which it is incorporated

is thoroughly water tight, strong and reliable, easily braced, and true in alinement, section by section.

In some kinds of foundation work, and especially in operating beneath heavy buildings or below superstructures having enormous weight, it is desirable to force the pipe downward by means of a jack. A pipe made up with either form of my sleeve may be forced into the ground by either driving or jacking, and will stand well under any normal strain to which it may thus be subjected.

I do not limit myself to the precise mechanism shown, as variations may be made therein without departing from my invention, the scope of which is commensurate with my claim.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is as follows:—

The combination of a pair of pipe sections, a pipe sleeve provided with an equatorial portion extending between and abutted by the ends of said pipe sections, said equatorial portion being compressed between the ends of said pipe sections when said pipe sections are subjected to pressure endwise of the length thereof, said pipe sleeve being further provided with portions fitting into adjacent ends of said pipe sections, said last mentioned portions of the pipe sleeve being provided with notches and forcibly urged outwardly against the interior walls of the pipe sections by means of the endwise pressure exerted by said pipe sections when assembled upon the outside surface of said pipe sleeve at the equatorial portion thereof.

Signed at New York, in the county of New York and State of New York, this 3d day of September, 1927.

HARRY PALTROWITZ.