April 24, 1956 L. G. BERQUIST 2,743,098

ANNEALING STEM

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FIG. 1.

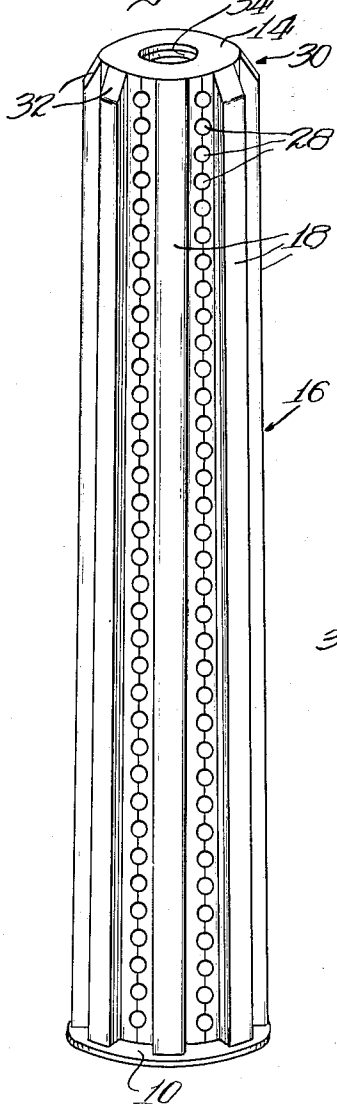
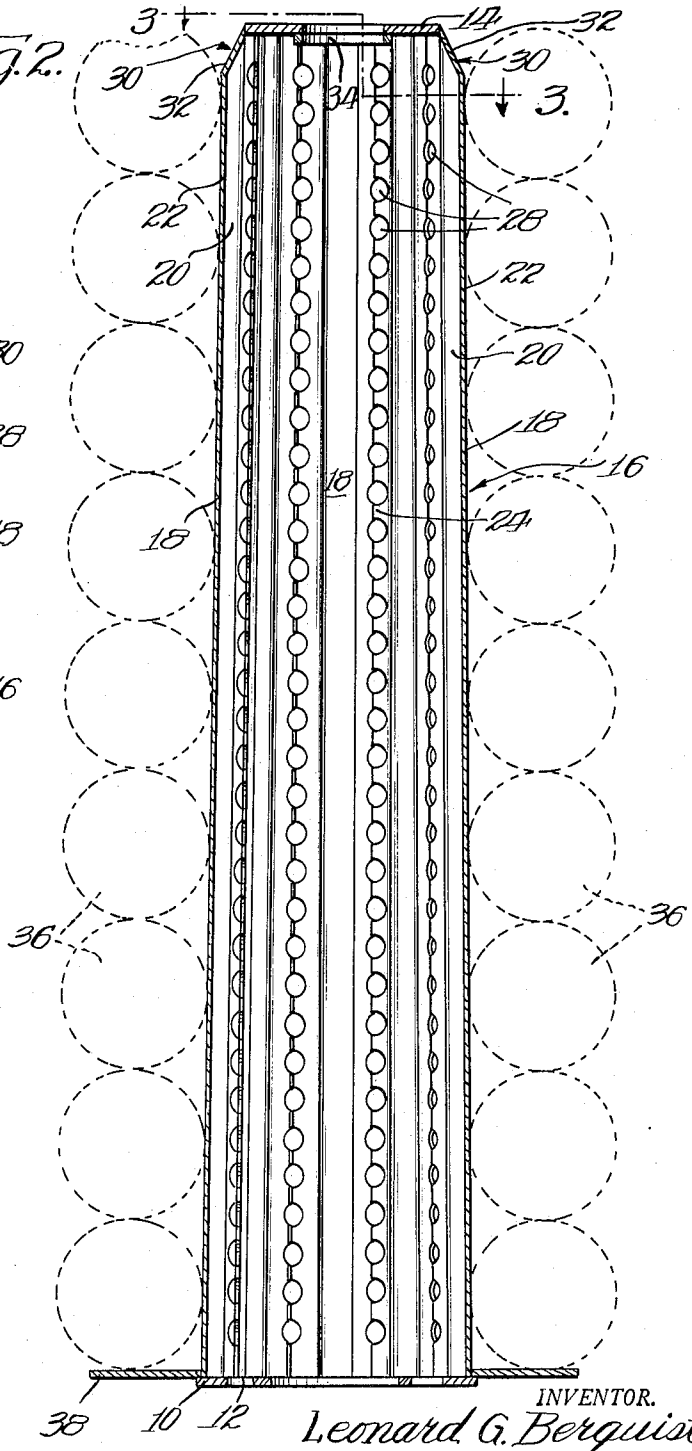


FIG. 2.



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Fig. 3.

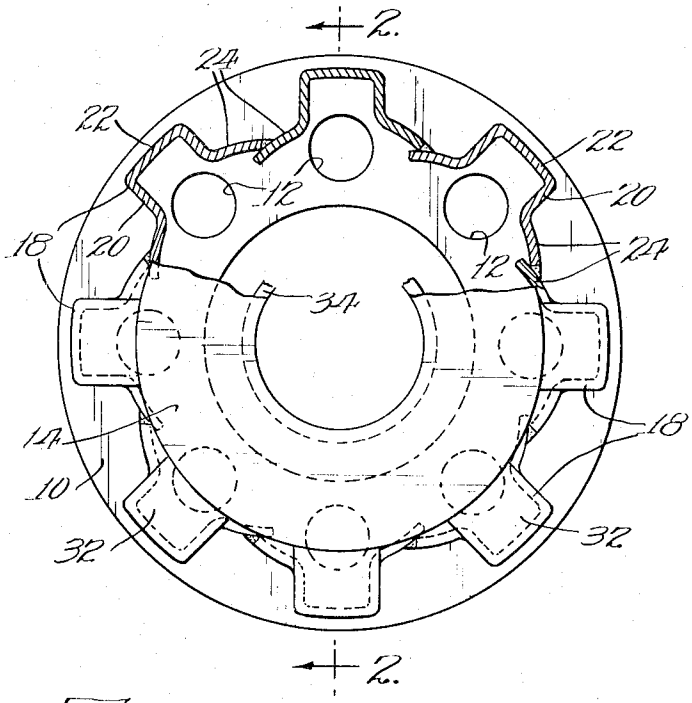


Fig. 4.

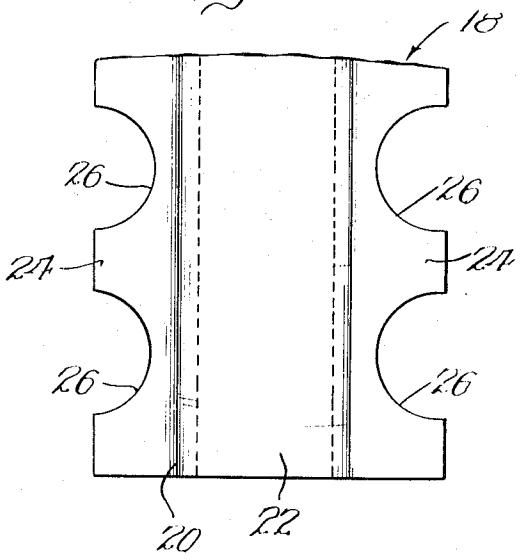
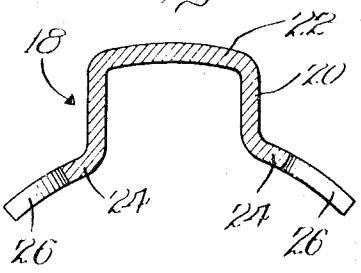


Fig. 5.



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2,743,098

Patented Apr. 24, 1956

2,743,098

ANNEALING STEM

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Application December 18, 1952, Serial No. 326,649

2 Claims. (Cl. 266—2)

The present invention relates to annealing stems, and, particularly, to an improved stem structure for supporting coils of wire or the like during annealing or other heat treating operations.

Annealing stems of the general character referred to herein have been previously proposed and successfully used. For example, in Patents No. 2,206,121, No. 2,310,991 and No. 2,334,439, all granted to Robert C. Pierce and all assigned to the assignee of the present application, several practical annealing stems and the manner of using the same are disclosed. The present invention relates to improvements in such stems.

An annealing stem to be completely practical must meet several conflicting requirements. It must possess substantial strength in order to support several coils of wire; it must not be subject to distortion when frequently heated and cooled; it must provide ample space for the passage of heated air or other fluids so that the coils supported thereon will be uniformly treated; it should not be bulky or heavy otherwise it will draw too much heat from the furnace or the like and from the coils and will prevent proper treatment of the coils; and it should be light in weight to facilitate manipulation and handling thereof. Heretofore, it has been necessary to sacrifice the latter two requirements in order to attain the first three, and most important, requirements of the structure.

It is an object of the present invention to provide an improved annealing stem that meets all of the requirements set forth above without sacrifice. In particular, it is an object of the present invention to provide an annealing stem that is light in weight, is made of relatively thin section material and is not bulky, and at the same time is strong, is not subject to distortion and provides more than ample space for the circulation of treating fluids.

According to the invention, I provide an annealing stem comprising a top plate, a bottom plate, and a plurality of staves of special form extending between said plates and defining a generally cylindrical but preferably undulatory body or stem portion. The staves are preferably of a flanged U-shape in cross section, with the flanges being curved to define a base circle and the base wall of the U-portion defining a tooth or outer circle. Several staves are utilized in welded side-by-side relation to define, more or less, a cylinder having peripherally spaced radially outwardly projecting teeth extending longitudinally thereof. When the coils are positioned on the stem, ample space is provided at the root portions of the toothed cylinder for circulation of treating fluids. Due to the thin section of the staves and plates, the stem will be light in weight and will not absorb a substantial amount of heat. However, due to the structural assembly of the staves and plates, the stem will be strong at all temperatures and will not be subject to distortion.

Another object of the invention is to provide the staves with serrated or notched flange portions, so that when the staves are assembled, the flange portions thereof will

define a plurality of apertures establishing communication between the interior of the stem and the root portions or recesses of the toothed or undulatory cylinder for the circulation of coil treating fluids.

A further object of the invention is the provision of an improved annealing stem having coil positioning portions adapted to maintain the inner diameter of the coils of wire during treatment and to prevent distortion thereof.

A still further object of the invention is the provision of an improved annealing stem that is economical in manufacture and assembly, yet is sturdy, efficient and extremely practical in use.

Other objects and advantages of the present invention will become apparent in the following detailed description of a preferred embodiment of the invention, wherein reference is made to the accompanying drawings, in which:

Figure 1 is a perspective view of the annealing stem of the present invention;

Figure 2 is a vertical section of the annealing stem, on an enlarged scale, showing the stem equipped with a stripper plate and showing, in dotted lines, a plurality of coils of wire thereon, the view being taken substantially on line 2—3 of Figure 3;

Figure 3 is a top view, partly in section and partly in plan; taken substantially on line 3—3 of Figure 2;

Figure 4 is a partial elevational view of one stave; and

Figure 5 is a cross sectional view of one stave.

Referring now to the drawings, the annealing stem of the present invention is shown as comprising a perforate bottom plate 10 that is preferably annular in form and provided with a plurality of annularly disposed apertures 12, a perforate top plate 14 that is preferably annular in form, and a generally cylindrical hollow body or stem portion 16. The stem portion 16 consists of a plurality of staves 18, each of which is formed as is shown in Figures 4 and 5. As shown, each stave 18 comprises a pre-formed member of undulating or undulatory shape, preferably of generally flanged U-shape, in cross section. That is, each stave includes a U-shaped portion 20, the base wall 22 of which is adapted to be disposed radially outwardly and with the side walls or legs defining a tooth or the like extending longitudinally of the staves. Each stave 18 also includes a pair of flanges 24 extending laterally outward from the legs of the U, with the flanges being arcuate or curved to define a base circle portion of the toothed or undulatory cylinder. As shown in Figure 4, each flange 24 is notched or serrated, preferably by providing half holes 26 along the edge thereof.

The staves 18 are assembled as shown in Figure 3 by placing one flange 24 of one stave on top of one flange of another stave and welding the two together. The flange on the opposite side of the said one stave is then positioned beneath one flange of a third stave and the two are welded together, and so on around a predetermined circle, the base circle, to form a generally cylindrical stem portion. In assembling the staves, the half holes in the flanges thereof are aligned to form apertures 28 establishing communication between the inside and outside of the hollow stem at the flange portions of the staves, that is, at the root portions or recesses of the toothed or undulatory cylinder. In the drawings, I have shown eight staves as assembled to form a stem. It will be appreciated, however, that a larger or smaller number of staves of larger or smaller size can be used to form stems of various sizes and diameters. In a practical construction, the staves are preferably from five to seven and one-half feet long.

Before assembly thereof, the U-shaped portion of each stave is preferably sharply inclined at the top thereof, at an angle of approximately 30 degrees, as indicated at 30,

to provide an entry portion or guide to facilitate threading of coils of wire onto the stem. The top of the U's are preferably each closed by an end plate 32 as is shown in Figure 2. After assembly of the stem, the top plate 14, which has an outer diameter corresponding approximately to the diameter of the stem at the flange or base circle portion thereof, is welded to the top of the stem. The top plate includes a cylindrical ring or down-turned flange portion 34 surrounding the central aperture therethrough for the reception of suitable crane hook means, such as described in Patent No. 2,310,991, by means of which the stem is raised, lowered and transported. The bottom plate 10 has an outer diameter slightly in excess of the outer diameter of the shell and is suitably secured to the shell by welding. In its preferred structure, the bottom plate 10 includes the same number of holes 12 as staves, with the holes being aligned with the interior of the U of the staves to facilitate proper circulation of treating fluids through the stem.

The manner of using the stem is shown in Figure 2 wherein a plurality of coils of wire, shown in dotted lines and indicated at 36, are positioned on the stem. To facilitate removal of the coils from the stem, a stripper plate 38 is slidably mounted on the stem and rests upon the radially outwardly extending portions of the bottom plate. As will be apparent, the angled upper ends 30 of the staves provide an entry portion to facilitate threading of the coils 36 onto the stem. To facilitate movement of the coils on the stem, the stem portion 16 preferably has a slight inward taper from the bottom to the top thereof, for example, one inch in seven feet. While this taper is preferably provided, the outer diameter of the stem at the same time can be held to sufficiently close tolerances that the stem, and particularly the tooth portions thereof, will prevent distortion or change in the inner diameter of the coils and will retain that dimension of the coils.

Due to the manner of assembly thereof, the annealing stem of the present invention is extremely strong, and has a very high resistance to distortion, despite the fact that the same is formed of metallic parts or components of relatively thin section. By proper selection of materials and dimensions, the weight of the stem can be varied within wide limits. However, I find that even with mild steel, the stem of the present invention is much lighter and of less section or bulk for a given strength than previous proposals in the art. By the proper choice of metals or alloys, the weight and section of the stem can be even further decreased.

Hereinbefore, I have shown and described a preferred configuration for the staves of the stem portion of my annealing stem. It will be appreciated, however, that other forms can be utilized as well. In brief, it may be stated that any shape presenting a generally toothed or undulatory peripheral surface on the stem is entirely satisfactory. Likewise, the particular design of the end plates and other details of construction may be varied within the meaning of the foregoing description and the appended claims. The top plate is preferably annular for the reception of a crane hook, but the bottom plate need only be perforate to accommodate circulation of the coil treating fluids.

From the foregoing, it will be appreciated that the improved annealing stem provided by the present invention is strong, is not subject to distortion, provides for more than ample circulation of treating fluids, is light in section and in bulk, and is light in weight. Accordingly, it will be appreciated that the present invention provides an annealing stem that meets all of the requirements set forth hereinbefore.

While I have described what I regard to be a preferred embodiment of my invention, it will be appreciated that various changes, re-arrangements and modifications may be made therein without departing from the scope of the invention, as defined by the appended claims.

I claim:

1. An annealing stem for use in handling coils of wire and the like comprising a generally cylindrical hollow stem portion, and perforate top and bottom plates for said stem portion, said stem portion comprising a plurality of longitudinally extending staves, each having a cross section of flanged U-shape, the flange of each stave being serrated along the outer edge thereof, said staves being secured together at the flange portions thereof in side-by-side relation with the serrations thereof aligned and with the bight portion of the U disposed radially outwardly, whereby said staves define a generally cylindrical hollow stem portion having a continuous but undulating peripheral wall with the bight portions of the U-shaped staves comprising circumferentially spaced coil supporting surfaces and with apertures being provided in said wall in the recesses of the undulations between said supported surfaces.

2. An annealing stem for handling coils of wire and the like comprising a hollow stem portion defined by a plurality of longitudinally extending staves, each of said staves being of flanged U-shape in cross section, the flange portions of said staves being arcuate and defining a base circle, said staves being secured together at the flange portions thereof with the U portions extending radially outwardly of the base circle defined by said flange portions whereby said stem portion is generally cylindrical and presents a continuous but undulatory peripheral wall in which the bight portions of the U-shaped staves comprise circumferentially spaced coil supporting surfaces, said staves being so constructed and arranged as to provide a slight taper to said stem portion, the edges of said flange portions of said staves being notched whereby apertures are formed in the recesses of the undulatory stem portion when the staves are secured together, the U portions of said staves being sharply inclined at the small end of said stem portion to mate with the base circle defined by said flange portions to provide an entry portion thereby to facilitate threading of coils of wire onto said stem portion, a first annular plate secured to the large end of said stem portion and including portions extending radially outwardly of said stem portion, and a second annular plate secured to the small end of said stem portion, said second plate having an outer diameter substantially conforming to the base circle defined by said flange portions.

References Cited in the file of this patent

UNITED STATES PATENTS

1,151,917	Wood	Aug. 31, 1915
1,696,801	Howard	Dec. 25, 1928
1,854,179	Chapin	Apr. 19, 1932
2,206,121	Pierce	July 2, 1940
2,278,109	Karp	Mar. 31, 1942
2,310,991	Pierce	Feb. 16, 1943
2,334,439	Pierce	Nov. 16, 1943