

(No Model.)

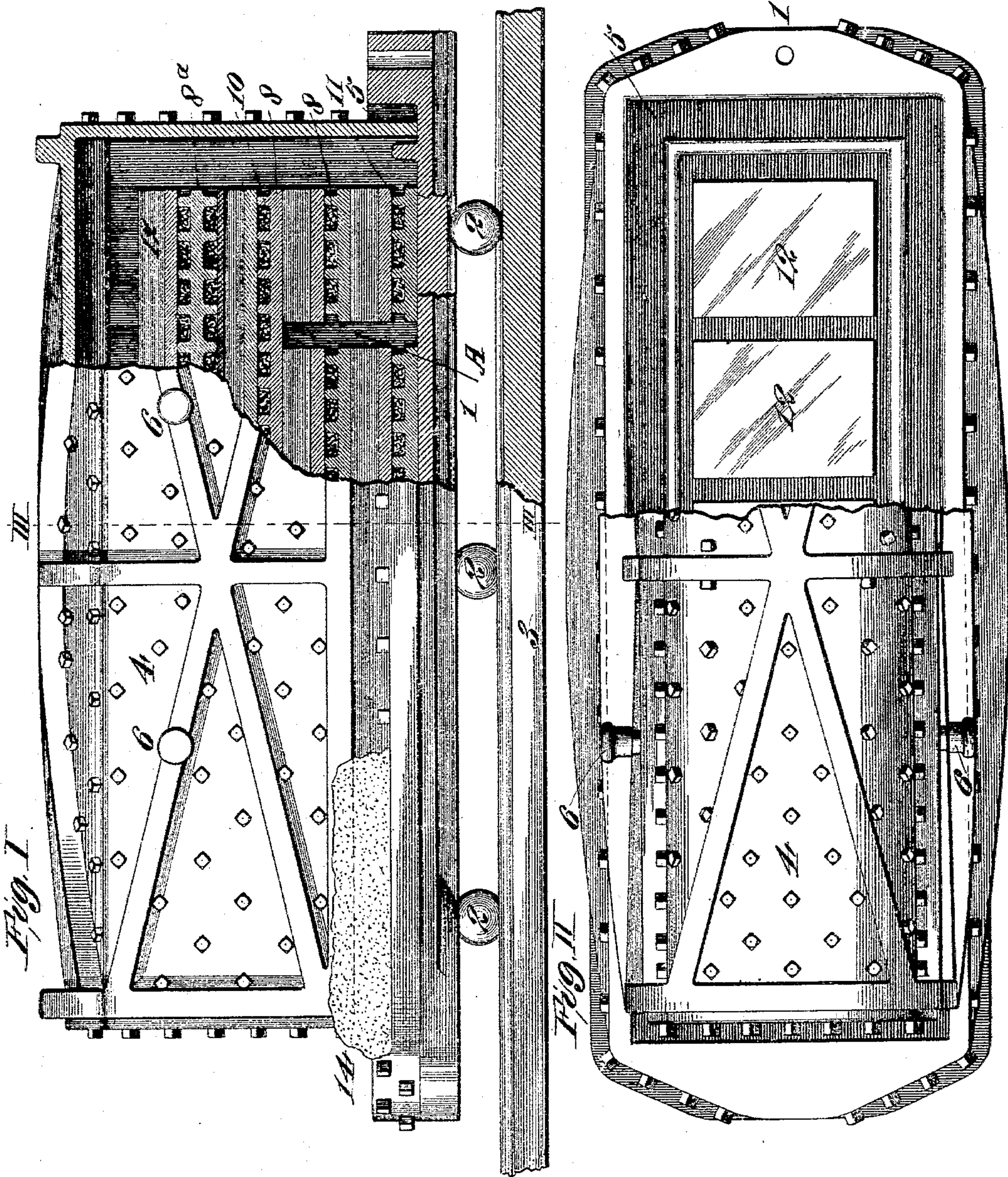
2 Sheets—Sheet 1.

W. E. HARRIS.

METHOD OF TREATING AND ANNEALING SHEET METAL.

No. 559,705.

Patented May 5, 1896.



Attest:
E. Knight
Stanley Stoner

Inventor:
Wm. E. Harris
By Knight & Co.
Attorneys.

(No Model.)

2 Sheets—Sheet 2.

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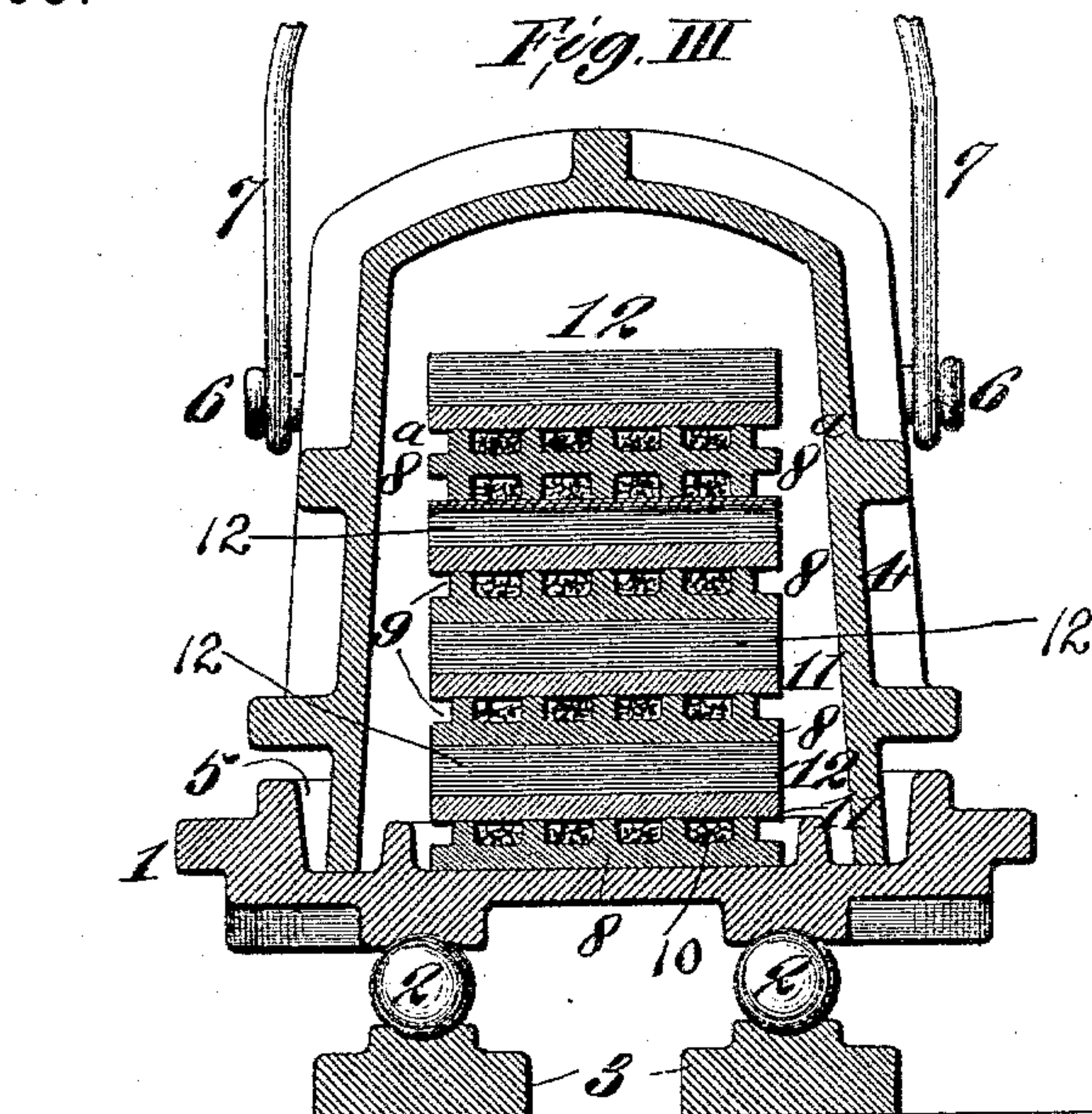


Fig. IV.

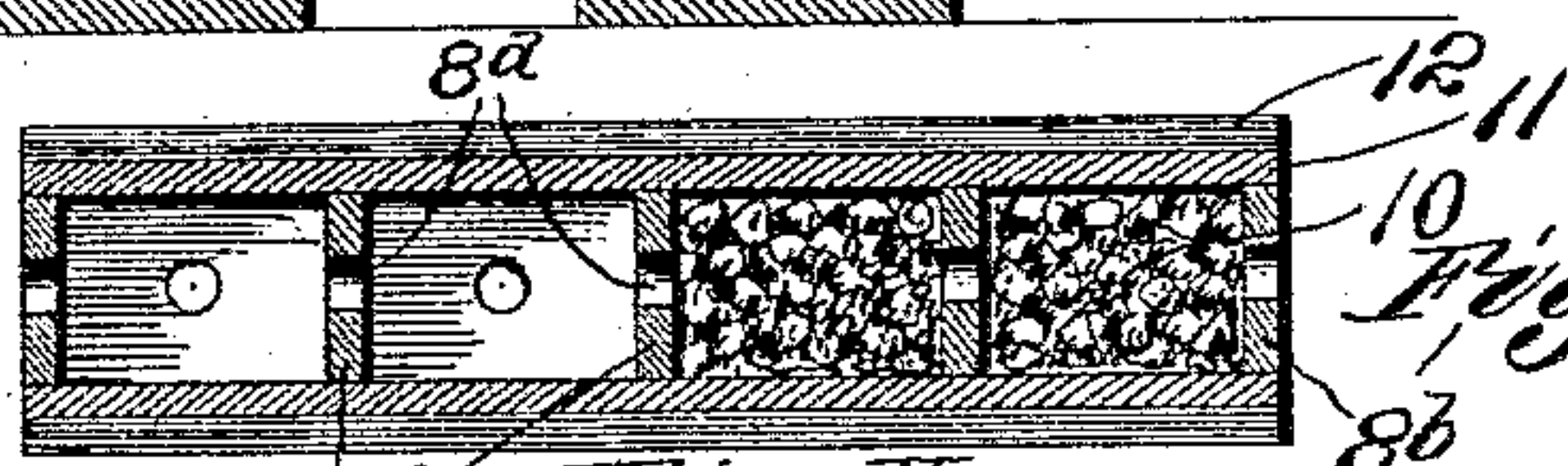
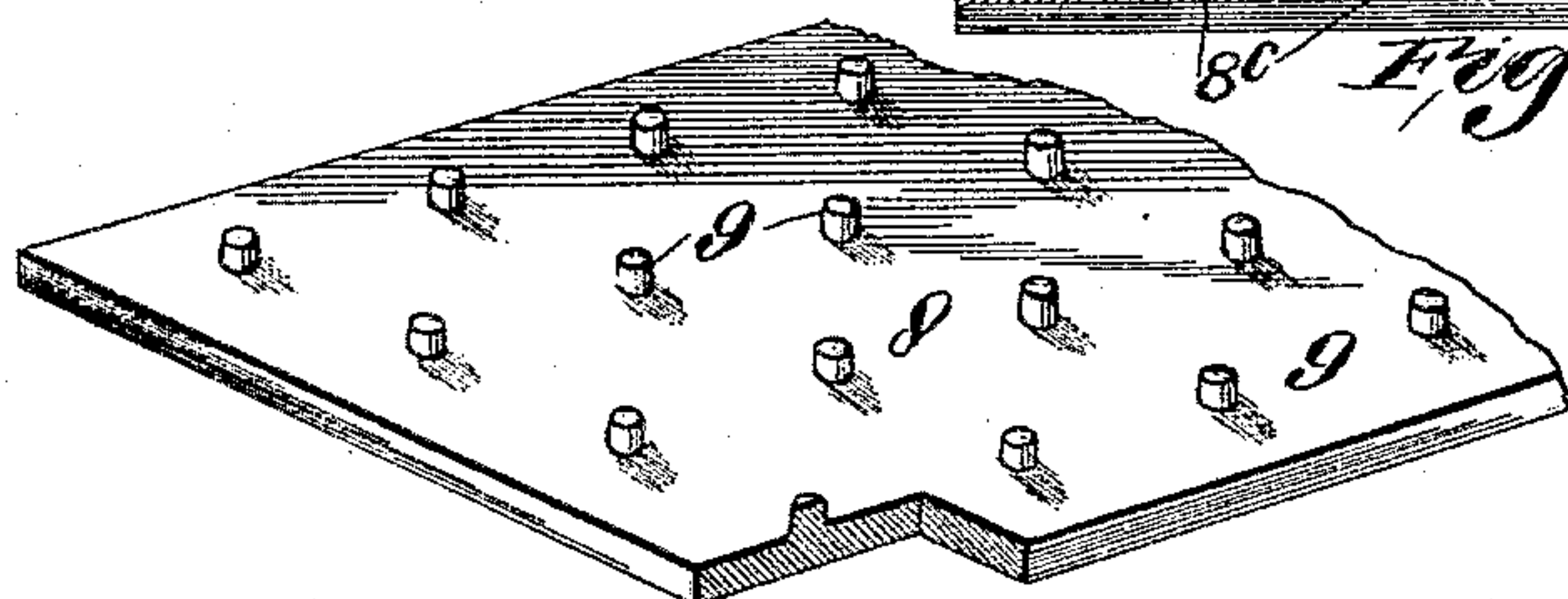


Fig. X.

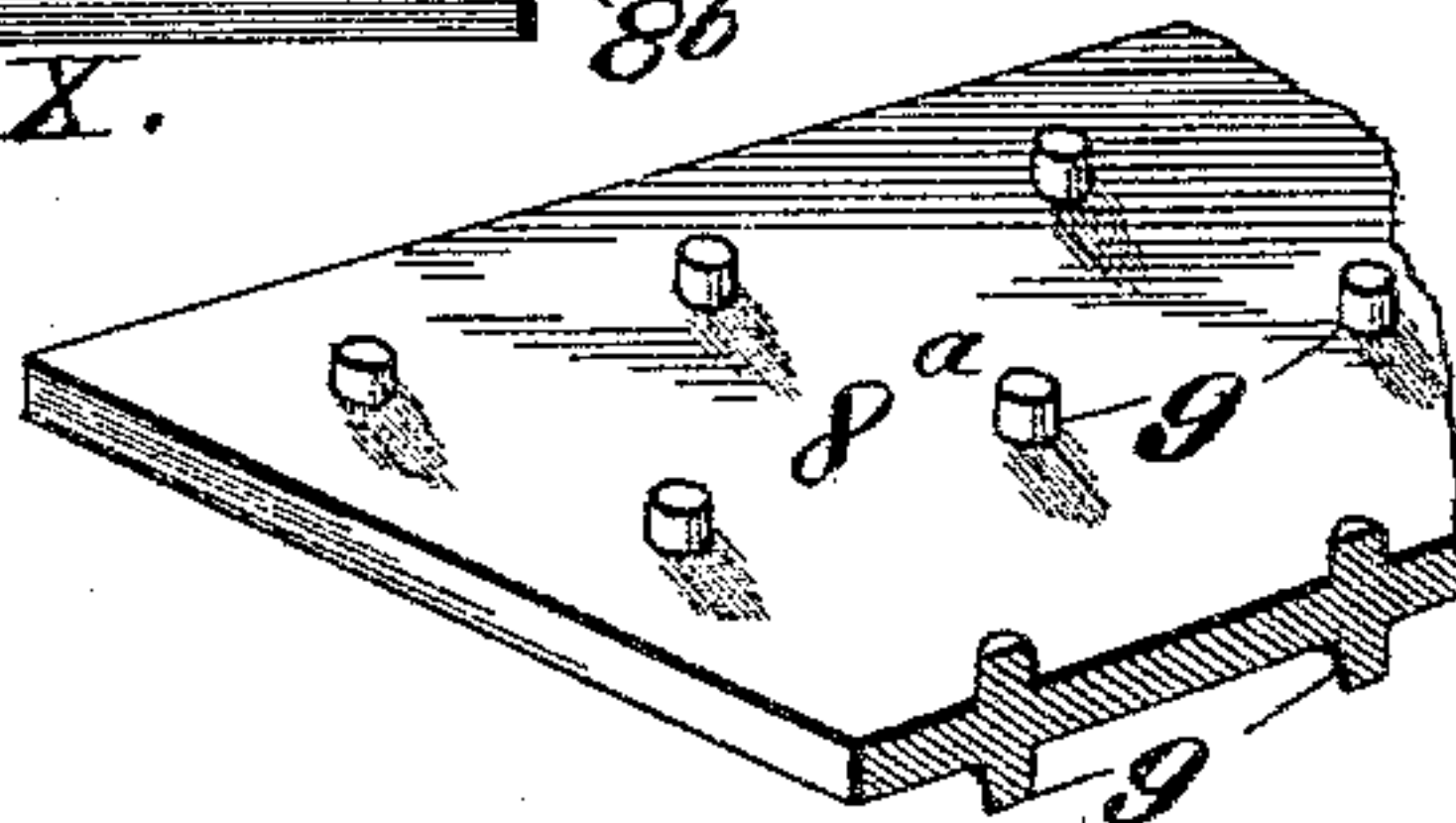


Fig. VI.

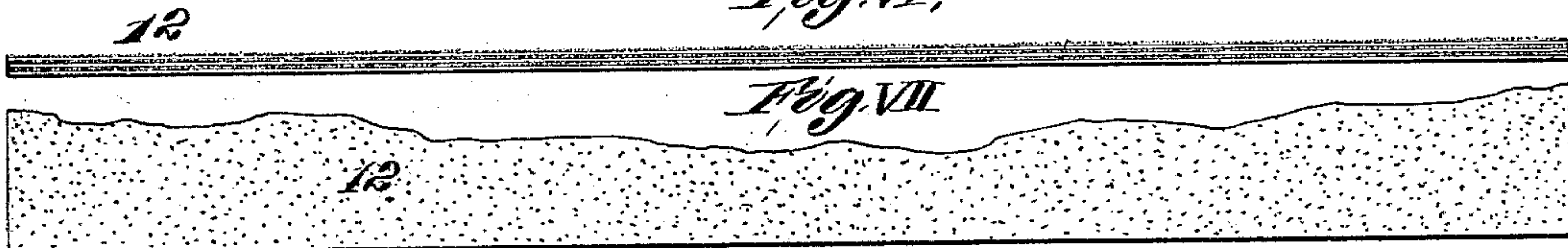


Fig. VII.



Fig. VIII.

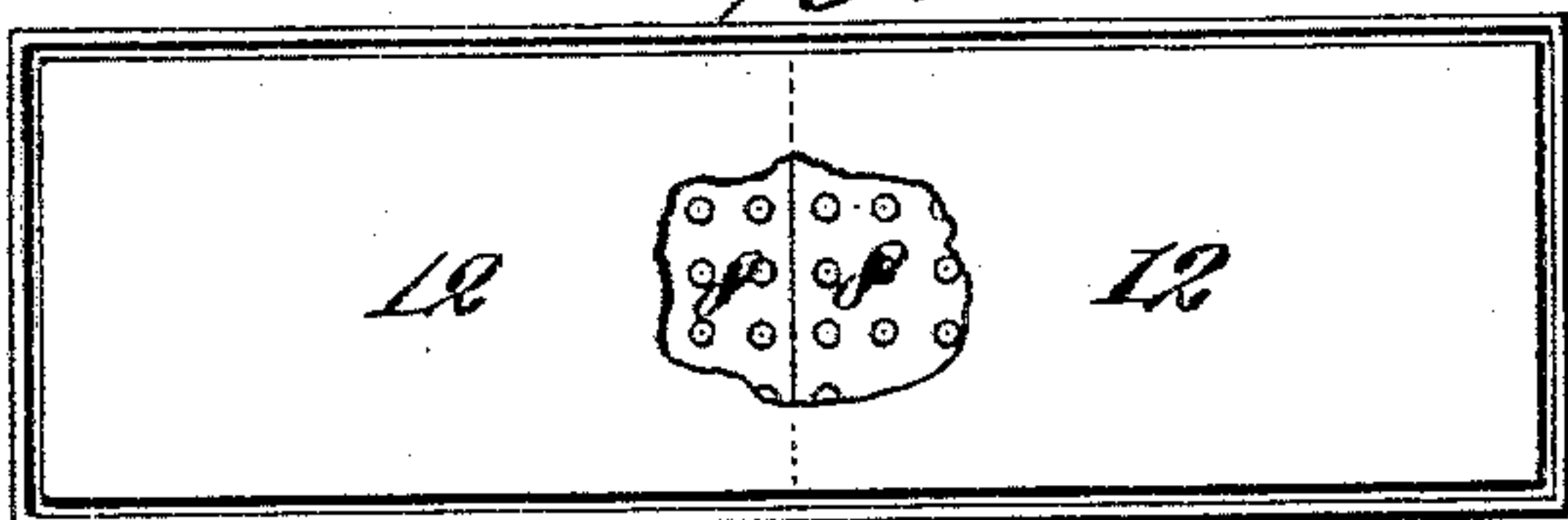
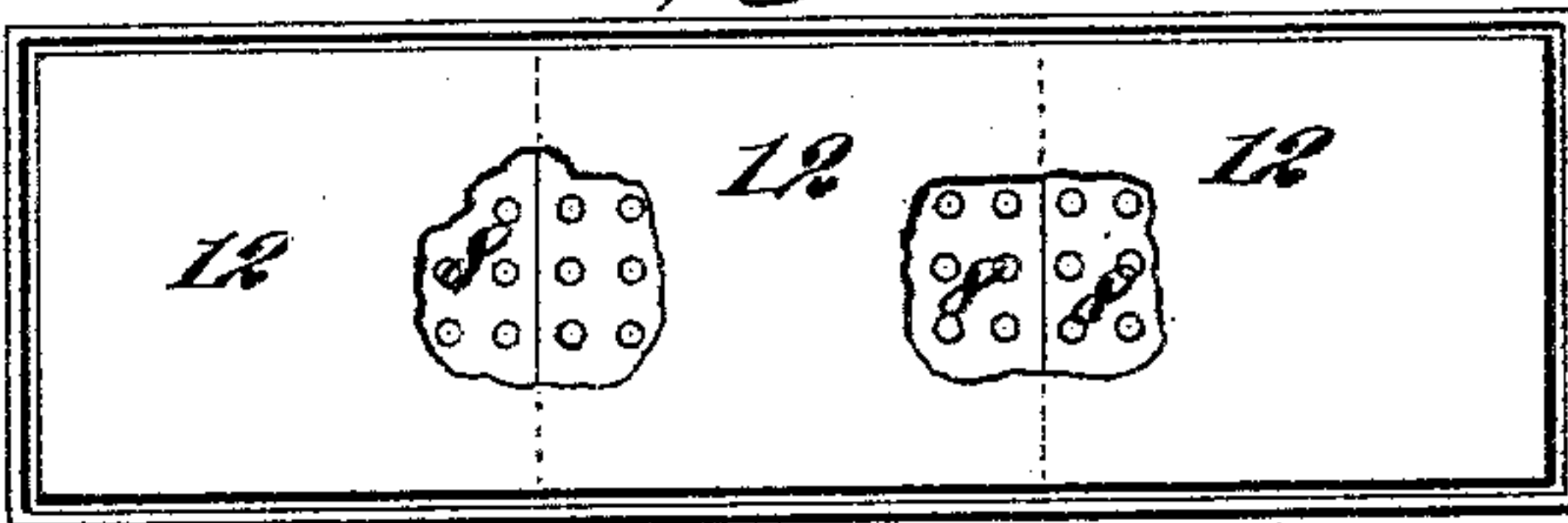


Fig. IX.



Attest:

E. Knight
Stanley Stover

Inventor.

Wm. E. Harris
By Knight Bros.
Atty's.

UNITED STATES PATENT OFFICE.

WILLIAM EDWIN HARRIS, OF NILES, OHIO.

METHOD OF TREATING AND ANNEALING SHEET METAL.

SPECIFICATION forming part of Letters Patent No. 559,705, dated May 5, 1896.

Application filed June 21, 1895. Serial No. 553,501. (No specimens.)

To all whom it may concern:

Be it known that I, WILLIAM EDWIN HARRIS, of Niles, in the county of Trumbull, State of Ohio, have invented a certain new and useful Improvement in Methods of Treating and Annealing Sheet Metal, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to an improved method of treating and annealing metallic sheets and apparatus therefor whereby there is imparted to the sheets, without mechanical treatment, the appearance of Russia iron or hammered sheets or plates.

In carrying out my improved method I first roll the metal into sheets while in a heated form, then anneal the sheets, then cold-roll the sheets, then stack the sheets again in the annealing-box with a mineral medium interposed between the different sheets, and then anneal the sheets for a second time. The interposed medium that I prefer and have found to be practicable is mineral, such as a mixture of copper filings and soapstone; but I do not desire to be limited to these particular mineral matters, nor do I desire to be limited to any particular medium for keeping the sheets apart. I have discovered that by separating the individual sheets and holding them a short distance apart while in the annealing-oven that there is imparted to the sheets a gloss and finish resembling very much the gloss and finish of Russia iron. By separating the individual sheets the heat is permitted to pass readily in between the sheets, imparting to them the gloss and finish that I have referred to.

I will describe the apparatus and means I have shown in the drawings for annealing and for separating the individual sheets and for separating these again into separate bunches.

Figure I is a view, partly in side elevation and partly in vertical longitudinal section, of my annealing-box and the sheets of metal piled in said box. Fig. II is a plan of the annealing-box with one end of the cover removed to show the interior of the box in plan. Fig. III is a vertical transverse section taken on line III III, Fig. I. Fig. IV is a perspective view of one of the intermediate plates that are inserted between the piles of sheets,

a portion of it being shown in section. Fig. V illustrates a variation of the plate shown in Fig. IV, in which knobs or studs are provided on both sides of the plate, a portion of this plate also being shown in section. Fig. VI is a view illustrating a number of sheets covered with a suitable agent for separating them and whereby there is imparted to the sheets a highly desirable gloss and finish. Fig. VII illustrates a top view of a portion of one of the sheets shown in Fig. VI. Figs. VIII and IX are views illustrating the employment of two or more of the plates shown in Figs. IV and V in place of one plate. Fig. X is a sectional view of a separating-box designed for employment in place of the plates illustrated in detail in Figs. IV and V.

Referring to the drawings, 1 designates the bed of the annealing-box, which is carried upon balls or rollers 2, that travel on grooved rails 3, and 4 designates the box-cover, which rests in the groove 5 of the bed 1, and is provided with projections 6 for the connection of a bail 7, that may be attached, as usual, to a crane for the purpose of elevating said cover.

8 designates a plate, which may be of cast-iron or other suitable material, and is provided on its sides with knobs or studs 9, located a suitable distance apart. In Fig. IV, I have shown these studs on one side only of the plate 8; but in Fig. V, I have shown a variation in which they are provided on both sides of a plate 8^a. These plates I employ between the piles of metallic sheets for the purpose of providing an air-space through which the heat may enter to reach the central portions of the sheets and anneal the sheets uniformly.

In Fig. X, I have shown a box 8^b provided with partitions 8^c, and in its walls and partitions are openings 8^d. This box is designed as a modification of the plates 8 and 8^a, and is adapted to hold the charcoal or equivalent filling 10, as in the instance of said plates, the heat having free access into the filling through the openings 8^d.

In carrying out my invention I first place one of the plates 8 in position on the bed of the annealing-box and next distribute over the plate in the spaces between the studs 9 wood-charcoal or charcoal-dust or an analogous or equivalent heat-conducting material,

such as pulverized bituminous or anthracite coal, which is designated in the drawings by 10. I next lay upon the plate 8 a flat plate 11, and on the plate 11 pile as many sheets 12, 5 with the interposed fine particles of mineral matter, as hereinafter described, as may be desired or deemed proper in order to attain the best results in annealing them. When as many sheets as desired have been placed in the 10 pile, a second plate 8 is laid upon the pile of sheets and covered with wood-charcoal, as in the first instance, and a plate 11 placed upon it, and another pile of sheets built up as before, and thus the process of building the 15 piles of sheets goes on until the height of the interior of the cover 4 is reached and the box has received all it can accommodate at one time. The box is then run on the track into a suitable furnace, and the furnace is fired 20 as usual.

In Figs. I and III, I have shown for illustration at the bottom a series of small sheets, between which is a circulation-space A, and at the top a series of larger sheets in position, 25 and in the same figures the plates 8 are shown at the bottom, while the topmost plate is one of those referred to as 8^a, which are provided with knobs or studs on both sides.

I have discovered that by separating the 30 individual sheets in annealing a gloss and finish can be imparted to them, thus producing what I term "colored sheets." In Figs. VI and VII, I have illustrated this part of my invention. To thus color them I sprinkle 35 over the sheets 12 (see Figs. VI and VII) a mixture composed approximately of one-half copper filings and one-half of pulverized soapstone. The placing of said substance is done during the process of piling the sheets, as 40 hereinbefore set forth, and the substance is placed between all of the sheets which it is desired to color. When the box is ready to enter the furnace, I place around the outside of the cover an embankment of sand, (designated by 14 in Fig. I,) so as to exclude the air 45 from the interior of the box, in order that the sheets being annealed will not scale. I then

roll the box into the furnace, which may be of any usual construction, and fire up to a cherry-red heat, and as soon as such heat is 50 attained I allow the fire to subside, and when the furnace is cooled down to a black heat the box is removed from the furnace, and the sheets will be found to be annealed and will have an attractive gloss imparted to them. 55

My method might be carried out to a certain extent by applying the separating medium to the sheets before they are put into the annealing-oven for the first time.

A very important result of my improved 60 method, which has been established by practical demonstration, is that the finished sheets do not break when bent at an acute angle or bent back and forth, as is the case with Russia iron or iron which has been given its fin- 65 ished appearance and gloss by the hammering method.

I claim as my invention—

1. The improved method of treating and annealing metallic sheets, which consists in 70 annealing the sheets, then cold-rolling the sheets, then stacking the sheets with a separating medium of copper filings and pulverized soapstone interposed between the respective sheets, and then annealing the sheets 75 a second time, substantially as set forth.

2. The improved method of treating and annealing metallic sheets, which consists in 80 first annealing the sheets, then cold-rolling the sheets, then stacking the sheets with interposed layers of copper filings and pulverized soapstone between the respective sheets, and then annealing the sheets a second time, substantially as set forth.

3. The improved method of annealing metallic sheets herein described, which consists in placing upon the sheets a coating of copper filings and pulverized soapstone, and then annealing the sheets, substantially as described. 85

WILLIAM EDWIN HARRIS.

In presence of—

ALBT. W. HARRIS,
CHARLES H. STROCK.