

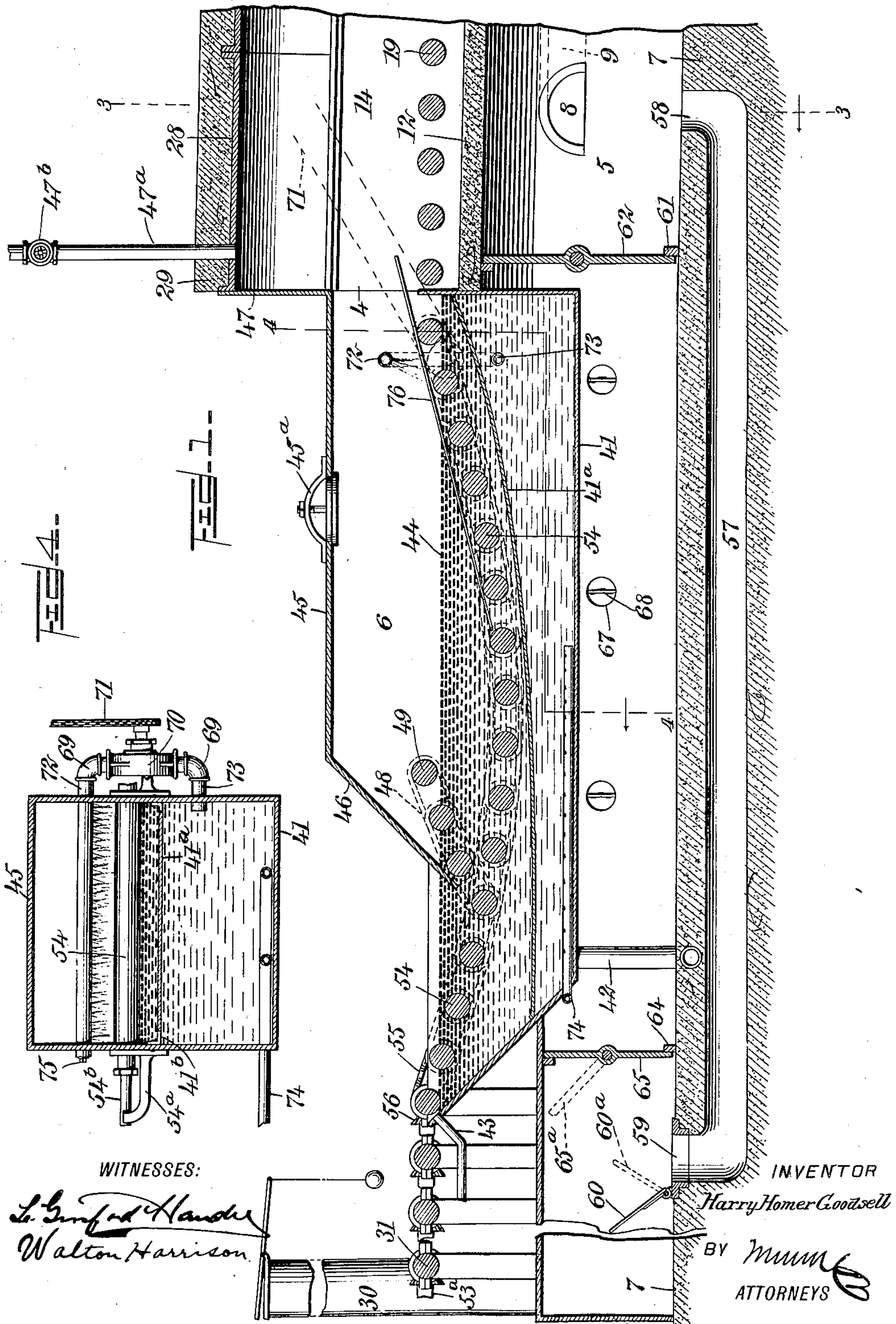
No. 813,206.

PATENTED FEB. 20, 1906.

H. H. GOODSSELL.
PROCESS OF TREATING METALS.

APPLICATION FILED JULY 7, 1905.

3 SHEETS—SHEET 1.



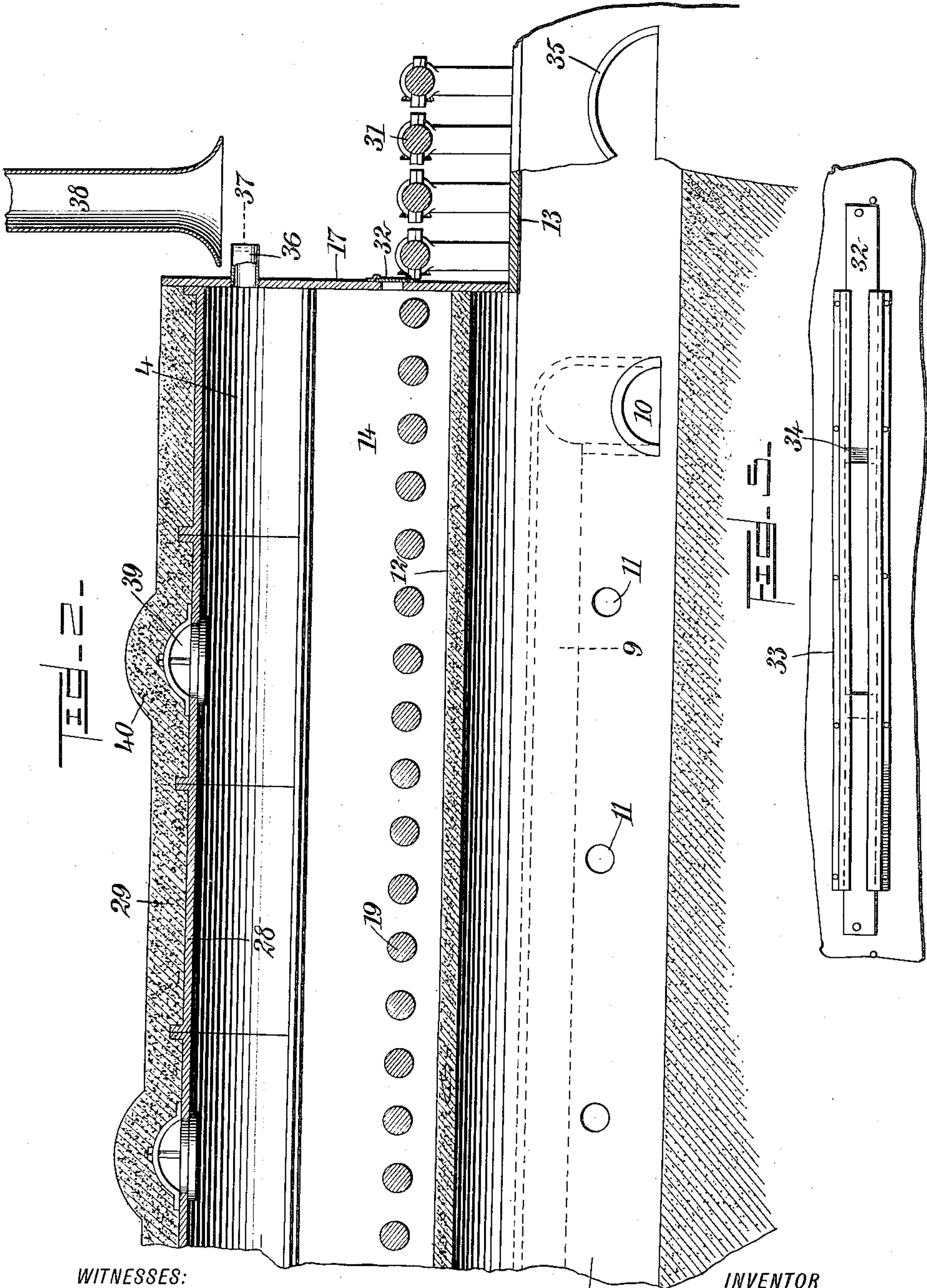
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WITNESSES:

L. Sanford Hand
Walton Harrison

INVENTOR

Harry Homer Goodsell

BY

Munn & Co.
ATTORNEYS

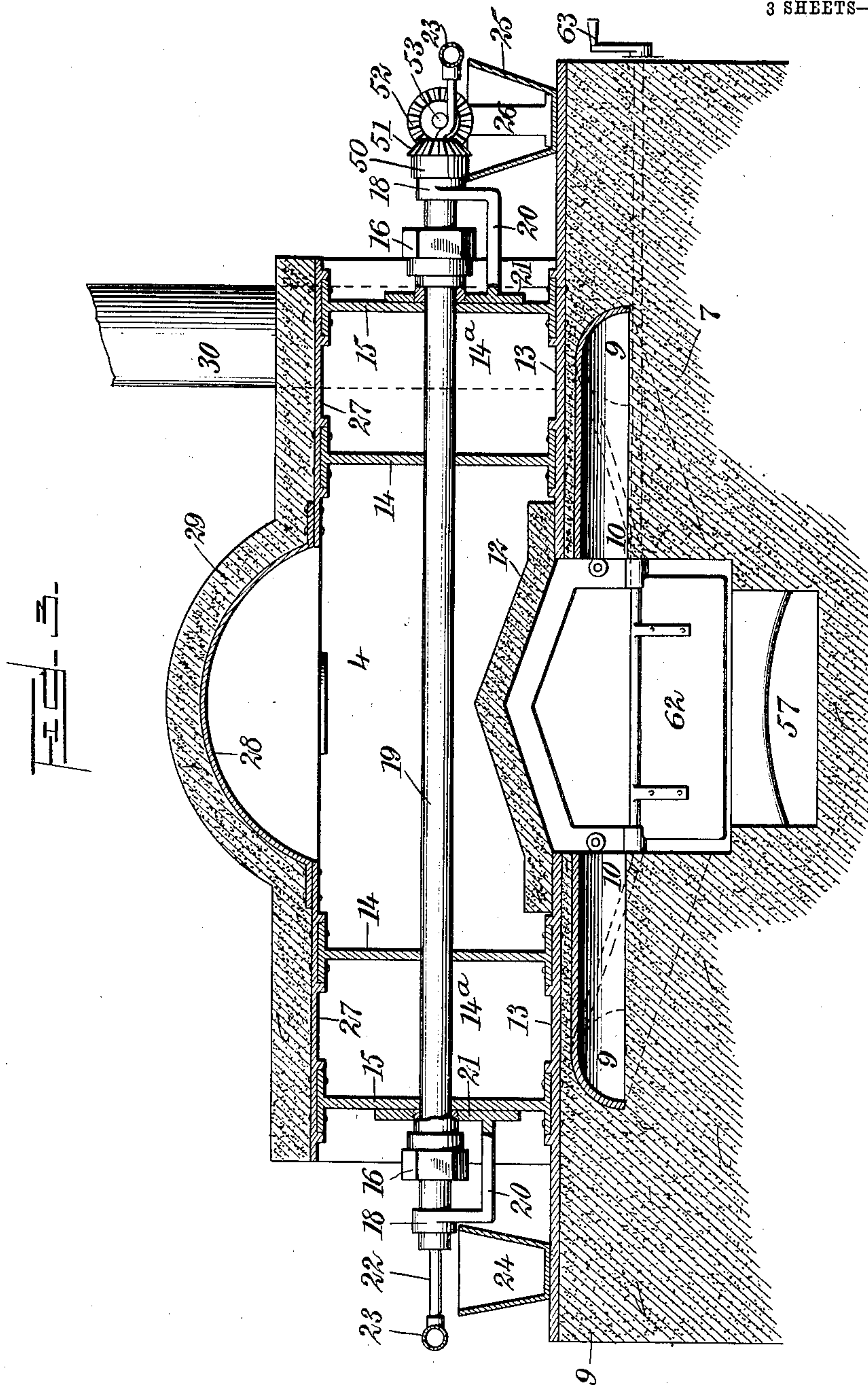
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Walton Harrison.

INVENTOR

Harry Homer Goodsell

BY

Mumford

ATTORNEYS

UNITED STATES PATENT OFFICE.

HARRY HOMER GOODSSELL, OF INDIANA HARBOR, INDIANA.

PROCESS OF TREATING METALS.

No. 813,206.

Specification of Letters Patent.

Patented Feb. 20, 1906.

Application filed July 7, 1905. Serial No. 268,688.

To all whom it may concern:

Be it known that I, HARRY HOMER GOODSSELL, a citizen of the United States, and a resident of Indiana Harbor, in the county of Lake and State of Indiana, have invented a new and Improved Process for Treating Metals, of which the following is a full, clear, and exact description.

My invention relates to methods for treating metals, and more particularly to a process for treating sheet iron and steel, so as to convert thereupon a surface adapted to resist the tendency to rust and also adapted to improve the appearance and working qualities of the metallic sheets.

Reference is made to my Patent No. 774,069, dated November 1, 1904, for a method of treating sheet iron and steel and also to Patent No. 795,218, dated July 18, 1905, for a furnace. In the process upon which I now seek Letters Patent I treat the metallic sheets somewhat differently than in the method described in my said patent, one of the principal differences being that I begin work upon the sheet at a comparatively low temperature and finish with a comparatively high temperature.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a fragmentary section through the furnace used in connection with my improved process. Fig. 2 is likewise a vertical central section through the furnace, the mechanism shown in Figs. 1 and 2 being practically continuations of each other. Fig. 3 is a vertical cross-section and is taken upon the line 3 3 of Fig. 1 looking in the direction of the arrow. Fig. 4 is a vertical cross-section through the pan 45 and is taken upon the line 4 4 of Fig. 1 looking in the direction of the arrow, and Fig. 5 is a detail of the door mechanism through which the plates pass out of the furnace.

My improved mechanism employs what I call a "bluing-chamber" 4, superposed over a heating-flue 5, as indicated in Figs. 1 and 2. A cooling-chamber 6 is located at the rear of the bluing-chamber, as shown in Fig. 1, and is heated from the heating-flue 5. The base 7, made of any refractory material, is provided with passages 8, 9, and 10, connected serially and together constituting a pair of air-flues.

The passage 8 at the front end of the furnace and the passage 10 at the rear end thereof both terminate in the heating-flue 5, the passage 8 delivering the heat into this flue at an elevation somewhat higher than that at which it was received from the flue by the passage 10. The purpose of this arrangement is to cause different portions of the furnace to expand and contract equally. The base 7 is also provided with passages 11, extending from the heating-flue 5 to the outer atmosphere. These passages may be used for admitting natural gas to the heating-flue 5, in which event the heating-flue 5 serves to admix the gas with the air arriving through the air-flues. If natural gas is not used, the passages 11 may be either closed or left open, as desired. If left open, they serve as air-ducts for supplying air in small quantities to the heating-flue 5. If desired, the smoke and gas from the ordinary coal-burners, stoves, or furnaces of any kind may be directed into the front end of the heating-flue 5 and carried back through this flue, so as to furnish the desired degree of heat. A ground plate 12, of refractory material, preferably quite thick, rests upon metallic plates 13, which are supported upon the base 7, and resting upon the plates 13 are I-beams 14 15, disposed parallel with each other, as indicated in Fig. 3. The outer I-beams 15 are provided with stuffing-boxes 16, and at their front ends they abut against the wall 17.

Pillow-blocks 18 support a number of rollers 19 and 31. The pillow-blocks 18 are supported by brackets 20, integral therewith, these brackets being mounted upon plates 21, which engage the outer I-beams 15. Troughs 24 25 are disposed adjacent to the outer ends of the rollers 19 and serve to catch and convey away any heated water which may flow therefrom. By means of pipes 22 23 coacting with the stuffing-boxes 16 water is supplied into the ends of the rollers 19, which are made hollow for the purpose, the water thence running into the troughs 24 25. I do not deem it necessary to describe fully the mechanism for supplying water to the rollers, as the same forms the subject-matter of my Patent No. 795,218, dated July 18, 1905. Pillow-blocks 26 may be mounted directly in the trough 25, as indicated in Fig. 3.

Mounted upon the I-beams 14 15 are metallic plates 27, connected together by arch-plates 28. The arch-plates abut against

each other, so as to form a continuous series, as indicated in Fig. 2. A fireproof covering 29, made, preferably, of asbestos, is placed upon the bluing-chamber 4, as shown.

5 The rollers 31, hereinbefore mentioned, do not differ materially from the rollers 19, except that being outside of the bluing-chamber, and consequently not being subjected to high degrees of heat, it is not necessary to provide them with water-jackets or means of cooling them. The bluing-chamber 4 is provided with sliding doors 32, (see Fig. 5,) arranged in a slideway 33 and adapted to move apart, so as to leave a comparatively wide
15 passage through which metallic plates may be passed out of the furnace. One boundary of this passage may be seen at 34 in Fig. 5. A chimney or smoke-stack 30 is provided for the purpose of carrying off the
20 gases of combustion which pass out of the heating-flue 5. A side passage 35 is provided in the rear end of the furnace, preferably below the plates 3, so as to form an entrance for the heated air and gas should it be desired
25 to use the same and also to allow access to the heating-flue 5.

A tubular member 36 pierces the front wall 17 and is provided with a glass disk 37, thus constituting a peep-hole through which
30 observations may be made from the outside. A funnel 38 opens downwardly toward the rollers 31 and is used for conveying away the heated air and steam which may chance to accumulate in the region immediately in
35 front of the wall 17. Of course the draft through the funnel may be forced, if desired, in any manner well known in the art. The top of the bluing-chamber is provided with manholes 39, which are covered by closure
40 members 40, of fireproof material, preferably asbestos.

A baffle-plate 41^a is inserted within the pan 41 by means of supporting-lugs 41^b, whereby it is spaced centrally, as indicated in Fig. 4.
45 The cooling-chamber 6 consists of a pan 41, provided with pipes 42 43, used, respectively, for filling the pan 41 with water or oil and for allowing any excess thereof to pass off without an overflow. Over the pan is a top 45, provided with an opening covered by a closure member 45^a, and the pan is provided at one end with a shield 46 and at the other end with a flange 47, connected upon the rear end
55 of the bluing-chamber. Mounted immediately below the shield and actuated by a sprocket-chain 48 are rollers 49, suitably geared together. The rollers 19 are each provided at one end with a collar 50 and with a bevel-gear 51, which engages another bevel-
60 gear 52, mounted upon a horizontal shaft 53. A number of rollers 54 are mounted in the pan 41 and arranged in the arc of a circle, as indicated in Fig. 1, these rollers being propelled by sprocket-gearing 55, actuated by
65 the shaft 53^a through the medium of a bevel-

gear 56. Brackets 54^a engage journal-necks 54^b, with which these rollers are provided, as indicated in Fig. 4. The shafts 53 and 53^a are driven by any suitable motor mechanism and are turned in such direction that the upper parts of the rollers move toward the rear of the furnace—that is, away from the pan 41. Within the pan 41 is a liquid 44, which, as above indicated, may be oil, water, or any other liquid used for the purpose of cooling, cleansing, or otherwise treating the plates at a preliminary stage.

With the construction above described I usually employ water, except in connection with heavy plates, and for these I use a volatile oil; but I do not limit myself to the liquids mentioned.

The passages 9 are preferably a little nearer together than are the I-beams 15, as will be understood from Fig. 3. My purpose
85 in so placing the I-beams is to enable them to vaporize any water which may condense upon the ends of the rollers 19, due to the chilling effect of the passages 14^a outside of the bluing-chamber 4. In other words, should steam condense upon the ends of the rollers 19 and in the form of water run down upon the plates 13 I desire to keep these plates heated, so that the water will be immediately reconverted into steam. My purpose in gearing together a plurality of rollers 49 in the front of the cooling-chamber is based upon my discovery that when plates suddenly enter the liquid 44 they may not sink directly, and especially as they are slightly heated they may generate a little steam or vapor, and thus tend to float. The rollers 49 prevent the plates from moving improperly and also serve as guides.

A by-pass flue 57 is disposed within the wall 7 and is provided with an end 58, which emerges into the heating-flue 5. The other end of this by-pass flue terminates in a doorway 59, closed by a door 60, the latter being operated by means of a hand-lever 60^a.
110 Mounted at the back of the heating-flue 5, preferably at a point near the pan 41, is a doorway 61, closed by a door 62, the latter having the form of a butterfly-valve and being operated by means of a hand-lever 63. (See Fig. 3.) Farther back in the furnace immediately to the rear of the pan 41 is another doorway 64, closed by a door 65, having also the form of a butterfly-valve and operated by means of a hand-lever 65^a. It
120 will thus be seen that the doors 60, 62, and 65 may be opened and closed independently of each other. A number of air-holes 67 are provided immediately adjacent to the pan 41, and mounted, respectively, within these air-holes are dampers 68, which may be used for closing and opening the holes 67 at pleasure. A pipe 69 is connected with the pan 41 and with a rotary pump 70, the latter being driven by a sprocket-chain 71.
130

In communication with the pump 70 are bent pipes 69, one being connected with a sprinkling-head 72, the other with a pipe 73, which taps into the pan 41 below the liquid line thereof. A perforated steam-pipe 74 also taps into the pan 41 and rests upon the bottom thereof. If desired, I can heat the water or oil 44 by means of this steam-pipe when desired instead of relying upon the heat from the heating-flue 5. By means of a removable plug 75 the sprinkling-head 72 may be cleaned without removing it from the pan.

As shown in Fig. 1, a pipe 47^a leads from the bluing-chamber 4 and is provided with a valve 47^b.

My invention is used as follows: The plates of iron or steel to be operated upon are placed upon the rollers 31, and thus are fed through the pan 41 and liquid 44 by means of the rollers 54. The rear end of the heating-flue 5 extends directly beneath the rollers 31, so that the plates to be treated are heated to some extent before entering the liquid. One of these plates is shown at 76 just emerging from the liquid 44. The pump 70 being in operation, the sprinkling-head 72 sprinkles the plate as it emerges from the liquid 44. The purpose of this arrangement is as follows: When the liquid 44 has been used upon a considerable number of plates, a scum accumulates and floats upon the top of the liquid. This scum adheres to the surface of the plates and protects the surface thereof to a greater or lesser extent, thereby interfering with the process. By means of the sprinkling-heads each plate is thoroughly cleansed upon emerging from the liquid. Each plate next enters the bluing-chamber 14, being carried along by the rollers 19. If the liquid 44 be water, it is heated by means of the heating-flue 5, so as to fill the bluing-chamber with steam, which varies in temperature from about 400° Fahrenheit at a point immediately adjacent to the pan up to about 900° to 1,200° Fahrenheit at the end of the bluing-chamber farthest from the pan. With comparatively heavy plates—that is to say, those of 14 gage and thicker—it is preferable to use oil instead of water in the pan 41. For this purpose I employ any volatile oil which readily vaporizes at a temperature approximating 600° Fahrenheit. I find that where heavy plates are used in connection with water the latter does not evaporate with sufficient quickness from the plates, and, moreover, tends to evaporate irregularly from different parts of the surface. This being so, a slight oxidation may affect the surface of the plate and impair the process. The plates pass forward through the bluing-chamber and being protected from oxidation by the steam or other vapor do not oxidize—at least they do not oxidize in the usual manner. As they approach the passage 34 they gradually rise in temperature until they reach the limit

above mentioned, whereupon they suddenly emerge into the outer atmosphere, and resting upon the rollers 31 at that end of the furnace they gradually cool down, acquiring as they do so a beautiful luster, together qualities not readily found in metallic plates. The main idea is to dry the sheet very quickly and raise it to the temperature mentioned and then have it emerge into the atmosphere.

Plates treated as above described do not readily undergo changes due to moisture or differences in temperature. They keep their color indefinitely and acquire a certain degree of toughness which is very desirable in actual practice.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The method herein described of treating plates of sheet iron and steel, which consists in passing the same through a body of heated liquid, spraying said plates after emerging from said liquid, raising the temperature of said plates while subjecting them to the vapor of said liquid so as to prevent oxidation of said plates, and finally allowing said plates to emerge into the atmosphere and gradually cool.

2. The method herein described of treating plates of sheet iron and steel, which consists in passing the same through a body of heated liquid serving as a vapor seal, subjecting said plates to the action of a vapor restrained by said vapor seal, increasing the temperature of said vapor, and thereby increasing the temperature of said plates, and finally allowing said plates to emerge into the air and to cool.

3. The method herein described of treating sheets of iron and steel, which consists in warming said plates, washing the same, subjecting said plates to the action of a body of vapor treated to different extents in different portions thereof, the lowest temperature of said vapor approximating 400° Fahrenheit and the highest temperature thereof approximating 900° to 1,200° Fahrenheit and finally allowing said plates to emerge into the open air and then to cool.

4. The method herein described of treating sheet iron and steel, which consists in passing the same slowly through a body of vapor heated unequally in different portions thereof, the iron and steel being first exposed to portions of low temperature and then to portions of successively higher temperature, and then allowing said iron and steel to emerge into the atmosphere and cool.

5. The method herein described of treating sheet iron and steel, which consists in passing the same through a volatile liquid, causing said liquid to vaporize so as to leave said iron and steel dry, gradually raising the temperature of said iron and steel by passing the same through a body of vapor heated un-

equally in its different portions, and finally allowing said iron and steel to cool in contact with the open air.

6. The method herein described of treating
5 plates of metal, which consists in subjecting the same to the action of an aeriform body, of which different portions are heated unequally, said plates being first brought into contact with portions of said aeriform body
10 having comparatively low temperatures and passed successively along to portions having

higher and higher temperatures, and finally causing said plates to emerge into the open air.

In testimony whereof I have signed my 15 name to this specification in the presence of two subscribing witnesses.

HARRY HOMER GOODSSELL.

Witnesses:

W. B. VAN HORNE,
A. HARLAN.