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2,710,677

PROTECTIVE SLEEVE FOR METAL POSTS

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Fig. 1.

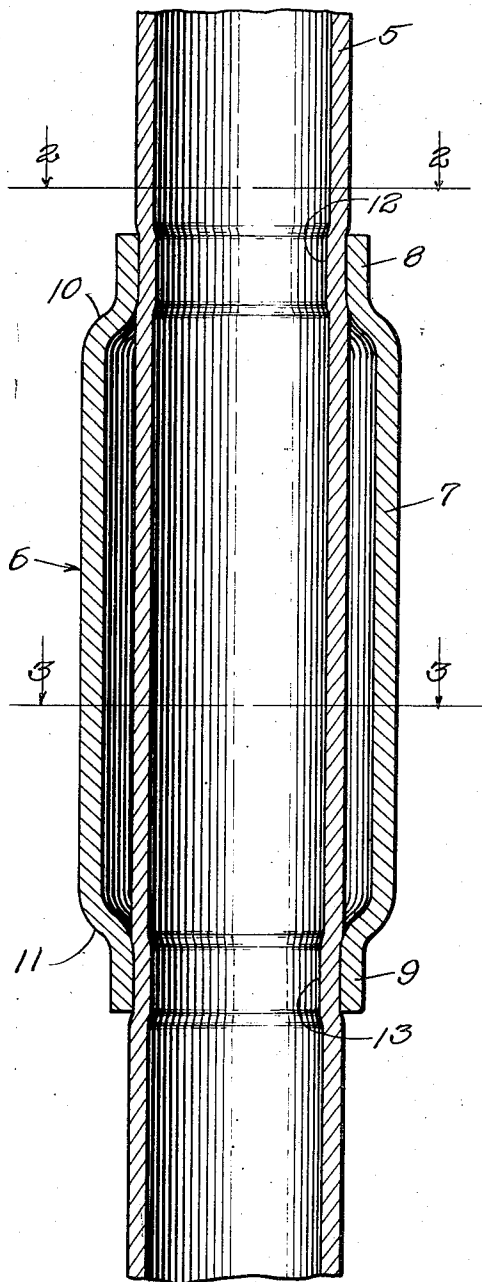


Fig. 2.

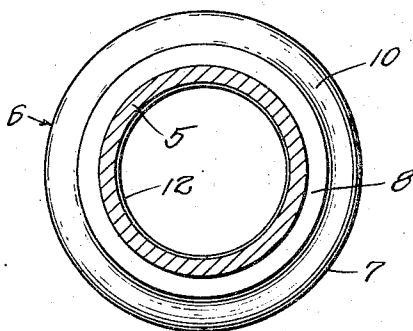
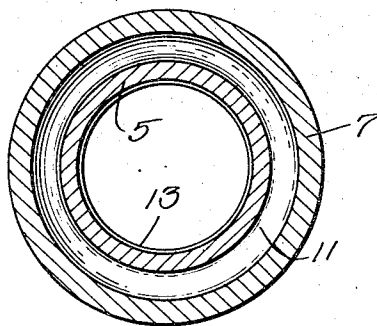


Fig. 3.



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PROTECTIVE SLEEVE FOR METAL POSTS

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1 Claim. (Cl. 189—32)

This invention relates to a metal post construction in which a post which is partially embedded in soil or concrete has a protecting and strengthening sleeve embracing it at ground level, and in particular it relates to a construction in which the end portions of the sleeve have their inner surfaces hermetically sealed to the post.

A number of different methods have been proposed for applying a protective shield to a metal post so as to prevent corrosion of the post and strengthen it at ground level—that is, at the level where it enters the ground or a concrete floor in which it is embedded. Lincoln Patent 712,394 shows a sleeve which has inturned flanges at its ends which have an internal diameter slightly less than the external diameter of the post, and which is heated and shrunk onto the post to provide a hermetic seal at its ends. It is not possible, however, to make the outer surface of a post and the flange faces of the sleeve sufficiently smooth to provide a dependable seal, and furthermore the relatively narrow flanges produce stress concentrations which tend to weaken the post instead of strengthening it.

Howard Ferris Patent 1,624,485 recognized the impracticability of attempting to seal a sleeve of the type shown by Lincoln, and solved the problem by providing holes in the pipe under the sleeve and dipping the structure into a protective material such as asphaltum, which coats the entire unit, both inside and outside the sleeve.

Applicant has discovered that a much more dependable seal than any heretofore known in this art may be obtained without the use of any surface coating material if an alloy steel sleeve has its end portions necked in under very heavy deforming pressure so that its inner surface adjacent its ends is in circumferential surface contact with the pipe, the deforming pressure being so high that the pipe is slightly deformed where it is gripped by the sleeve and the material of the sleeve is pressure flowed into the surface irregularities of the pipe.

It is quite important that an alloy steel of particular grain characteristics be used. In cutting the alloy steel sleeve a burr is formed, and it is necessary that this burr be as small as possible so that it will not interfere with obtaining a proper hermetic seal. A sleeve which is formed of long grain steel alloy may be cut without leaving any substantial burr, while the reverse is true of a short grain steel. While it is perfectly possible to remove the burr from the cut ends of pipe, it is not practicable to do so within the necessary cost limits of a manufacturing operation of this character. Thus, the use of a material which does not form a substantial burr when cut is of great practical importance in the manufacture of a shielded steel post.

The necked in end portions of the sleeve occupy a fairly substantial area along the length of the pipe—much greater than that obtained in a shield construction having inturned end flanges. This is an important factor in strengthening the post because it prevents the stress concentrations which tend to take place at the upper sealing line between the sleeve and post when the post is

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subjected to bending strains. The post and shield structure here disclosed is therefore substantially stronger than any prior art construction of which applicant is aware.

Shielded post structures of this general type are used in large numbers in cow stall construction in which the lower ends of the posts are embedded in the concrete floor of a barn. The cost of manufacturing such cow stalls depends heavily upon the size of the material which must be used in the stall structure, and the present invention permits the production of a stall of considerably increased strength without the necessity for using larger pipe. This is of considerable interest both to dairymen and manufacturers of barn equipment because of the fact that in the past 25 years the average weight of dairy cattle has increased by about 25% so that it is desirable to increase stall strength proportionately.

The invention is illustrated in a preferred embodiment in the accompanying drawings in which:

Fig. 1 is a vertical sectional view of a pipe provided with the improved shield;

Fig. 2 is a section taken as indicated along the line 2—2 of Fig. 1; and

Fig. 3 is a section taken as indicated along the line 3—3 of Fig. 1.

Referring to the drawings in greater detail, a metal pipe 5, which is to be used as a post, is provided with a protective sleeve 6 which is formed of an alloy steel pipe which is quite resistant to corrosion so as to act as a shield which protects the post against moisture damage. The preferred alloy steel pipe is a continuous weld pipe which is sold under the trade-mark "Yoloy" by the Youngstown Sheet & Tube Co. Yoloy pipe is a very corrosion resistant pipe of long grain structure having the following average chemical and physical properties:

Average chemical properties Yoloy pipe

C	Mn	P	S	Cu	Ni
.06%	.42%	.010%	.031%	.95%	1.75%

Physical properties

Average values for
1" continuous weld
Yoloy pipe

Tensile strength	62384 p. s. i.
Yield point	48802 p. s. i.
Elongation	23.9% in 8"

Assuming that the pipe is to be used as a partition post in a cow barn, the post might be embedded in concrete, for example, from the line 3—3 downward. It is well known that metal posts have a great tendency to rust at ground level—that is, along the line where the post enters any foundation material in which it is embedded, whether that material be earth or concrete. Rust formed at the ground level is particularly deleterious because it is at ground level that any bending stresses are applied to the post as a result, for example, of an animal lurching against it. Thus the post becomes weakened along the line at which the bending strain is concentrated.

As best seen in Fig. 1 the sleeve 6 has its central portion 7 in spaced relation to the pipe 5, and is necked in at its ends 8 and 9 to bring the inner surfaces of the end portions of the sleeve into contact with the post 5. Under the heavy forming pressures employed the grain of the sleeve and of the post may become substantially homogeneous. The necking operation forms annular shoulders 10 and 11 adjacent the two ends of the sleeve 6.

The end portions of the alloy steel shield are necked in under extremely high forming pressure so that the pipe 5 is slightly distorted, as seen at 12 and 13 in Fig. 1. A forming pressure of about 80 tons is employed. The distortion is sufficient to be visible to the naked eye upon

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sighting through the post, but is somewhat exaggerated in the drawings for clarity of illustration. The heavy forming pressure used is sufficient to flow the material of the sleeve in the areas 8 and 9 so that it fills any irregularities in the surface of the pipe 5.

The relatively great extent of the gripping and contacting areas 8 and 9 of the sleeve is of great importance in strengthening the construction by eliminating the stress concentrations which are present in shield structures in which the sleeve has intumed flanges at its ends. The area of contact at each end should be at least one-half inch, and preferably is more than that.

An additional factor of great practical importance is that the necking operation compensates for any irregularities in the size of the post or of the sleeve. Normal manufacturing tolerances on the pipe and the continuously welded alloy sleeve are not very close; and the necking operation automatically takes up any variations in external diameter of the post and internal diameter of the sleeve within normal manufacturing tolerances.

The foregoing detailed description is given for clearness of understanding only and no unnecessary limitations are to be understood therefrom, as some modifications will be obvious to those skilled in the art.

I claim:

In combination, a metal pipe adapted for use as a

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post, and a steel shield of corrosion resistant continuously welded pipe surrounding a portion of said post to protect the post from moisture damage and strengthen the post at ground level, said shield being in spaced relationship to said post over its entire central portion and having end portions of reduced diameter the internal surfaces of which are in intimate, direct facing engagement with the raw outer surface of the post, said end portions having a thickness at least as great as that of the central portion, said post having a band of radial deformation beneath each of said reduced end portions of the shield, said reduced end portions of the shield being enmeshed with and effectively filling the surface irregularities and interstices of the outer surface of the post to hermetically seal the shield on the post.

References Cited in the file of this patent

UNITED STATES PATENTS

712,394	Lincoln	Oct. 28, 1902
753,555	Douglas et al.	Mar. 1, 1904

FOREIGN PATENTS

4,839	Great Britain	Mar. 2, 1903
32,810	Austria	May 11, 1908
472,942	Great Britain	Oct. 4, 1937