J. D. GREY.

APPARATUS FOR PICKLING SHEET IRON.

No. 190,316. Patented May 1, 1877.

*Fig. 1.*

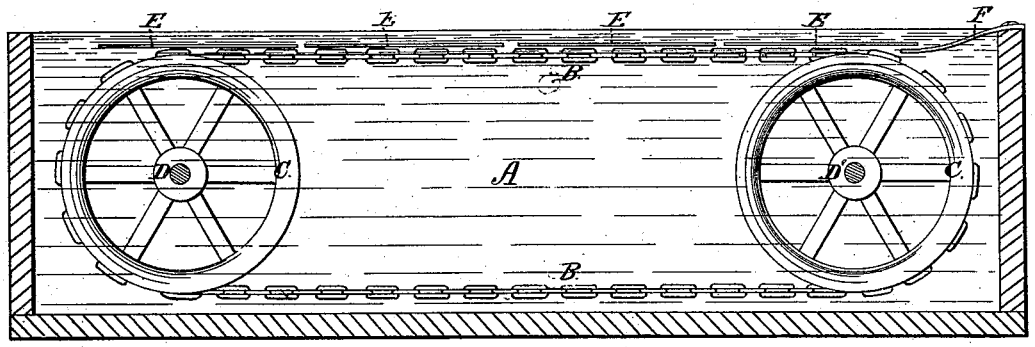
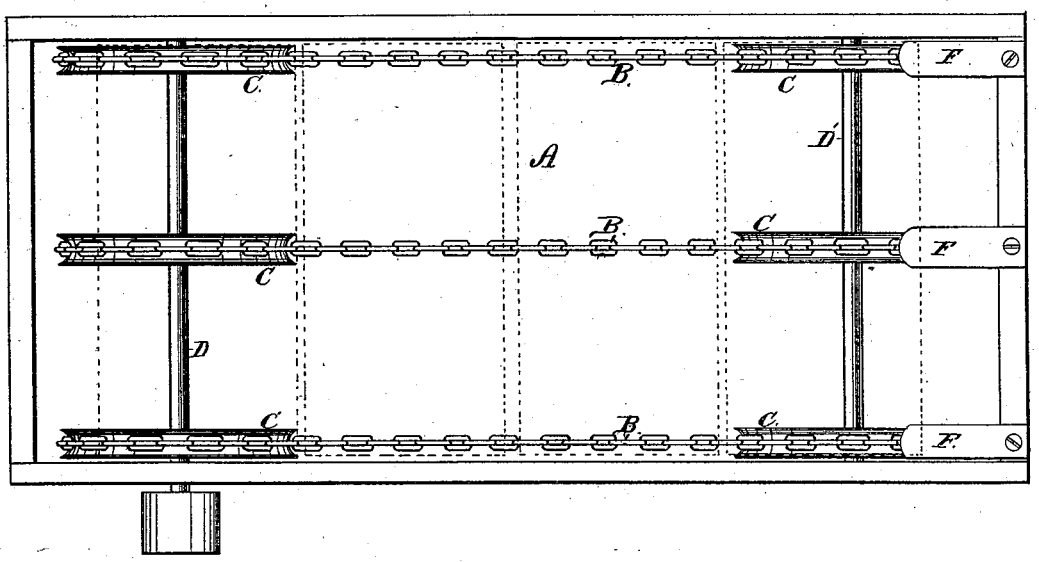



*Fig. 2.*




WITNESSES:

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# UNITED STATES PATENT OFFICE.

JOHN D. GREY, OF BALTIMORE, MARYLAND.

## IMPROVEMENT IN APPARATUS FOR PICKLING SHEET-IRON.

Specification forming part of Letters Patent No. **190,316**, dated May 1, 1877; application filed April 5, 1877.

*To all whom it may concern:*

Be it known that I, JOHN D. GREY, of Baltimore city, State of Maryland, have invented a new and Improved Apparatus for Pickling Sheet-Iron; and I do hereby declare that the following is a full, clear, and exact description of the same.

I will first describe the process heretofore practiced.

After the sheets have been annealed they are placed in a tank edgewise or vertical to the number of seventy-five to one hundred sheets in a pack. The tank is then filled with dilute sulphuric acid. The sheets are allowed to remain in this bath from an hour to an hour and a half for the purpose of removing the oxide. This long exposure of sheets to the action of the acid is very injurious to the sheet-iron, causing it to blister, and rendering it very brittle.

The principal reason the sheets require to remain so long in the bath is, when so many sheets are placed at one time in the bath they lie so close together as to prevent the acid having free access to the contact-surfaces of the sheets.

In carrying out my process, I employ an apparatus shown in vertical longitudinal section in Figure 1, and in plan in Fig. 2, of accompanying drawing.

The apparatus consists of a shallow oblong tank, A, filled with dilute sulphuric acid, and endless traveling chains B, mounted on pulleys C, fixed on transverse shafts D D′. The shafts are so located, and the pulleys of such diameter relative to the edge of the tank, that the upper sections or halves of the chains lie about two inches beneath the surface of the acid. The sheets E to be pickled are placed upon or slid onto the chains, so that they lie edge to edge, as shown. The shaft D being rotated by power applied in any suitable manner to its projecting end *a*, the chains are caused to travel slowly toward the right. The sheets may be removed from the tank by the use of tongs, but I prefer to employ for this purpose inclines F, placed at the end of the tank, and attached to the top edge thereof. The progressive movement of the chains causes the sheets E to successively meet the inclines F, up which each is forced to slide by edgewise pressure of those behind it. It thus passes out of the acid-tank, and is at once plunged or placed in a tank of water. In practice, I purpose placing the water-tank in such contiguity to the acid-tank A that the pickled sheets shall pass from the former directly into the latter. The time occupied in the passage of a sheet through the acid is about three (3) minutes. Thus, in a tank about fifty (50) feet long, I am enabled to pickle three times the number of sheets, besides saving about one-third the quantity of acid, and half the labor and expense incident to the old plan above described.

What I claim is—

1. For use in the process of pickling iron, the acid-tank, traveling chains, and cross-shafts, combined as shown and described.

2. For use in the process of pickling iron, the combination of the inclines F with the tank and endless chains, as shown and described, for the purpose specified.

The above specification of my invention signed by me this 24th day of March, 1877.

JOHN D. GREY.

Witnesses:

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