

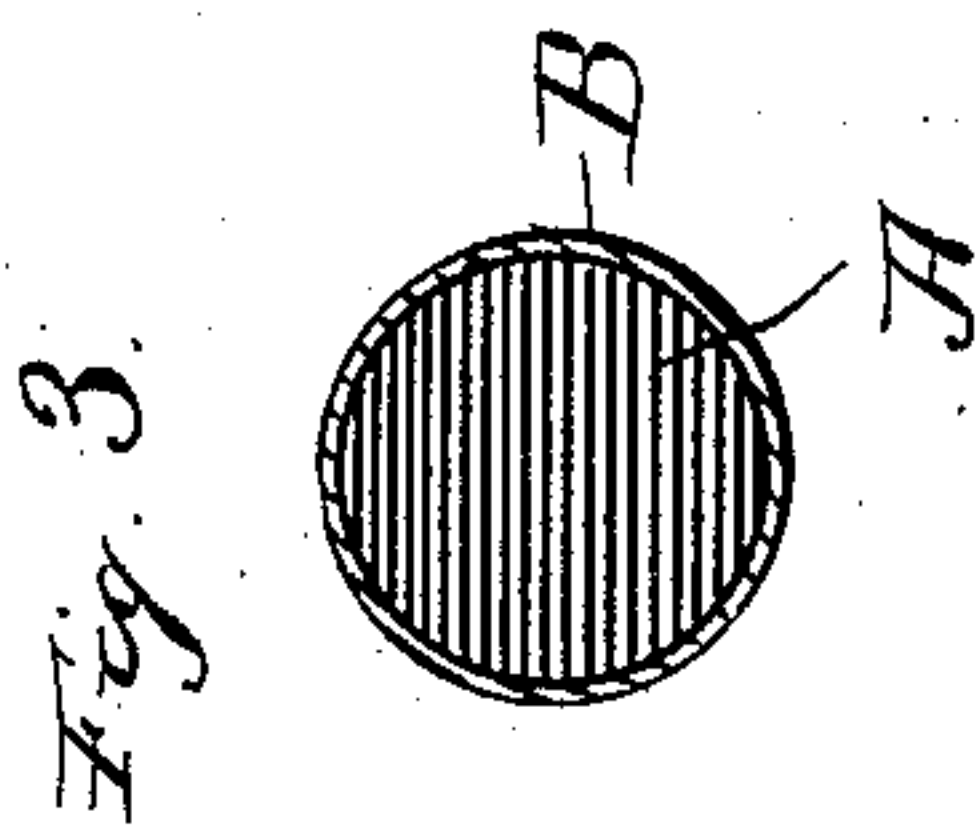
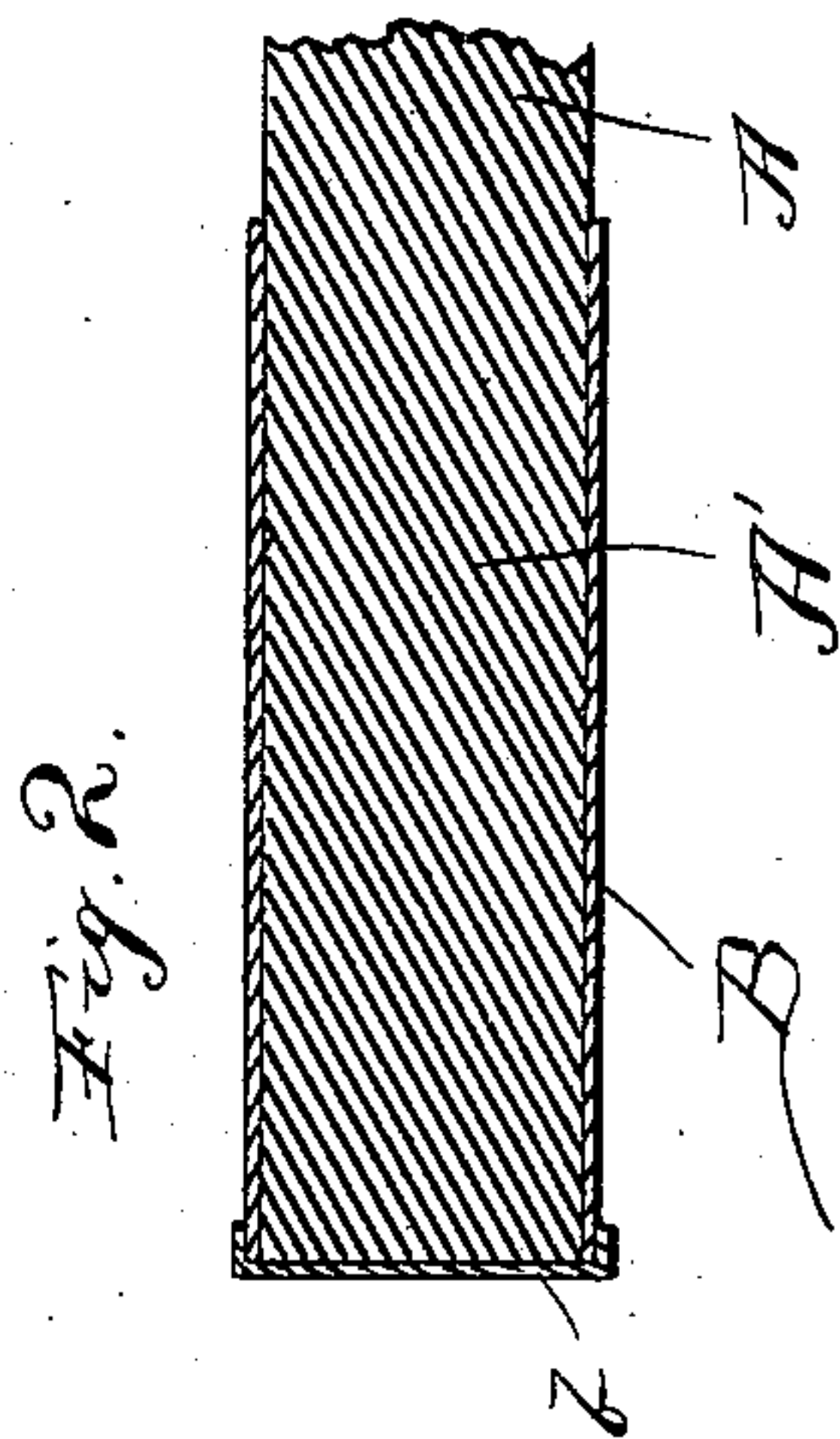
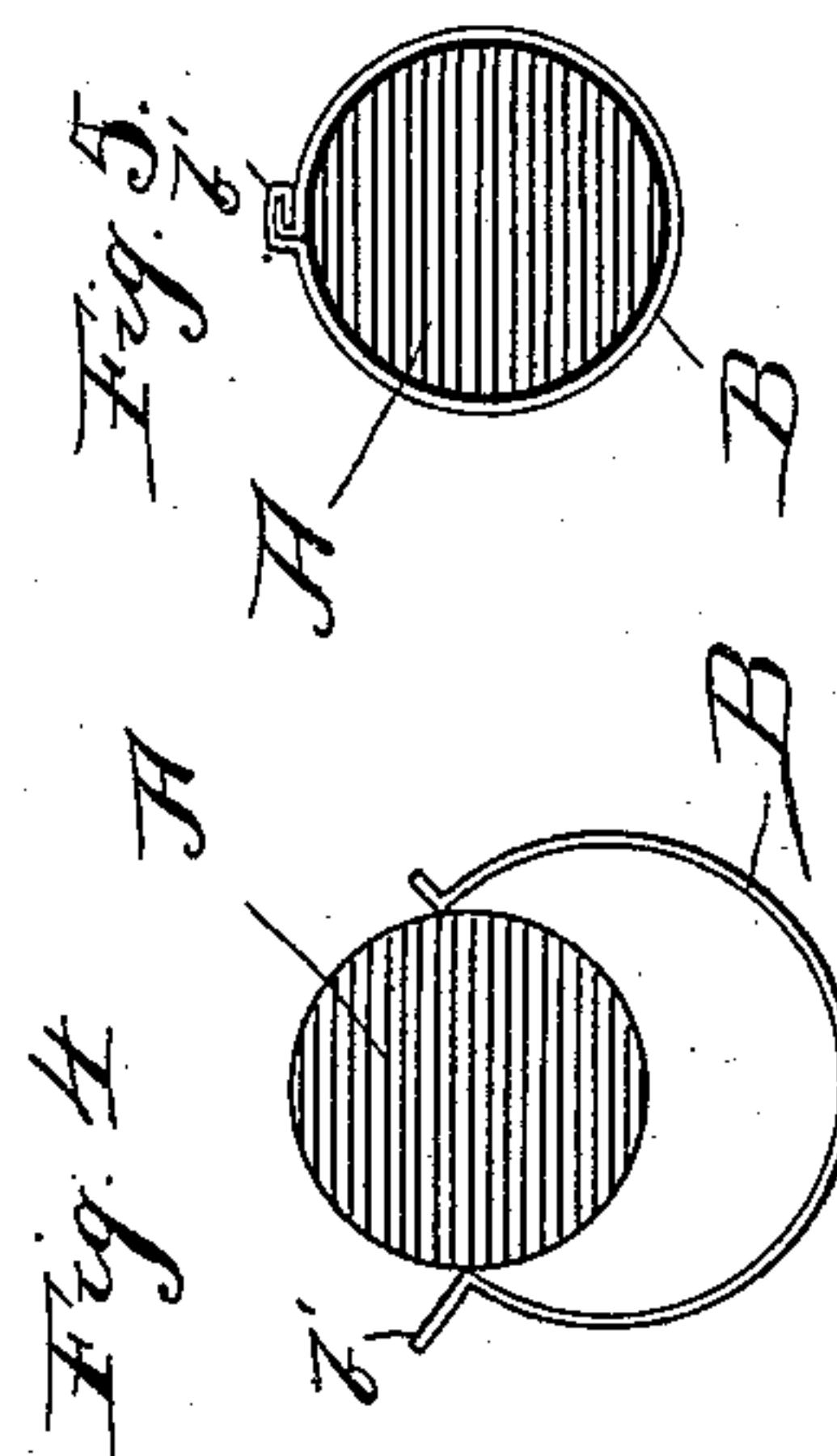
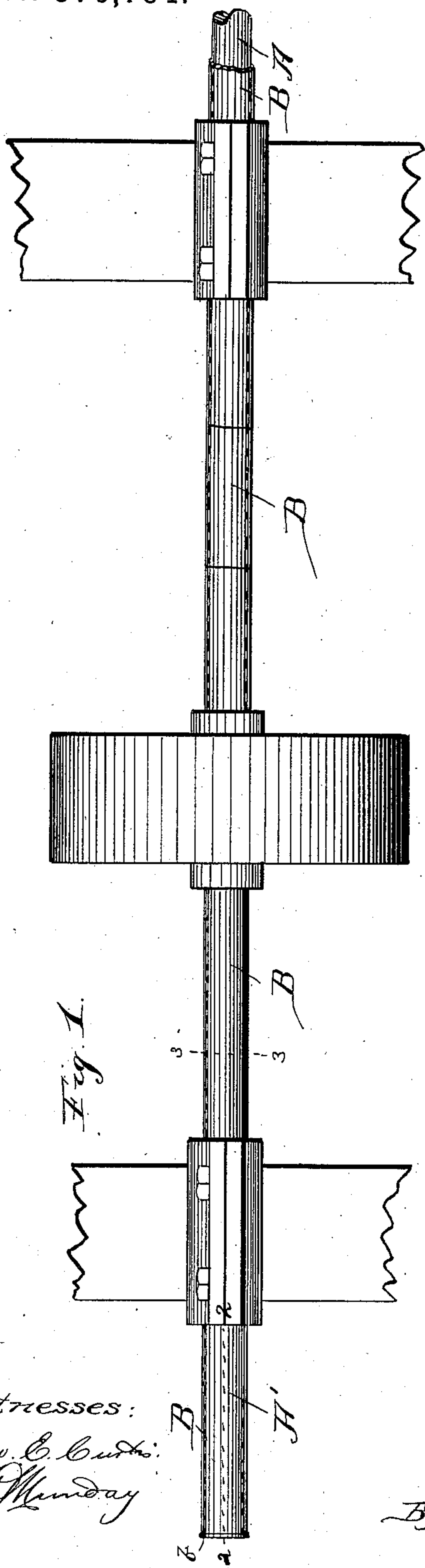
(No Model.)

D. M. HAYWORTH.

SHAFT COVERING.

No. 370,784.

Patented Oct. 4, 1887.



Witnesses:
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UNITED STATES PATENT OFFICE.

DAVID M. HAYWORTH, OF CHICAGO, ILLINOIS.

SHAFT-COVERING.

SPECIFICATION forming part of Letters Patent No. 370,784, dated October 4, 1887.

Application filed May 12, 1887. Serial No. 237,995. (No model.)

To all whom it may concern:

Be it known that I, DAVID M. HAYWORTH, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Shaft Coverings or Protectors, of which the following is a specification.

My invention relates to devices for covering or protecting revolving shafts in mills and other machinery from injuring persons that may come in contact therewith.

Heretofore shaft-coverings have usually consisted of stationary boxes surrounding the shaft. These boxes or troughs are often clumsy and in the way, and frequently the shafts are so located that it is difficult to properly support such covering-boxes.

My invention consists, in connection with a revolving shaft, of a light metal covering-tube fitting over the shaft and supported and kept in place by it. This covering-tube fits the shaft snugly, so that the covering-tube will revolve with the shaft ordinarily, and yet loosely enough so that when a person or anything presses against the tube-covered shaft or comes in contact with it the covering-tube will remain stationary and the shaft revolve within it. The covering-tube is preferably made of thin sheet metal—such as tin, light brass tubing, or galvanized sheet-iron—and I prefer to make the covering-tube longitudinally seamless. It may, however, be made like an ordinary tin-can body, with a longitudinal seam. As this metal covering-tube is light and fits the shaft smoothly, its revolving motion with the shaft is very easily arrested, and as the covering-tube revolves with the shaft, except at those times when something comes in contact with it, there is little or no friction or wear upon the covering-tube by the shaft. The covering-tube being made of thin light metal and of true circular shape, like the shaft, it adds very little to the diameter of the shaft, and in no way interferes with the neat appearance of the shafting and machinery. Indeed, as I often make my covering-tubes of polished or plated metal, it is very difficult to distinguish the covered portion of a shaft from the uncovered part. As the exterior of the covering-tube is smooth and round, like the shaft itself, and of but little increased diameter, there is not the least danger of injury by coming in con-

tact with the covering-tube when it is rapidly revolving with its shaft. The covering-tube should not be so loose upon the shaft but that it will by its friction upon the shaft revolve with it. The friction or tightness of fit of the tube upon the shaft should, however, be so slight as to readily permit the shaft to turn within the covering-tube when anything tends to hold the covering-tube from revolving. Where the covering-tube fits upon the projecting end of the shaft I provide the covering-tube with a cap or closed end, so that the end of the shaft will not be exposed. Where shafting to be covered is of great length I deem it preferable to divide the covering-tubes into a number of shorter lengths, each of, say, two or three feet, as any danger of the tube binding upon the shaft by reason of slight inaccuracies in either shaft or tube will thus be prevented.

In the accompanying drawings, which form a part of this specification, and in which similar letters of reference indicate like parts, Figure 1 is a side elevation of a shaft provided with my invention. Fig. 2 is a central longitudinal section of the shaft and its covering on line 2 2 of Fig. 1. Fig. 3 is a cross-section on line 3 3 of Fig. 1. Figs. 4 and 5 show a modification.

In the drawings, A represents a revolving shaft.

B is a close-fitting exteriorly and interiorly smooth metal covering-tube, fitting the shaft closely or with a slight degree of friction, so that the tube will revolve with the shaft ordinarily and be adapted to permit the shaft to revolve within the tube when external objects come in contact with the covering-tube. The covering-tube is made in sections of convenient length, preferably of from two to three feet or shorter, according to the length of the shaft or part of the shaft to be covered thereby. The covering-tube B is furnished with a cap or closed end, b, where the covering-tube fits over the projecting end of a shaft, as at A'. The covering-tube is preferably made of thin sheet metal, about one thirty-second or one sixty-fourth of an inch in thickness, so that it will be somewhat elastic or flexible, and thus fit the shaft more closely and snugly, while at the same time it is loose to readily permit the shaft to revolve within it.

The covering-tube may be made of seamless

brass tubing, of tin or other sheet metal. The interior surface of the tube is smooth, and fits accurately the smooth surface of the shaft. The shaft itself supports the covering-tube and keeps it in place by its loose frictional connection therewith. The covering-tube may be made of any length desired to fit the exposed part of the shaft to be covered between the bearings, pulleys, &c.

I do not claim a stationary or non-revolving covering or box for shafts, as I am aware that they are old.

The covering-tube B may be applied over the end of the shaft by slipping it on endwise, or where the shafting or machinery is already put up the tube B may preferably be made with a longitudinal seam and sprung on side-wise over the shaft, as indicated in Figs. 4 and 5, the side seam, *b'*, being closed after the tube is thus sprung upon the shaft.

The shaft A, upon which the tube fits, supports the tube at all points and prevents it from being dented or bent out of shape. It will always, therefore, readily permit the shaft to revolve within it.

The side seam, *b'*, may be formed after the tube is sprung upon the shaft either by folding or rolling its flanges into an interlocked seam; or the lapping edge of the tube may be soldered.

I hereby disclaim as not of my invention the devices shown and described in Letters Patent Nos. 137,991 and 169,706, and in the English Patent No. 425 of 1876.

I claim—

1. The combination, with revolving shaft A, of light flexible metal covering-tube B, fitting closely upon said shaft with a slight degree of friction throughout the length of said tube, substantially as specified.

2. The combination, with revolving shaft A, of light flexible metal covering-tube B, fitting closely upon said shaft with a slight degree of friction throughout the length of said tube, said covering-tube being furnished with a cap or closed end, *b*, substantially as specified.

3. The combination, with a shaft, of a light flexible metal covering-tube, B, fitting closely around the shaft with a slight degree of friction between the two throughout the length of said tube, so that the covering-tube will revolve with the shaft, and at the same time permit the shaft to revolve within the tube when the latter is held from revolving, said tube being made in short lengths, substantially as shown and described.

4. The combination, with a shaft having a smooth exterior surface, of a close-fitting light flexible covering-tube, B, having a smooth and circular exterior surface and a smooth and circular interior surface, the interior diameter of said tube being equal to the diameter of said shaft, substantially as specified.

DAVID M. HAYWORTH.

Witnesses:

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