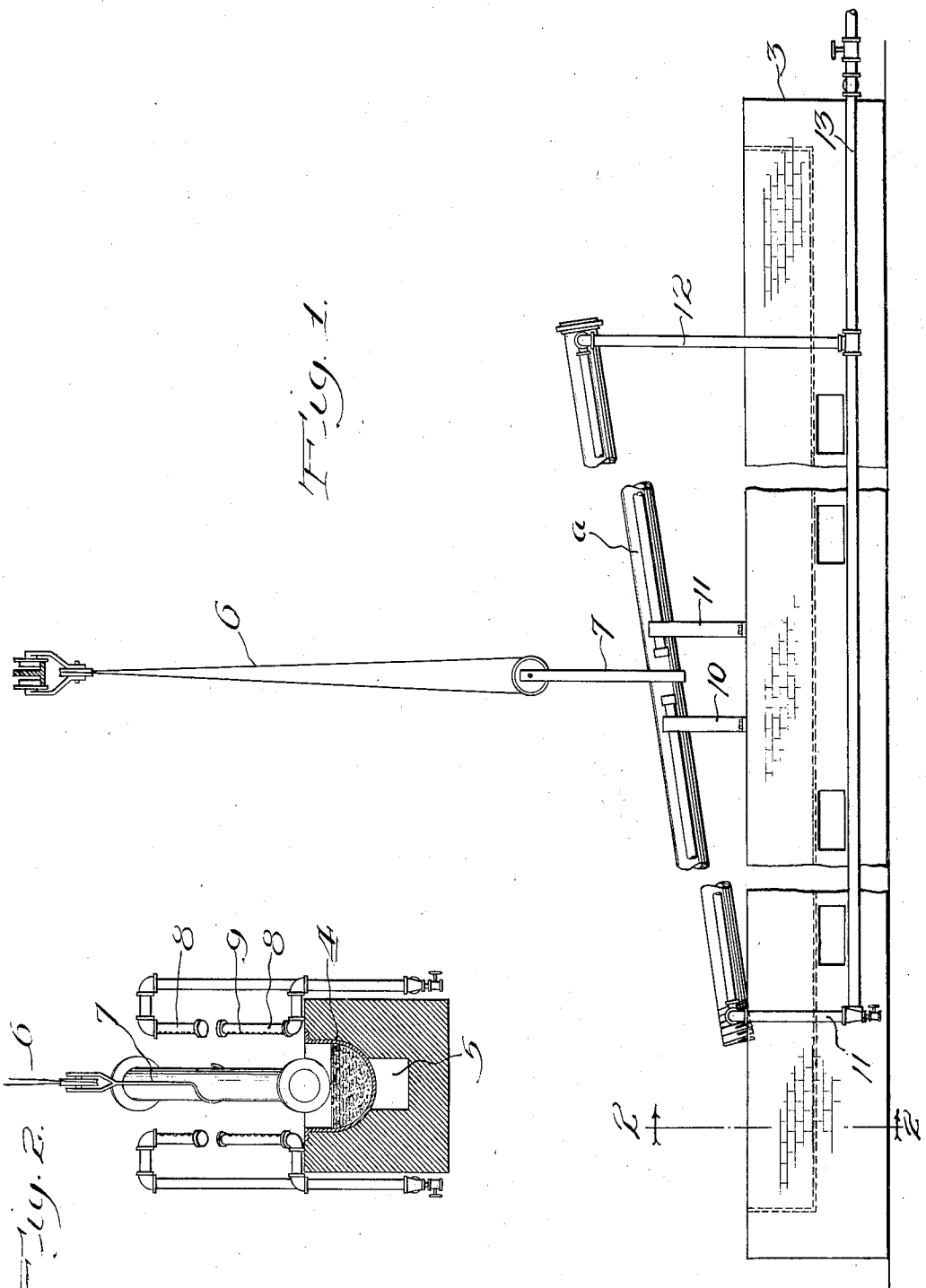
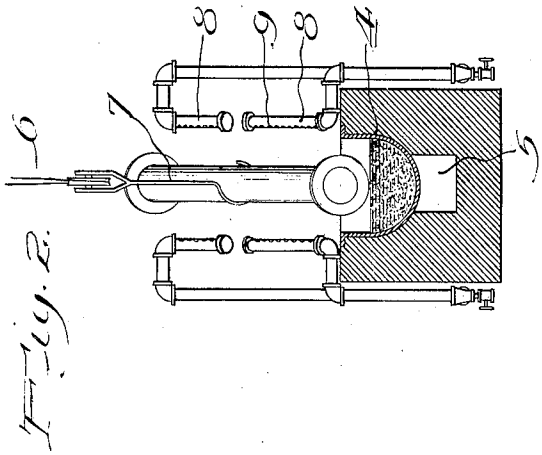
Feb. 28, 1928. 1,660,558

W. T. HERREN

METHOD AND APPARATUS FOR COATING METAL ARTICLES WITH METAL

Filed Jan. 7, 1925





Inventor:
Wilson T. Herren
by Rectorhibbard Sawyer and
Mason &
Kelly.

Patented Feb. 28, 1928. 1,660,558

UNITED STATES PATENT OFFICE.

WILSON T. HERREN, OF BARRINGTON, ILLINOIS.

METHOD AND APPARATUS FOR COATING METAL ARTICLES WITH METAL.

Application filed January 7, 1925. Serial No. 955.

My invention will be disclosed in connection with the coating of pipes with lead, but it is also applicable to coating other metal articles not only with lead but with other metals having a lower melting point than the article coated, as will appear from the drawing and the following description.

Iron pipe and the like are commonly coated with lead by immersing them in a bath of the molten metal, after suitable preliminary treatment, and after the molten metal has had time to properly adhere to the articles, they are withdrawn from the bath and the surplus metal permitted to drain back into the bath. In the case of iron pipe or other cylindrical bodies during the draining operation, they are preferably revolved by hand or otherwise in an inclined position so that during the draining operation the molten metal remaining on the pipe is more evenly distributed than would otherwise be the case. In order to get an effective adhesion of the coating metal, the article being coated is preferably allowed to remain in the bath until it acquires a temperature above the melting point of the coating metal, and when it is withdrawn, it requires some time to cool below this temperature thus keeping the metal on the article in a more or less fluid condition for a considerable period. If the pipe is tilted, as referred to above, the coating metal, even after the surplus thereof has been drained off, continues to flow toward the lower side of the pipe and this movement of the metal connot be overcome by merely rotating the pipe. The coating metal therefore tends to accumulate at the lower side of the pipe instead of retaining its even distribution thereover. If the coating at the upper side of the pipe is of the desired thickness, in the finished product, that at the lower side of the pipe is unnecessarily thick. Moreover, the accumulation at the lower side of the pipe is irregular forming beads or knobs so that there is not only a waste of metal, but the finished article has not the desired regular appearance. Furthermore, in case the lower end of the pipe is threaded the accumulation of lead thereon is particularly objectionable as it must be substantially removed in order to render the thread available. It is neither practicable nor desirable to so suddenly chill the entire pipe body as to prevent this flow of the coating metal toward the depressed end thereof, as to do so would injuriously affect the adhesion of the coating metal as well as its proper distribution. According to my improved method of treatment, the objectionable flow of the metal is overcome without chilling the coated article suddenly. Instead of attempting to suddenly reduce the pipe or other article below the melting point of the lead or other coating metal, I permit the temperature of the article as a whole to fall relatively slowly, but prevent the undesirable flow of the coating metal by promptly cooling it to a temperature at which it sets and preventing the temperature thereof from arising above the melting point due to the absorption of heat by the coating metal from the body of metal coated. In the preferred method of practicing the invention, I force a gas or vapor against the coated pipe in sufficient volume and at such temperature as to cool the coating below the melting point thereof and prevent its rising while the pipe as a whole is slowly dropping to a temperature below the melting point of the coating metal. My invention comprises not only a process for thus evenly coating the pipe or other article with the coating metal, but an apparatus which I have designed for carrying out the process.

In the accompanying drawings, Figure 1 is an apparatus for practicing my invention as applied to the coating of pipe; and Fig. 2 a transverse section thereof on the line 2—2 of Fig. 1.

I have shown the lead heating furnace 3 as of an ordinary type provided with a vat 4 and a heating flue 5. Any desired or approved form of lead heating furnace may be employed. I have shown an ordinary block and tackle means 6 having a hook 7 mounted above the furnace for the purpose of lowering the pipe into the bath and raising it therefrom. The pipe may be readily turned in the open hook 7. On opposite sides of and above the bath I provide two sets of perforated pipes 8, 9 which are suitably supported in brackets 10, 11 and by feed pipes 11, 12 parallel to each other and in the longitudinal plane of the vat and inclined at an angle suitable for the drainage of the pipes. I have shown a pipe 13 for supplying pipes 11, 12 and the perforated pipes 8, 9 with a suitable cooling fluid. The arrangement just described is satisfactory for practicing my improved process, but obviously other means might be employed adapted to so supply a cooling agent to the

pipes in their inclined position over the vat in sufficient quantity and at the proper temperature to absorb heat at a sufficient rate from the metal coating to prevent its flowing notwithstanding the heat received from the body of the pipe.

With the construction shown after the pipe has been immersed for a sufficient period and at a suitable temperature to cause the coating metal to adhere firmly thereto, which temperature is well above the melting point of the coating metal, it is raised out of the coating vat to an inclined position parallel to and between the pipes for supplying the cooling medium. It is revolved in this position while the cooling medium is caused to impinge thereon from the perforated pipes. I have found steam to be a satisfactory cooling medium and one which it is convenient to employ. Other cooling media of the required temperature and in the necessary volume might be employed instead of steam. The pipe, after being brought to the inclined position shown, is preferably revolved while the cooling jets are playing thereon so that the coating on all parts of the pipe, after the excess metal has drained therefrom back into the vat is cooled to and maintained at a temperature at which no substantial flow takes place. The heat is abstracted from the coating metal at a speed at least equal to that at which it is received from the body of the pipe and the cooling is continued until the entire pipe is below the melting temperature of the coating metal after which it may be removed from the position shown in the drawings.

I claim:

A process of coating pipe with a metal of lower melting point which consists in dipping the pipe in a bath of the molten coating metal, raising it from the bath into an inclined position revolving the pipe while in such position and projecting a cooling fluid against it thereby lowering the temperature of the coating metal below its melting point and permitting the pipe body to cool more slowly.

WILSON T. HERREN.