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H. A. COADY
STOPPER ROD ASSEMBLIES
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3,040,400

Fig. 1.

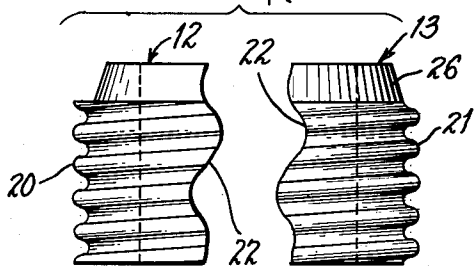


Fig. 3.

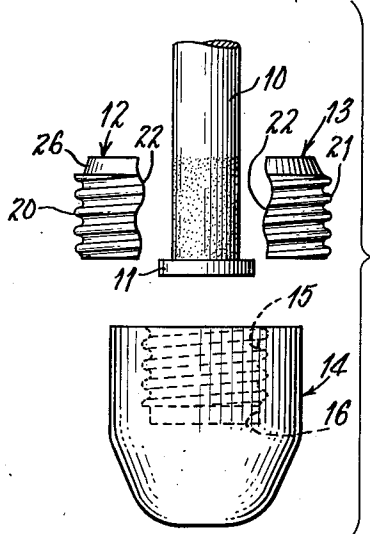


Fig. 2.

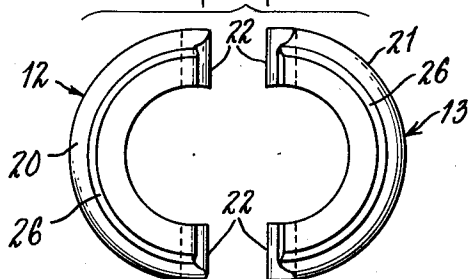


Fig. 4.

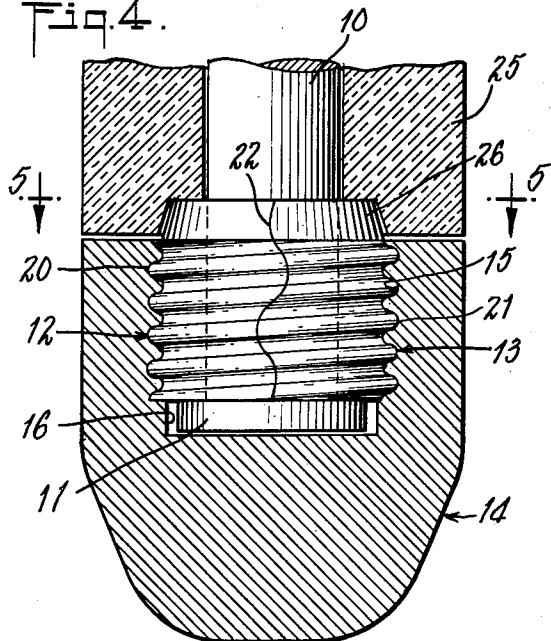
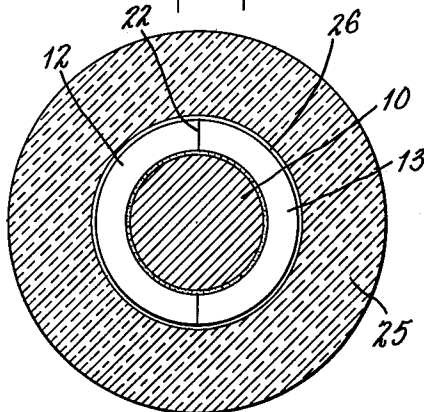


Fig. 5.



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STOPPER ROD ASSEMBLIES

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3 Claims. (Cl. 22—85)

This invention relates to stoppers and stopper rod assemblies.

In the steel industry, the increased steel tonnages require a longer pouring time and higher pouring temperatures and have given rise to a real problem in stopper rod assemblies.

In some stopper rod assemblies a bolt is inserted through a bore in the bottom of the stopper, the bore being plugged after the rod is in place and the bolt affixed to the rod. The increased pouring temperature and increased tonnages cause accelerated erosion at the bottom or nose portion of the stopper, particularly in the case of stoppers having plugged bottoms.

This invention has for its salient object to provide a solid nose stopper, thus minimizing erosion and thermo-shock cracks, and means for fastening it to the assembly.

Another object of the invention is to provide a stopper rod assembly utilizing a split sleeve to secure the rod to the stopper.

Another object of the invention is to provide a stopper rod assembly utilizing a split threaded sleeve to secure the rod to the stopper, the split sleeve being so formed as to insure the proper alinement of the threads when the sleeve sections are assembled on the stopper rod.

Further objects of the invention will appear from the following specification taken in connection with the drawings which form a part of this application, and in which

FIG. 1 is an elevational view of the split sleeve, the sections being spaced apart;

FIG. 2 is a plan view of the split sleeve, as shown in FIG. 1;

FIG. 3 is an exploded view showing the stopper rod, sleeve sections, and stopper, prior to assembly;

FIG. 4 is a sectional elevation showing the parts in assembled position; and

FIG. 5 is a sectional elevation taken substantially on line 5—5 of FIG. 4, looking in the direction of the arrows.

The stopper rod assembly comprises a stopper rod 10 having a flange or head 11 at the lower end thereof, a split sleeve comprising sections 12 and 13, and a stopper 14. The stopper has an internal downwardly extending threaded recess or bore 15 and an extension 16 at the bottom of the recess 15 designed to receive the stopper rod head or flange 11. The sleeve sections 12 and 13 are externally threaded, as shown at 20 and 21, and in order to insure the threads being in proper alinement when the sections are assembled on the rod, the inner edges of each section has an undulating surface 22, these undulating inner edges being designed to interfit so as to accurately position the sections relative to each other, thus insuring the proper alinement of the threads 20 and 21. Without some such interfitting parts or surfaces it is obvious that one section might be assembled out of alinement with the other section, thus preventing the proper alinement of the threads.

The split sleeve is preferably formed of suitable refractory material and, if desired, may be formed of the same material as the stopper 14.

FIG. 3 illustrates the positioning of the parts prior to assembly. The lower end of the stopper rod and the

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head are preferably coated with a suitable refractory cement and the sections 12 and 13 are then pressed inwardly against the lower end of the rod 10 to the position shown in FIG. 4. Due to the undulating surfaces 22, the sections 12 and 13 will be properly positioned on the rod to accurately align the threads 20 and 21.

Pressure is applied to the two sleeve sections to hold them onto the rod and this is aided by the cement coating. The stopper is then threaded onto the sections or onto the split sleeve in the manner shown in FIG. 4. If desired, the threaded bore of the stopper may be coated with a refractory cement to aid in holding the sleeve and stopper in assembled position.

FIG. 4 shows the stopper rod and stopper in assembled position and also shows a sleeve 25 which rests upon an upwardly extending portion 26 of the split sleeve.

It will be evident from the foregoing description that the assembling of the stopper rod to the stopper can be easily and quickly accomplished by means of the split sleeve since when a one-piece sleeve is used it is necessary to insert this sleeve on top of the rod.

Although one specific embodiment of the invention has been particularly shown and described, it will be understood that the invention is capable of modification and that changes in the construction and in the arrangement of the various cooperating parts may be made without departing from the spirit or scope of the invention, as expressed in the following claims.

What I claim is:

1. A stopper rod assembly comprising a solid nose having a transverse planar upper end, said nose including a bore normal to said flat upper end extending into said nose and terminating at an intermediate portion thereof, said bore including a lower recess and internal continuous threads extending to said flat upper end and formed above said recess, a stopper rod extending axially of said bore and including a lower transverse flange portion disposed in said lower recess, and a sectional sleeve circumposed about said rod above said flange, said sleeve comprising a pair of externally threaded, substantially semi-cylindrical sections including mating external aligned fragmentary thread portions terminating at the longitudinal edges of said sections and providing a continuous thread mating with said recess threads, the longitudinal edge portions of said semi-cylindrical sections including mating, complementary portions spaced therealong and orienting said sleeve section, fragmentary external thread portions into mating alignment to provide the continuous thread about said sleeve.

2. The structure of claim 1; said substantially semi-cylindrical sections including upper substantially semi-annular, upwardly tapered portions forming a substantially frusto-conical portion disposed above the flat upper end of said nose.

3. The structure of claim 1; said complementary portions spaced along the longitudinal edges of said sleeve sections comprising undulations along said longitudinal edges.

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