

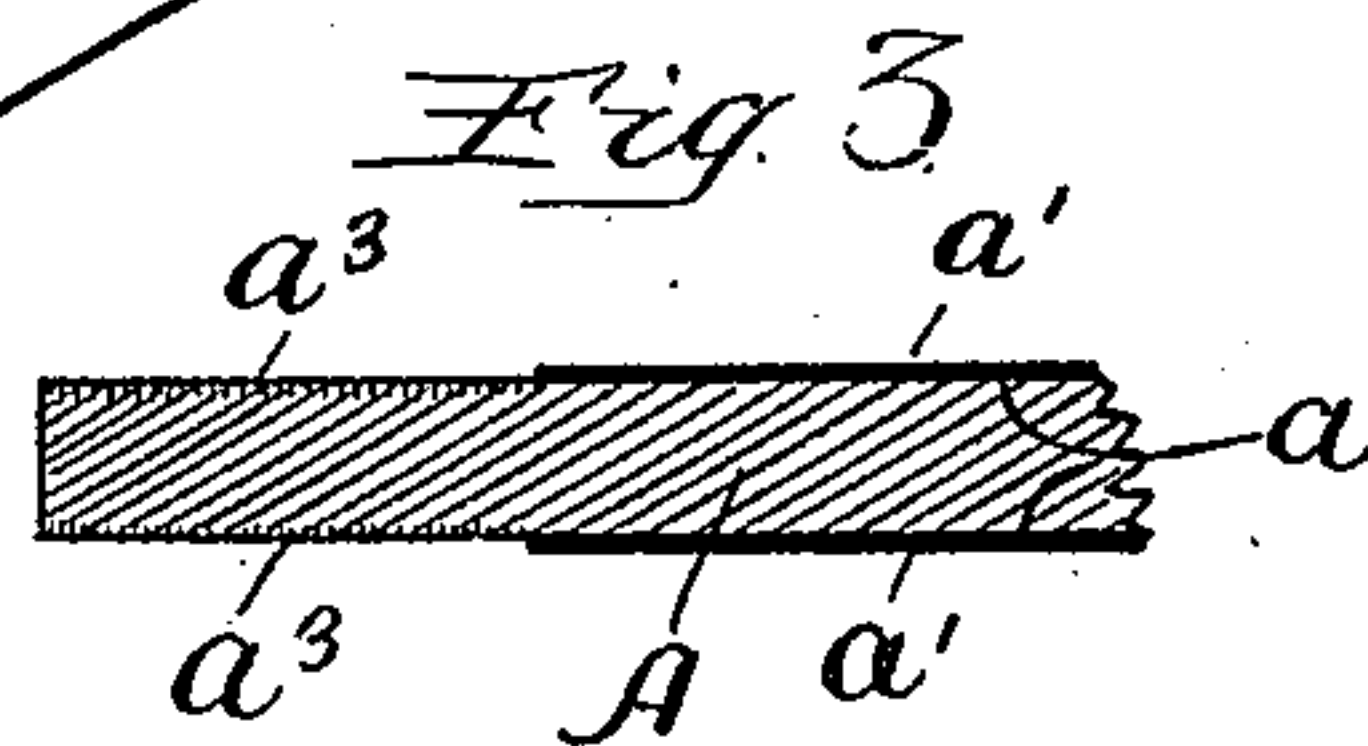
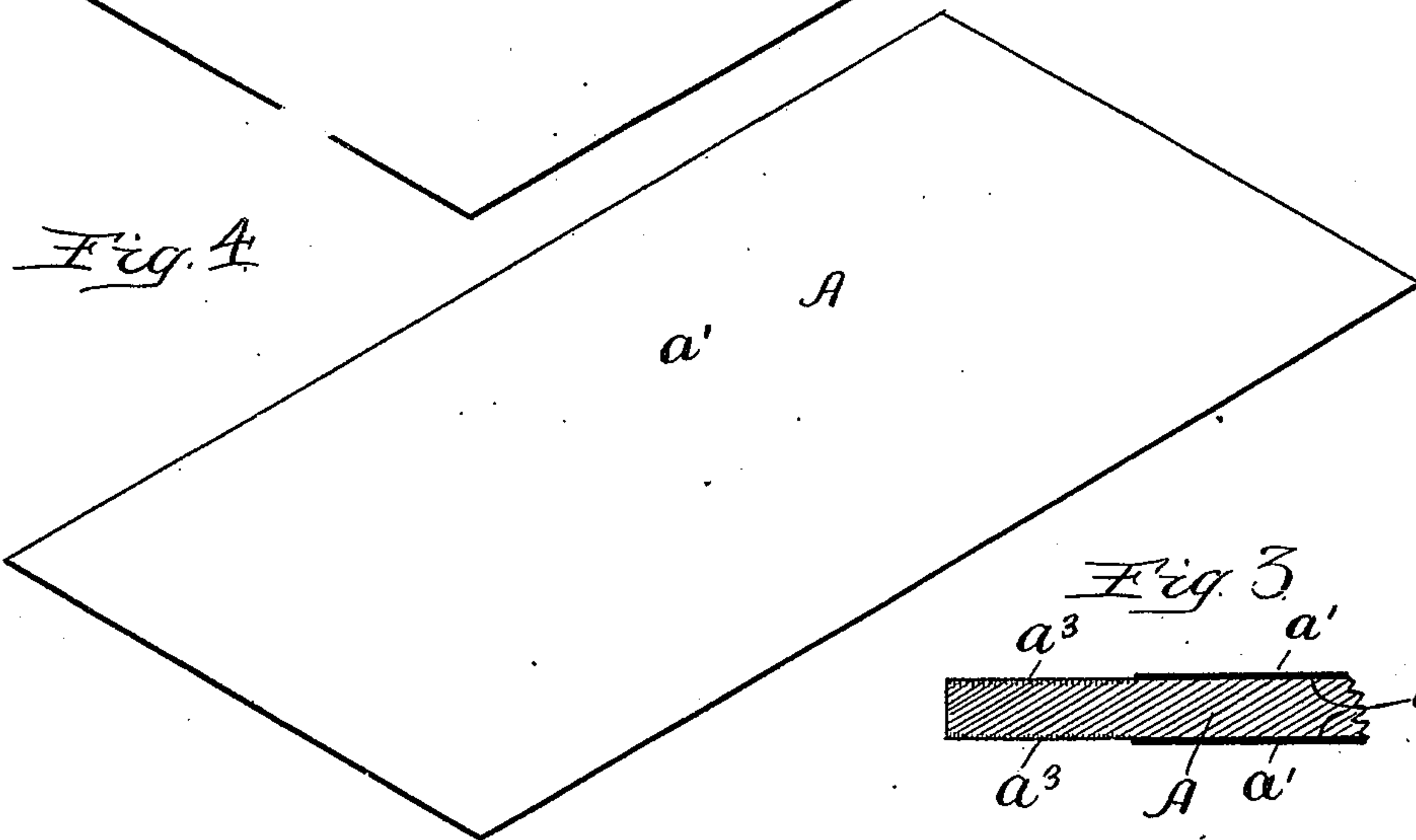
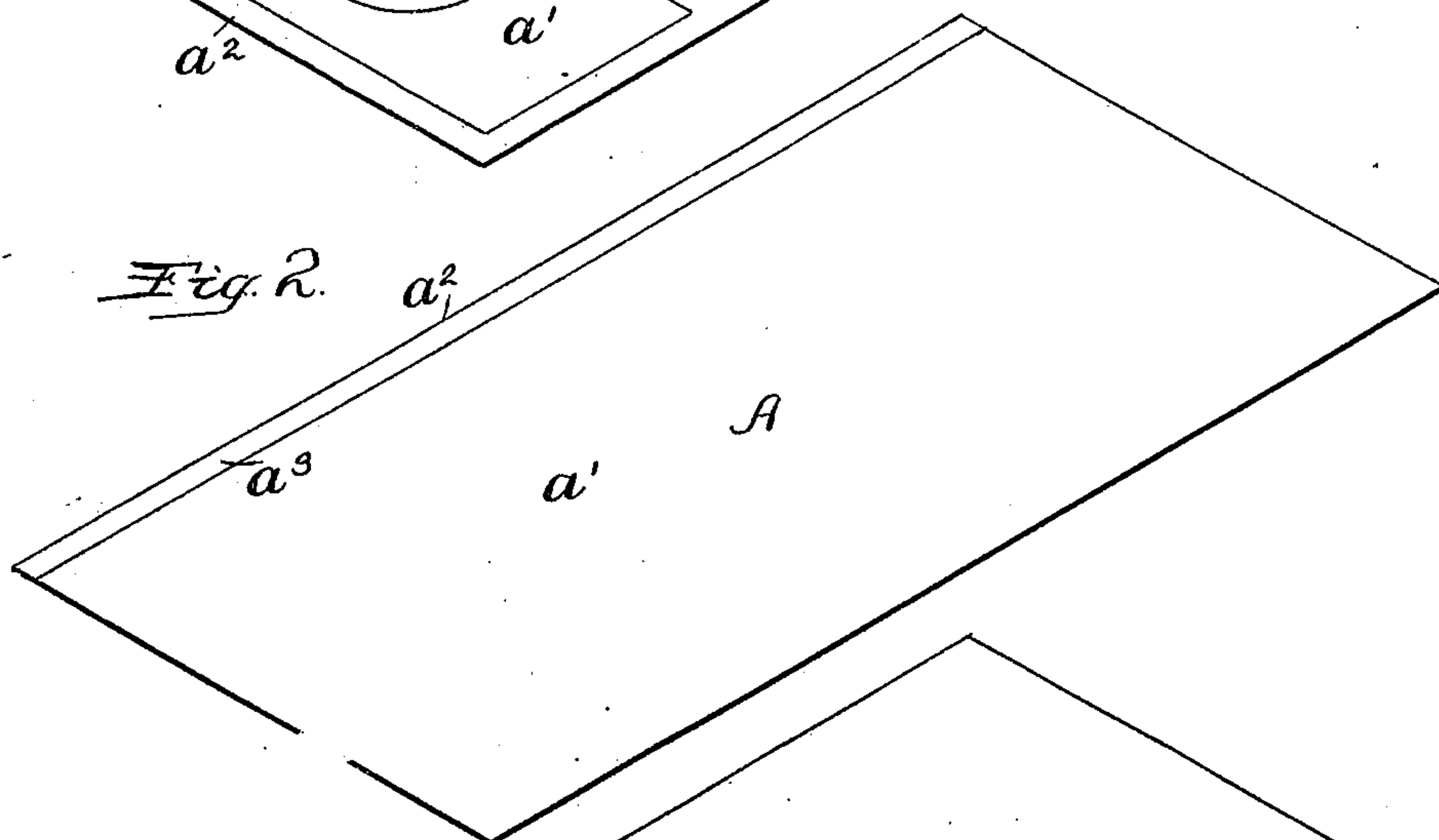
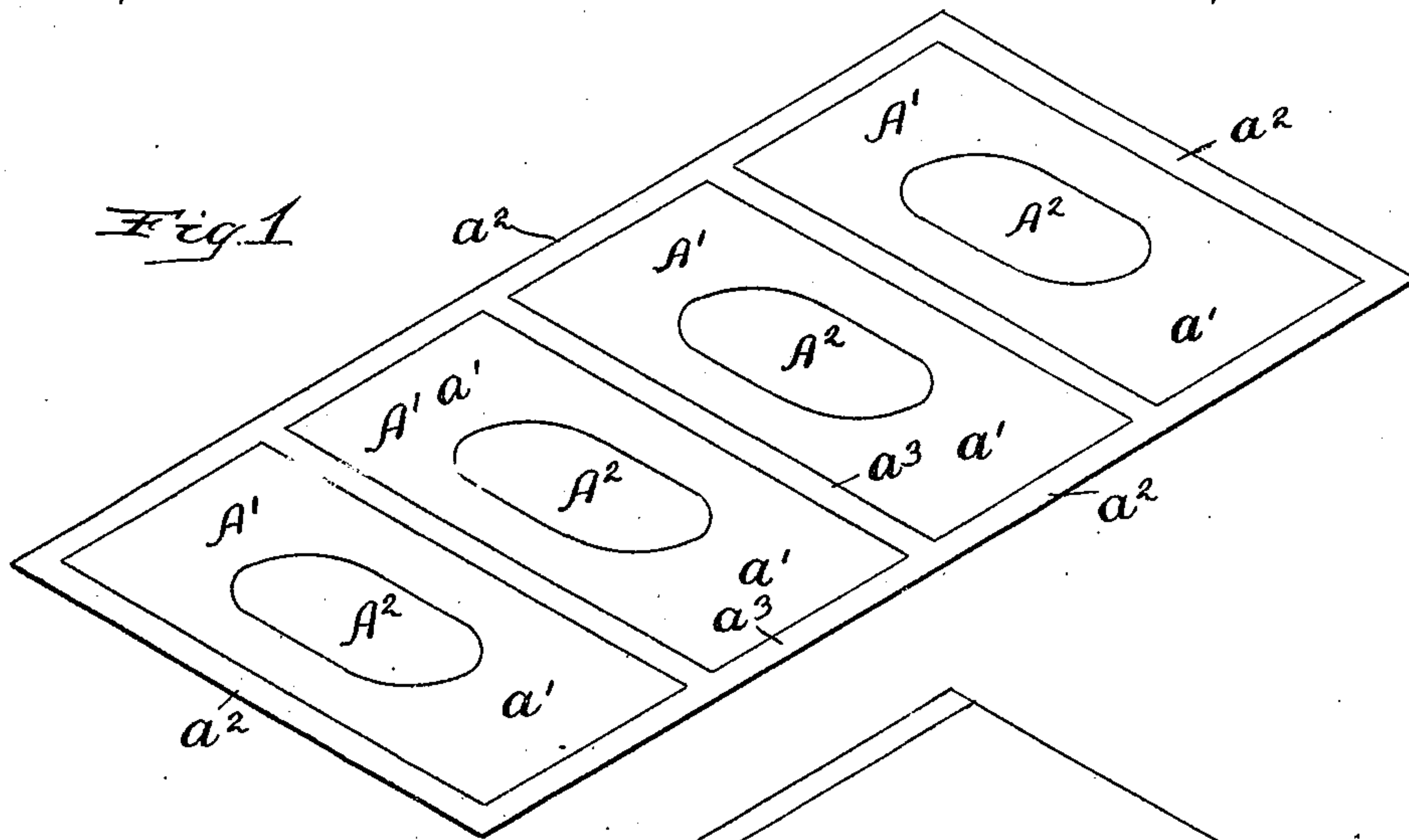
(No Model.)

E. NORTON.

PROCESS OF JAPANNING IRON OR STEEL SHEETS.

No. 547,086.

Patented Oct. 1, 1895.



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PROCESS OF JAPANNING IRON OR STEEL SHEETS.

SPECIFICATION forming part of Letters Patent No. 547,086, dated October 1, 1895.

Application filed January 7, 1893. Serial No. 457,585. (No specimens.)

To all whom it may concern:

Be it known that I, EDWIN NORTON, a citizen of the United States, residing in Maywood, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Processes of Japanning Iron or Steel Sheets, of which the following is a specification.

My invention relates to improvements in sheets of iron or steel, and more particularly to what is commonly known in the art as "japanned" or "decorated" ware, and wherein the surface of the iron or steel sheets is covered with paint or varnish or other analogous material and baked or heated to amalgamate the surface coating with the metal and cause the coating to adhere firmly thereto.

Heretofore in the manufacture of japanned or decorated ware of the better quality from iron or steel sheets it has been customary to first tin the iron or steel sheets or coat them with tin or other soft metal and then apply the japan finish or coating on the tinned surface of the sheets, though a cheaper and inferior quality of ware has been made by applying the japan finish or coating directly on the black scale or oxide surface of the ordinary black iron or steel sheets. The latter ware is not durable, because of the liability of the scale or oxide surface coating itself to peel off and of course carry with it the japan finish or coating and thus leave the iron or steel sheet entirely exposed to rust in spots, and though the former ware is much more durable still, owing to the peculiar soft and polished surface given by the tin or soft-metal coating and upon which the japan finish or coating is applied, the latter sometimes wears off very quickly, leaving the tin exposed at parts and the vessel or article unsightly, especially where from its use it is exposed to much handling or rubbing where it is manufactured into articles by use of drawing-dies.

The object of my invention or discovery is to provide a japanned or decorated sheet metal that will be better and more durable than that heretofore in use and at the same of simple construction, so that it may be cheaply manufactured.

A further object is at the same time to so construct my improved japanned or decorated

sheets that sheet-metal vessels or articles manufactured therefrom may have their necessary joints united by soldered seams.

I have discovered, and herein my invention in part consists, that by applying the paint, varnish, or japanning material to the iron or steel sheets in a white-pickled condition—that is to say, after the sheets have been white-pickled and all scale or oxide removed from their surface, but before they have been tinned—a much more durable and better japanned or decorated sheet is produced than if the same sheet had been first tinned before being japanned or coated with the paint or varnish. I have found by experiment that the japanning coating unites much more firmly and securely to the white-pickled untinned iron or steel surface of the sheet than it does with the tin or soft-metal surface of the tinned sheet and wears much better and is much more durable. I think this is due to the fact that where the japan coating is applied to and heated or baked upon the clean or white-pickled iron or steel surface of the sheet the japan material penetrates the pores of the iron or steel and is thus caused to adhere and unite more firmly and intimately than it does with the tin-coat surface; but whatever may be the cause the fact is that the white-pickled or clean iron or steel surface is much better adapted to receive and firmly unite with the japan finish or coating than the tin or soft-metal surface.

In the process of practically manufacturing or producing my improved japanned or decorated iron or steel sheets I have discovered, and herein my invention also in part consists, that by first taking the ordinary black iron or steel sheets, then pickling the same in the ordinary way in an acid bath to remove the oxide or scale from the surface of the sheets, then washing or bathing the sheets in water to remove or clean the sheets from the acid, then drying, heating, and coating the sheets with melted stearine or stearic acid or other equivalent material to prevent oxidation or rusting of the white-pickled surface of the sheets, (the heating, drying, and stearine coating operations being all preferably performed simultaneously, so that the protecting stearine coating will take the place of the

protecting water film or coating as the water is drained off and the sheets dried,) and then cleaning the sheets by rubbing with bran to remove all surplus stearine from the surface thereof. I have discovered by treating the sheets by the foregoing steps that the minute quantity of stearine which remains upon the surface of the sheet or in the surface pores of the metal will not in any way interfere with the paint, varnish, or japan material or with the japanning operation, and that the surface of the iron or steel sheets may be in this way practically coated with the paint, varnish, or material used for japanning or decorating without danger of the white-pickled sheets becoming oxidized or rusted before the paint, varnish, or japanning material is applied.

A further improvement consists in providing my improved japanned or decorated iron or steel sheet with strips or portions uncoated with the japan material at the parts where it is desired to form soldered joints or seams in making sheet-metal vessels or other articles therefrom. At such unjapanned strips or portions of the sheet the iron or steel sheet has a non-oxidizable solderable surface produced by the stearine remaining on its surface or filling its pores.

In the accompanying drawings, which form a part of this specification, and in which similar letters of reference indicate like parts, Figure 1 is a perspective view of a sheet of iron or steel embodying my invention. Fig. 2 is a similar view showing the reverse side thereof. Fig. 3 is a much enlarged or exaggerated partial cross-sectional view. Fig. 4 shows my improved sheet without any solderable strips or portions left on the surface thereof, the same being designed for use in making vessels or articles requiring no solderable seams or joints.

In the drawings, A represents the sheet of iron or steel having a clean or white-pickled surface a and provided with a japanned finish or coating a' of paint, varnish, or other equivalent material, the same being preferably baked or heated in the usual manner. At strips or portions a^2 , where the blanks A' cut from the sheet are intended to be soldered or united together or to other parts by soldered seams, the surface of the sheet is uncoated with japan, but is furnished simply with the protective coating a^3 of stearine or other equivalent protective substance that will not interfere with the soldering. The sheet A or the blanks A' may also be furnished on their surface with labels or other decorations A^2 , printed thereon at the time the paint or varnish is applied.

As shown in Fig. 1, the paint, varnish, or japanning material coating of the sheet is to be applied to the sheet by printing; but, as shown in Fig. 4, this coating may be applied by a brush or by dipping or immersion in a bath of the material, or in any manner desired.

In manufacturing my improved japanned or decorated sheets of iron or steel I proceed

by a process consisting of the following steps, viz: I first white-pickle the black sheets of iron or steel to remove the scale or oxide from their surfaces. This may be done in any suitable manner known to those skilled in the art, but preferably in the same way that the black sheets are usually pickled preparatory to tinning in the process of manufacturing tin-plate—that is to say, by immersion in a dilute acid bath. I next wash or bathe the white-pickled sheets in water to remove the acid of the pickling-bath. This may be done in any suitable manner known to those skilled in the art, but preferably in the same way that is employed for this step in the manufacture of tin orterne plate. I next dry or remove the water from the surface of the sheets, and preferably at the same time coat the metal with melted stearine. This may be done in any suitable manner or by any suitable means known to those skilled in the art, but preferably by passing the wet white-pickled sheets between heated rolls, the surface of which is supplied with hot melted stearine, and by use of the process and machine set forth and described in United States Letters Patent No. 488,527, granted to me December 20, 1892, on process of coating sheet metal, and No. 488,025, granted to John G. Hodgson and myself December 13, 1892, on machines for drying and fluxing metal sheets. I next clean and polish the stearine-coated white-pickled sheet and remove all surplus stearine from its surface. This may be done in any suitable way known to those skilled in the art, but preferably by rubbing the surfaces of the sheet with bran in the manner commonly employed in the process of manufacturing tin-plate, the particular method and machine for this purpose which I prefer to use being that shown and described in the pending application of John G. Hodgson, Serial No. 445,074, filed September 5, 1892, for patent on the art of and machine for cleaning and polishing tin-plate. I next japan or decorate the surfaces of the sheet. This may be done in any suitable way known to those skilled in the art, but preferably in the same way that is now commonly employed for japanning or decorating tin-coated plates of iron or steel—that is to say, the surface of the sheet is coated with paint, varnish, or other japanning substance, and heated or baked to cause the coating to amalgamate or unite intimately with the iron or steel surface of the white-pickled sheet and adhere firmly thereto.

When it is desired that the japanned sheet or blank cut therefrom shall be capable of being united by soldered joints with other portions of the same sheet or with other sheets or blanks the paint, varnish, or japan material coating should be applied to the surface of the sheet by printing, and plain or uncoating strips or portions, as a^2 , left, so that the sheet or blank will have a solderable portion or surface. Where the blanks cut from the sheet

are not intended to be united by soldered seams, the whole surface of the sheet may be furnished with the japan, paint, or coating a' .

By use of the adjective phrase "white-pickled," as applied to the sheets, I mean to indicate or designate the clean condition of the ordinary black sheets after the scale or oxide has been removed from their surface by the pickling step or operation, and before new or further rust or oxide has been allowed to form upon the surface of the clean sheet.

At the unjapanned portion or portions a^2 of the sheet the white-pickled surface of the sheet is prevented from oxidation by the stearine a^3 filling the pores of the metal or which remains upon its surface after the cleaning or bran-rubbing step of the process. The stearine itself acts as a flux for soldering, and hence does not interfere with the soldering of the sheet or blank at the unjapanned portions a^2 . At the same time the trace of stearine left upon the surface of the sheet or in the pores of the metal serves as an effective protection against rust or oxidation.

It should be observed that one side edge of the sheet A has an unjapanned margin a^2 on each of its two surfaces, while the opposite side edge of the sheet has such unjapanned margin a^2 upon only one of its two surfaces. This clearly appears from Figs 1, 2, and 3. The purpose of this is to leave an unjapanned strip on the outside of the overlapping edges of the sheet or blank for the solder to flow in the operation of soldering the seam, as will be readily understood by those skilled in the art.

The heat to which the sheets are subjected in the heating or baking portion of the japanning operation does not ordinarily operate to carbonize the stearine remaining upon the portions of the sheet remaining uncoated by the japanning material, and as there is only a trace of stearine remaining in the pores of the metal or upon the surface of the sheet at the uncoated portions thereof the heat does not

tend or materially tend to drive the stearine off or out of the pores of the metal; at least I do not find any difficulty in soldering the sheets at the portions uncoated by the japanning material after the baking or heating operation.

I claim—

1. The process herein described of manufacturing japanned or decorated sheets of iron or steel from ordinary black or oxidized sheets of iron or steel, consisting in the following successive steps: first pickling the black sheets to remove the oxide or scale; second, washing the sheets to remove the acid of the pickling bath; third, drying, heating and coating the white pickled sheets with melted stearine to prevent the white pickled surface of the sheet becoming tarnished or oxidized; fourth, cleaning the sheets to remove the surplus stearine from the surface of the white pickled sheets, and finally coating the surface of such white pickled stearine coated and cleaned sheets with japanning or decorating material and amalgamating the same therewith by heating or baking, substantially as specified.

2. The process of manufacturing japanned or decorated sheets of iron or steel, consisting in first pickling the black sheets to remove the oxide or scale; next washing the sheets to remove the acid of the pickling bath; next drying, heating and coating the white pickled sheets with melted stearine; next cleaning the sheets to remove the surplus stearine or other preservative coating from the surface of the white pickled sheets, and finally japanning or decorating a portion of the surface of said sheet and leaving a portion thereof unjapanned, so that the sheet will have in part a solderable surface, substantially as specified.

EDWIN NORTON.

Witnesses:

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EDW. S. EVARTS.