R. D. COLQUHOUN.

PROCESS FOR RUST PROOFING IRON AND STEEL.

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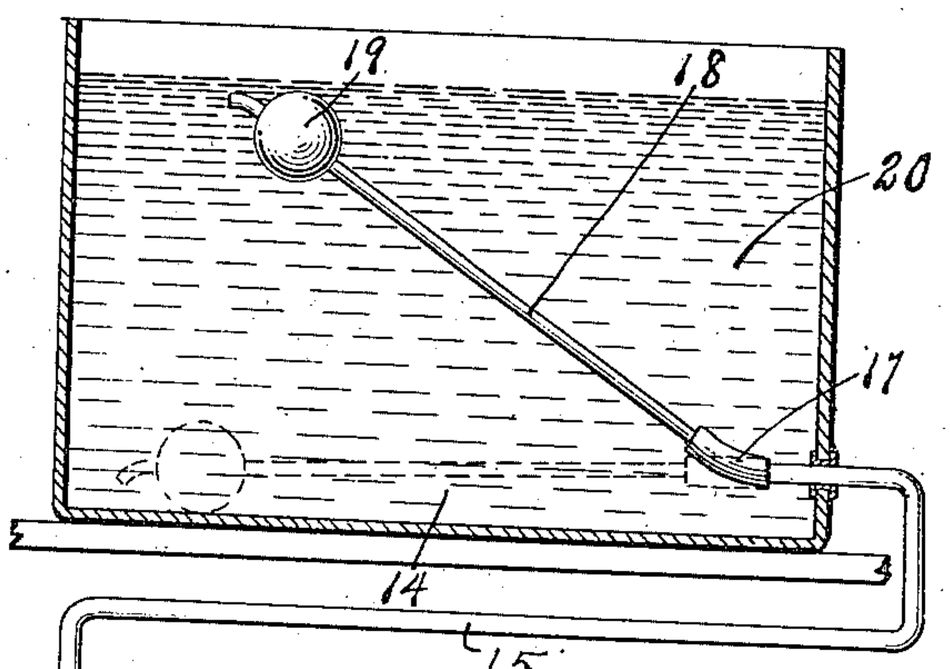
1,311,319.

Patented July 29, 1919.



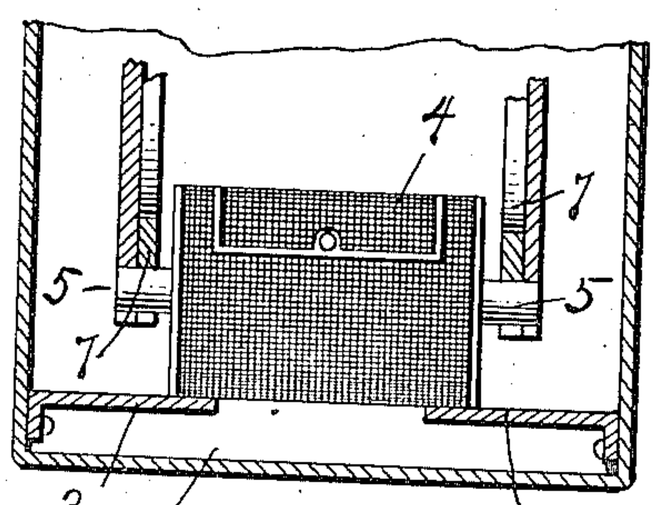


Fig. 2.

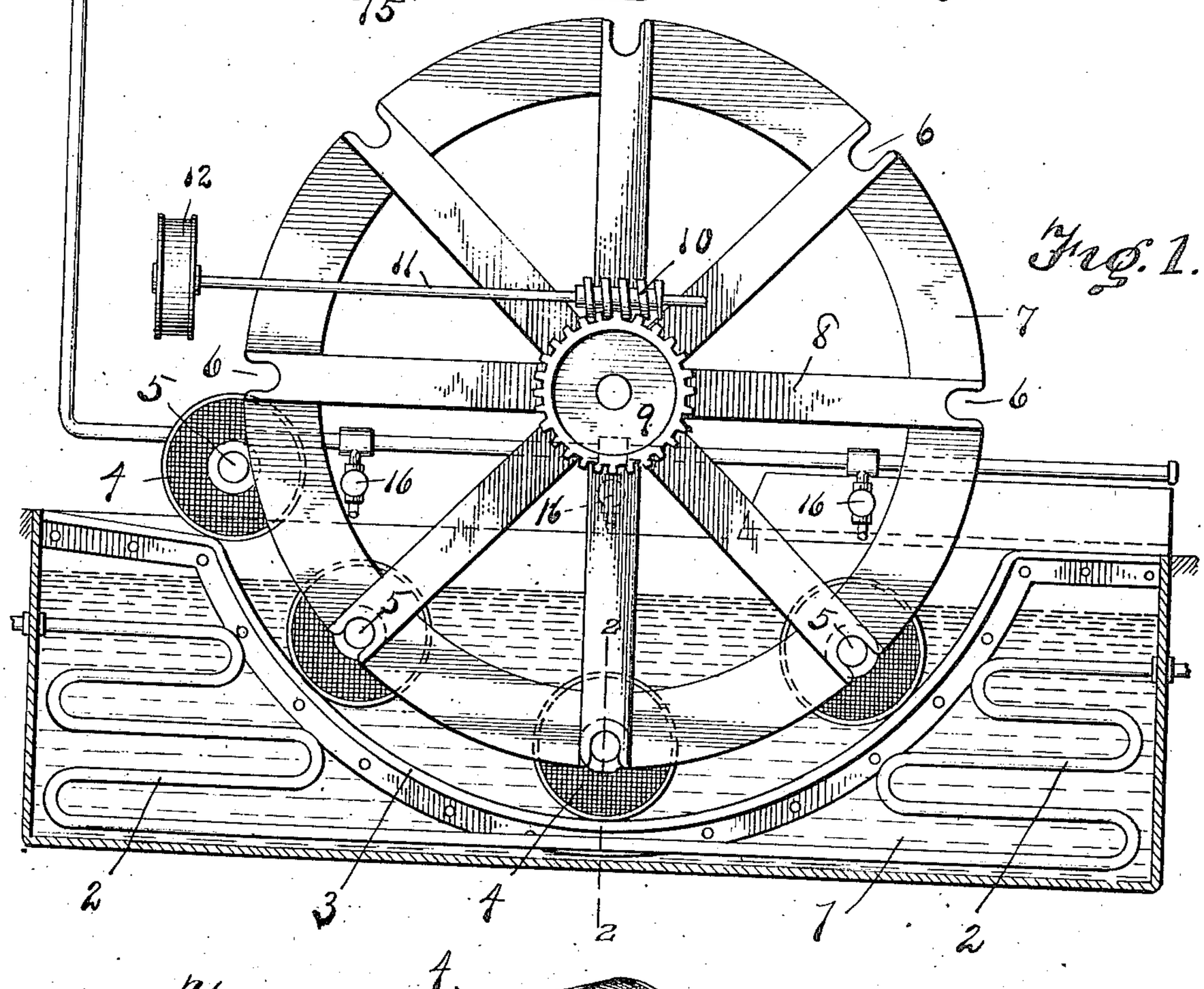
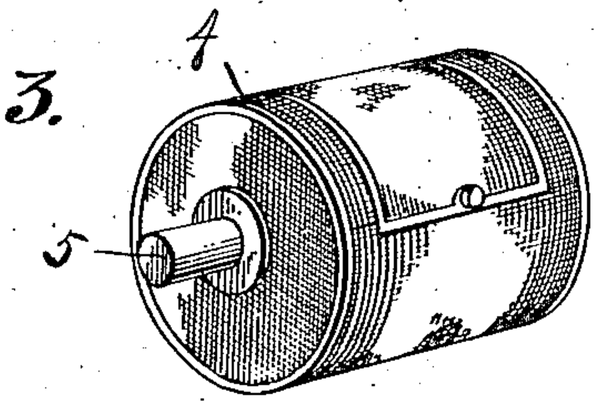


Fig. 1.

Fig. 3.



Witnesses

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PROCESS FOR RUST-PROOFING IRON AND STEEL.

1,311,319. Specification of Letters Patent. Patented July 29, 1919.

Application filed March 31, 1919. Serial No. 286,383.

To all whom it may concern:

Be it known that I, ROY D. COLQUHOUN, a citizen of the United States, and residing at Detroit, in the county of Wayne and State of Michigan, have invented a new and Improved Process for Rust-Proofing Iron and Steel, of which the following is a specification.

This invention relates to the art of changing the surfaces of articles of iron and steel from the metallic state to that of an iron compound, preferably a phosphate, which will not rust, and its object is to provide a process by which the time required for this rust-proofing action will be reduced to a minimum.

This process consists in keeping the activity of a rust-proofing bath up to a maximum by keeping the bath at the boiling point and continually adding in a solution the chemicals necessary to revive the bath as fast as it becomes weakened through use, the amount of the solution being sufficient to replace that which evaporates.

This process also consists in mixing the active chemicals in solution in a separate tank and drawing off the solution at the top so as to leave the sediment at the bottom of the mixing tank and supplying this solution to the rust-proofing tank at different points so that the solution therein will be practically uniform.

This process further consists in passing the articles to be treated through the rust-proofing bath at a constant speed at the same time turning over the articles while submerged.

In the accompanying drawing which illustrates conventionally a device for carrying out this process, Figure 1 is a side elevation of this apparatus with the sides of the tanks removed. Fig. 2 is a section on the line 2—2 of Fig. 1. Fig. 3 is a perspective of a receptacle for the articles to be treated.

Similar reference characters refer to like parts throughout the several views.

The treating tank 1 which contains the rust-proofing bath may be heated by steam coils 2 and with tracks 3 on which the cylindrical containers 4 may travel. Short shafts 5 at the ends of the containers may enter the pockets 6 in the rims 7 of the double wheel 8, which may be driven by means of a worm wheel 9, worm 10, shaft 11 and pulley 12. It will be understood that this construction is merely illustrative and that any other desired type of tank and conveying mechanism may be used.

The containers 4 may roll on the tracks 3 and in so doing turn the articles therein over and over which is of great value as the rust-proofing action is usually much more active on the upper side than on the lower side of the articles being treated.

The mixing tank 14 is preferably placed higher than the treating tank and in it are placed the phosphoric acid, manganese dioxid, water and such other materials as are employed to produce the solution. The proportions of the acid and manganese may be those specified by the Richards Patent No. 1,069,903, dated August 12, 1913. A pipe 15 extends therefrom and is provided with any desired number of discharge valves 16 spaced along the length of the tank 1 so that the strength of the bath will be substantially uniform throughout the length of the tank. The rate of flow from one tank to the other is substantially the rate of evaporation from the tank 1 so as to keep the bath at substantially constant level. The strength of the solution flowing to the tank 1 will depend upon the rate at which the bath becomes exhausted and the rate of evaporation.

In order to prevent the sediment in the mixing tank 14 from flowing to the treating tank a short piece 17 of rubber tubing may be slipped onto the upper end of the pipe 15 and a short pipe 18 inserted into the rubber. A float 19 will keep the inlet end of this pipe near the surface of the solution 20 in this tank so that this solution can flow quietly into this pipe without disturbing the sediment in the bottom of the tank. As no solid matter will be placed in the tank 1, the amount of sediment which will accumulate therein will be very small.

Tests have shown that by keeping the rust-proofing solution in the treating tank up to maximum strength the time required is reduced substantially one half, and that the time is further reduced by turning over the articles being treated.

I claim:—

1. The process of treating articles of iron and steel to prevent rusting which consists in submerging them in a bath comprising a compound of phosphorus to which is constantly added a similar compound of phos-

phorus in more concentrated solution to keep the bath at maximum activity.

2. The process of treating articles of iron and steel to prevent rusting which consists in submerging them in a bath comprising a compound of phosphorus in solution to which is constantly added at a plurality of spaced points a similar compound of phosphorus in more concentrated solution to keep the bath at maximum activity.

3. The process of treating articles of iron and steel to prevent rusting which consists in submerging them in a bath comprising a compound of phosphorus in solution, heating the bath and continually adding the same compound of phosphorus in a more concentrated solution to compensate for the evaporation and to keep the bath at maximum activity.

ROY D. COLQUHOUN.