E. J. WELCH & A. CROCKER.

PROCESS OF MAKING SCREEN PLATES.

APPLICATION FILED APR. 30, 1906.

919,505. Patented Apr. 27, 1909.

Fig. 1.

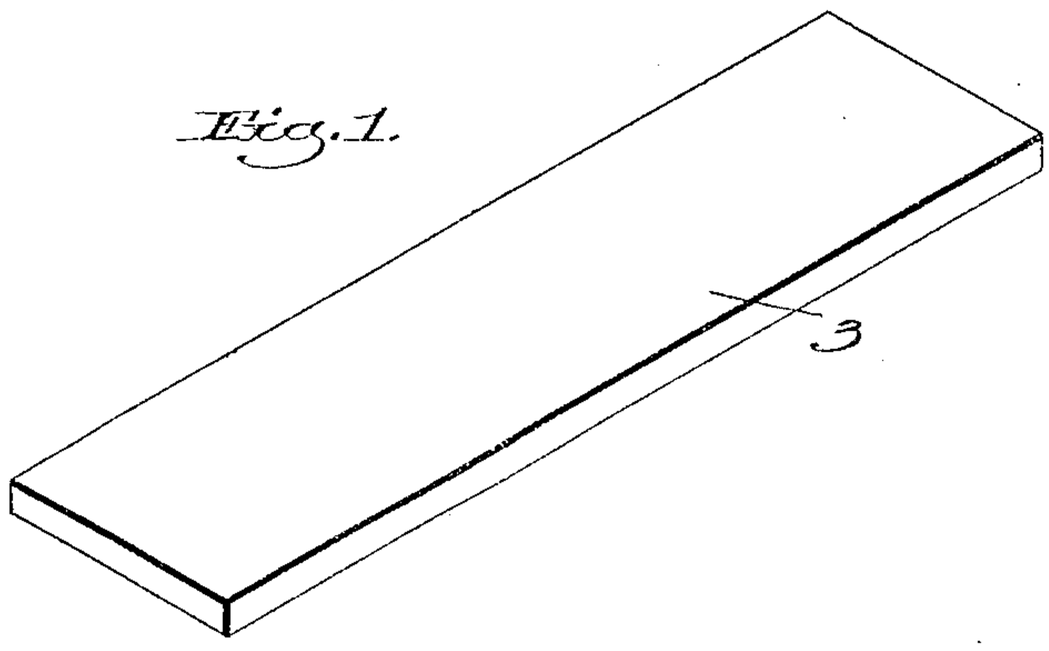


Fig. 2.

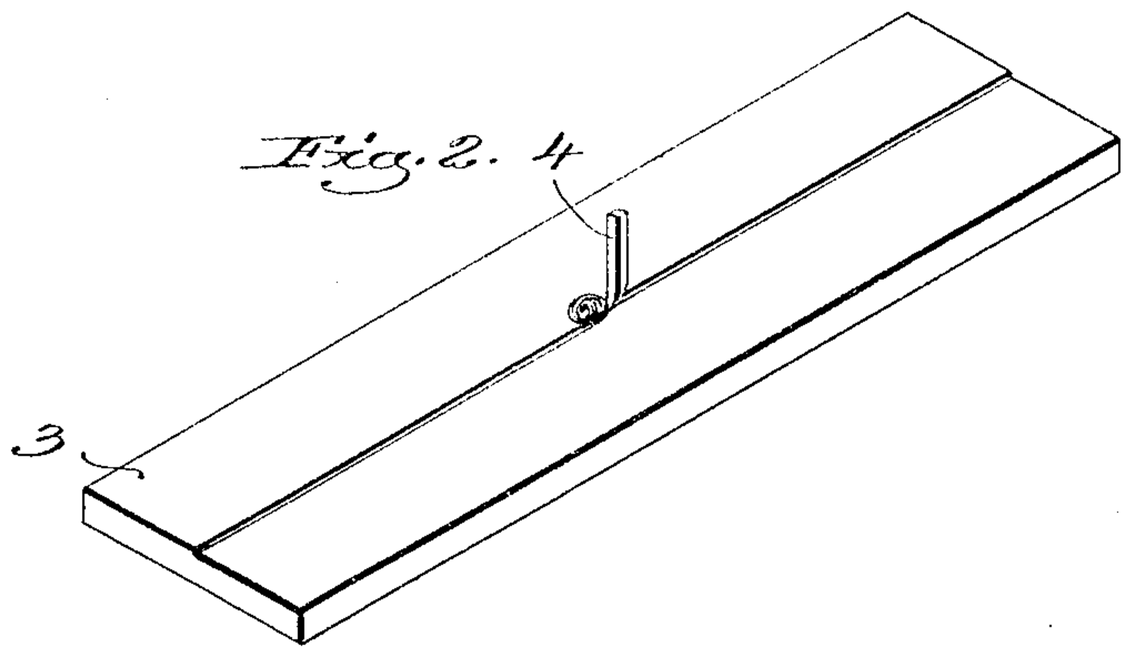
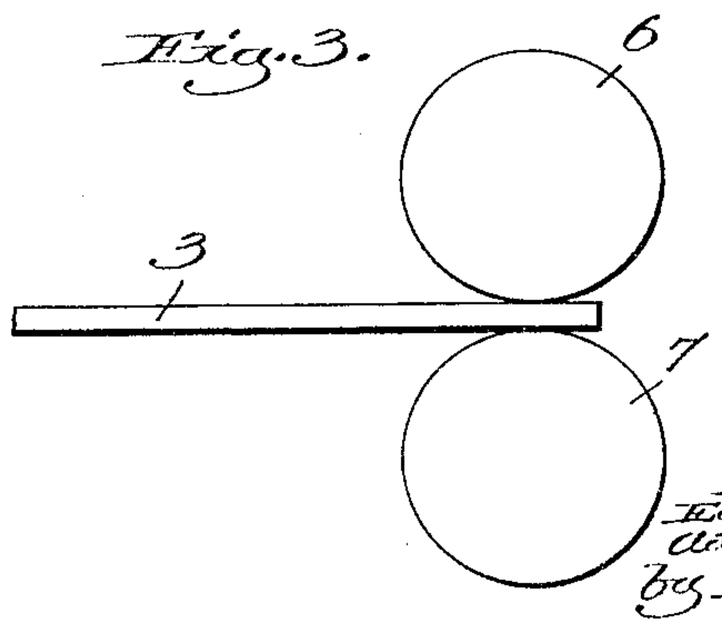


Fig. 3.



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UNITED STATES PATENT OFFICE.

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PROCESS OF MAKING SCREEN-PLATES.

No. 919,505. Specification of Letters Patent. Patented April 27, 1909.

Application filed April 30, 1906. Serial No. 314,471.

To all whom it may concern:

Be it known that we, EDWARD J. WELCH and ADAMS CROCKER, citizens of the United States, and residents of Fitchburg, county of Worcester, State of Massachusetts, have invented an Improvement in Processes of Making Screen-Plates, of which the following description is a specification.

This invention has for its object to provide a novel process for making screen plates for paper-making machines.

Heretofore it has been a more or less common practice to make screen plates from composition ingots which are first cast in metal molds and then are reduced to the proper size and thickness for the screen plate by repeated rollings, the plate being subjected to an annealing process between each rolling. The repeated rollings of the ingot render it homogeneous and close up any blow holes that may exist, and the intermediate annealing process keeps the plate in proper condition for rolling. When the plate has been reduced to its proper size and thickness by these repeated rollings, it is given the desired temper, and then the slots are cut in it as usual.

Obviously the making of a screen-plate according to this process consumes considerable time owing to the repeated rollings and annealings to which the plate is subjected. Furthermore this process cannot be successfully carried out unless the alloy or composition from which the ingots are poured has the proper ingredients.

A screen-plate made from copper and a proper amount of tin has such properties that it can be reduced to the proper size by the repeated rollings, as stated above, but such a screen-plate is apt to be so hard that the slots therein can only be cut with difficulty.

If sufficient lead, or lead and tin combined, or similar ingredients are added to the alloy the plate will have such a structure that the slots can be more easily and perfectly cut therein; but if a plate made from a copper alloy containing lead, or lead and tin, etc., in sufficient quantities is subjected to repeated rollings the plate will assume a fractured or cracked character and will lack the homogeneity necessary in screen-plates. The presence of lead in the alloy also has the advantage that it tends to increase the acid resisting properties of the screen plate. There are, therefore, many advantages in using for a screen plate an alloy including lead, or lead and tin combined, or a similar material, but as it has been found inexpedient to subject a screen-plate made of such alloy to repeated rollings, it has been customary to make plates of this alloy by casting the ingot in a sand mold (a sand mold being used in order to obtain as perfect a casting as possible and one as free from blow holes as possible) and then machining the casting to reduce it to the required dimensions, this being the only way in which a composition having the desired amount of lead, or lead and tin combined, has been heretofore treated. While a screen-plate made in this way has the proper acid resisting properties, and is of such a character that the slots can be readily and cleanly cut therein, yet such a screen-plate cannot be properly tempered by any known tempering process, and when completed it is "dead" metal, and has not sufficient life to enable it to withstand the abuse to which screen-plates are put.

We have discovered that a screen-plate having the proper temper, the proper structural characteristics to enable the slots to be cut cleanly, and the proper acid resisting properties, may be made by first casting in a sand mold an ingot of a suitable composition, which ingot is approximately the size and thickness of the completed screen-plate, then machining the ingot so as to smooth up the surfaces thereof and reduce it to very nearly the thickness of the completed screen-plate, and then cold-rolling the trued-up plate, this cold-rolling process resulting both in reducing the plate to exactly the required thickness and also operating to give it the proper temper which is so essential to an article of this character.

We have found from experiments that a suitable alloy from which to make screen-plates according to this process is one comprising substantially 82% copper, 12% tin, 3% lead and 3% zinc. The presence of the zinc in the alloy helps to make the casting sound and free from blow holes, and the presence of the tin tends to make the casting tough.

A plate made of this alloy could not be subjected to repeated rollings without giving it the cracked or fractured character above described owing to the presence of lead in combination with the tin, but we have demon-

strated that cold-rolling the trued-up plate once does not affect it deleteriously. In fact cold-rolling it once has decidedly beneficial results as it gives to it the proper temper. A plate made from the above described alloy has sufficient lead in it so that the slots therein can be readily and smoothly cut, but unless the plate is tempered in some way it would be "dead" and would lack the resiliency and life necessary to cause it to withstand the severe wear to which screen-plates are put. Cold-rolling this plate once or so gives to it the necessary life and temper, but does not destroy the structure as repeated cold-rollings would. Casting the ingot in a sand mold renders it substantially homogeneous and free from blow holes so that repeated rollings are unnecessary and the casting of the ingot to substantially the desired thickness and shape reduces the amount of work necessary to reduce the ingot to the size and shape of the finished screen-plate. All that is necessary is to true-up the ingot and then to subject it to this one cold rolling process. In truing-up the ingot by a suitable machine the ingot is reduced to very nearly the thickness desired for the screen-plate, and the final step of the process, to wit:—the cold-rolling, brings the screen-plate to exactly the right thickness, and at the same time gives it the necessary temper, as above described.

While we have found that an alloy, such as above described, is very satisfactory yet we have also demonstrated that it is possible to vary the proportions of the ingredients more or less without impairing the quality of the finished plate when made in accordance with our improved process.

In the drawings wherein we have illustrated more or less diagrammatically the manner of carrying out the above described process—Figure 1 shows the cast ingot in perspective; Fig. 2 shows the process of truing up the ingot; Fig. 3 shows the cold-rolling process.

The ingot is designated by 3 and it may be cast in sand in any usual way. After it is cast, as stated above, it is trued up by a suitable machine; and to illustrate this step in the process Fig. 2 shows a tool 4 acting on the face of the ingot for truing up the surface thereof. The final step of the process is the cold-rolling which may be conveniently done by placing the trued-up ingot between rolls 6 and 7 in any suitable way.

Having fully described our invention what we claim as new and desire to secure by Letters Patent is:—

The steps in the process of manufacturing screen plates which consists in first casting an ingot of a copper alloy having lead therein, second truing up the casting and reducing it to substantially the size desired for the screen plate, and third tempering the trued-up casting by cold-rolling.

In testimony whereof, we have signed our names to this specification, in the presence of two subscribing witnesses.

EDWARD J. WELCH.
ADAMS CROCKER.

Witnesses:
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