

J. E. CARNAHAN.
NOZZLE FOR BLUING STEEL SHEETS.
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927,449.

Patented July 6, 1909.

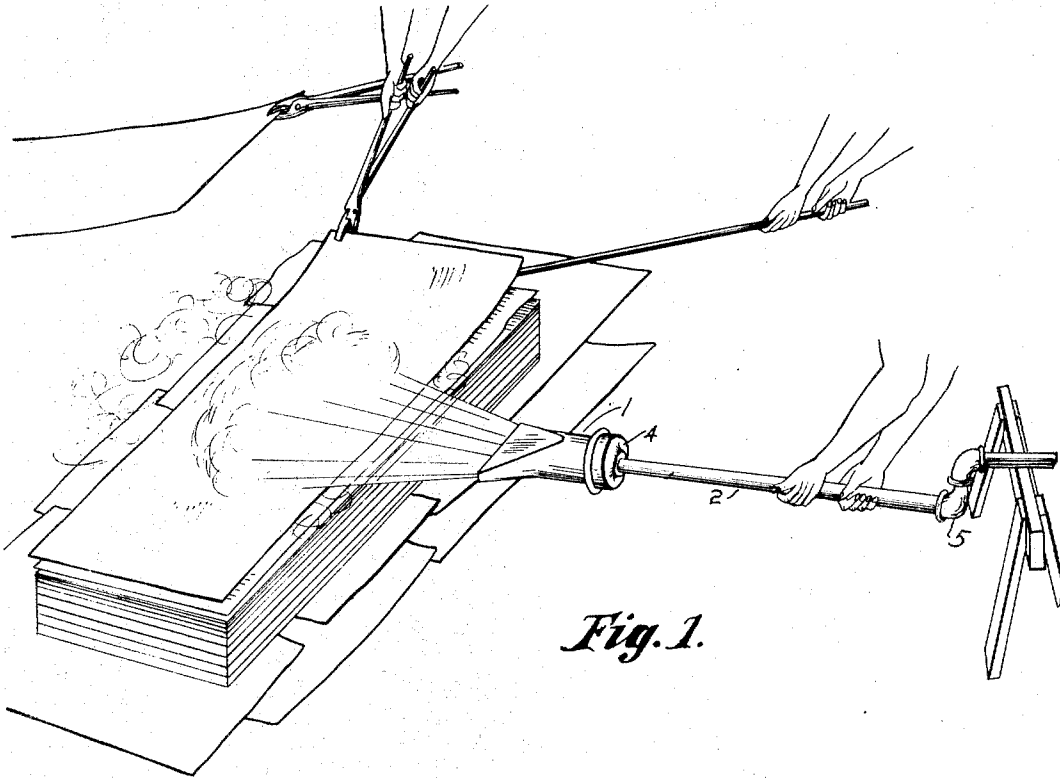


Fig. 1.

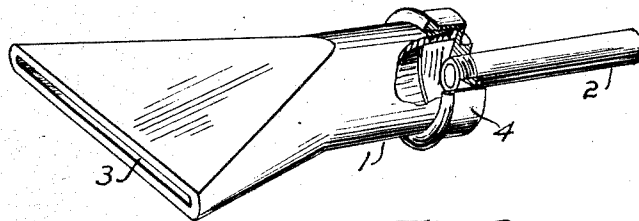


Fig. 2.

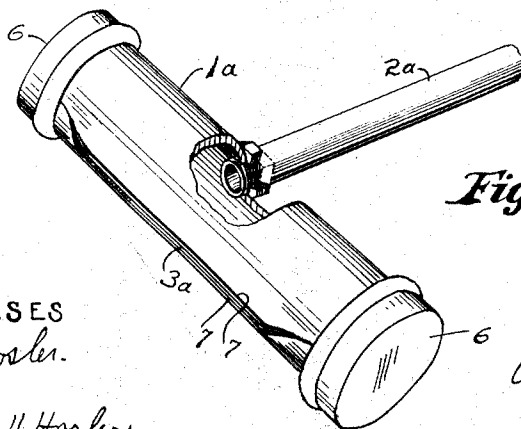


Fig. 3.

WITNESSES

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JOHN E. CARNAHAN, OF CANTON, OHIO, ASSIGNOR TO THE CARNAHAN TIN PLATE & SHEET COMPANY, OF CANTON, OHIO, A CORPORATION OF OHIO.

NOZZLE FOR BLUING STEEL SHEETS.

No. 927,449.

Specification of Letters Patent.

Patented July 6, 1909.

Application filed August 28, 1908. Serial No. 450,613.

To all whom it may concern:

Be it known that I, JOHN E. CARNAHAN, a citizen of the United States, residing at Canton, in the county of Stark and State of Ohio, have invented a new and useful Nozzle for Bluing Steel Sheets, of which the following is a specification.

A well-known process for bluing steel sheets consists in heating a pack of sheets suitably inclosed to exclude the air and the gases of combustion, and then uncovering the pack and impinging the side edges of the sheets with a stream of steam, which serves the double purpose of loosening and separating the upper sheets one from another, so that they can be conveniently grasped and removed by ordinary tongs, and of oxidizing the surfaces of the sheet by reason of the bath which is given to both sides thereof. In the performance of this process, the best results are usually obtained by impinging the edges of the sheets with live steam, and the steam is preferably applied by discharging it from the flattened mouth of a nozzle so as to impinge the sheets with a wide but thin sheet of steam. A difficulty is experienced in the use of live steam for the reason that when the sheets are impinged by the unreduced force of the steam, the face or surface of the sheets are cut or abraded to such an extent as to prevent the formation of an oxidized coating thereon or to remove the same after it has been formed; and if it is sought to remedy this difficulty by reducing the pressure of the steam in the supply pipe at a point remote from the nozzle, the steam in the reduced current loses its life before it is discharged from the nozzle and reaches the sheets and thus loses its best qualities as an oxidizing agent. This difficulty is overcome by enlarging the body of the nozzle as compared with the cross section of the supply pipe so as to form a pressure reducing drum or chamber in the nozzle adjacent to its discharge aperture, which aperture is preferably made in the form of an elongated slot in the forward end of the nozzle.

The pertinent features of the process referred to herein, and the improved nozzle to which the invention relates, are illustrated in the accompanying drawings, forming part hereof, in which—

Figure 1 is a perspective view showing a

pack of sheets uncovered and an adjacent steam pipe and nozzle, showing the method of impinging the sheets with the stream of steam; Fig. 2, a perspective view of a preferred form of nozzle and a short section of the supply pipe, with parts broken away to show details of the connecting collar; and Fig. 3, a perspective view showing a modified form of the nozzle.

Similar numerals refer to similar parts throughout the drawings.

The nozzle 1 is preferably formed from a section of pipe having a diameter some two or three times the diameter of the supply pipe 2, and having the forward end flattened and swaged to make the outlet aperture in the form of the elongated slot 3. The rear end of the nozzle and the forward end of the supply pipe are preferably threaded and connected together by the ordinary reducing collar 4. The supply pipe is preferably provided with a flexible joint as 5 which permits the nozzle to be oscillated, laterally at least, to impinge the side edges of the sheets throughout their entire length.

The modified form of the nozzle illustrated in Fig. 3 is formed of a section of pipe having a diameter considerably larger than the diameter of the supply pipe 2*, to the end of which supply pipe the nozzle pipe is transversely connected. Each end of the nozzle pipe is closed by a cap 6 and the forward side of the same is provided with the longitudinal slot 3*, the edges of which slot are preferably bent outward to form the forwardly flaring lips 7.

It is evident that in either form of the nozzle herein illustrated and described, there is formed a chamber or drum in the body of the nozzle and adjacent to the outlet aperture thereof, which chamber is considerably larger in diameter and the outlet aperture is preferably somewhat larger in area than the cross section of the supply pipe, thereby serving to reduce the pressure of the live steam and to soften the force of the discharge thereof against the edges of the sheets, but without in any manner impairing the life of the steam or reducing its oxidizing qualities. And it will be understood that the form of nozzle herein set forth can be employed to discharge water and various aqueous and other vapors from a relatively smaller supply pipe.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A nozzle for bluing steel sheets having a supply pipe inlet in one end and an elongated discharge slot in the other end having a greater area than the inlet, and an enlarged chamber in the nozzle adjacent to the discharge slot.

2. A nozzle for bluing steel sheets having

a supply pipe inlet in one end and a discharge aperture in the other end having a greater area than the inlet, and an enlarged chamber in the nozzle adjacent to the discharge aperture.

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Witnesses:

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