(No Model.)

I. A. F. BANG & M. C. A. RUFFIN.

PROCESS OF SEPARATING TIN FROM OTHER METALS.

No. 483,245. Patented Sept. 27, 1892.

FIG. 1.

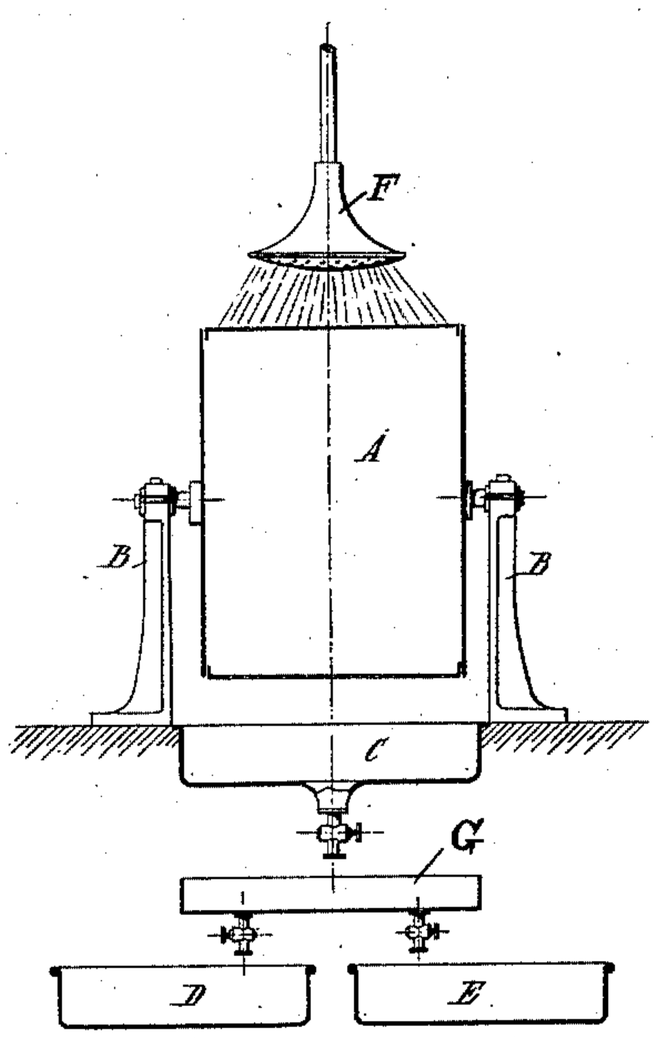


FIG. 2.

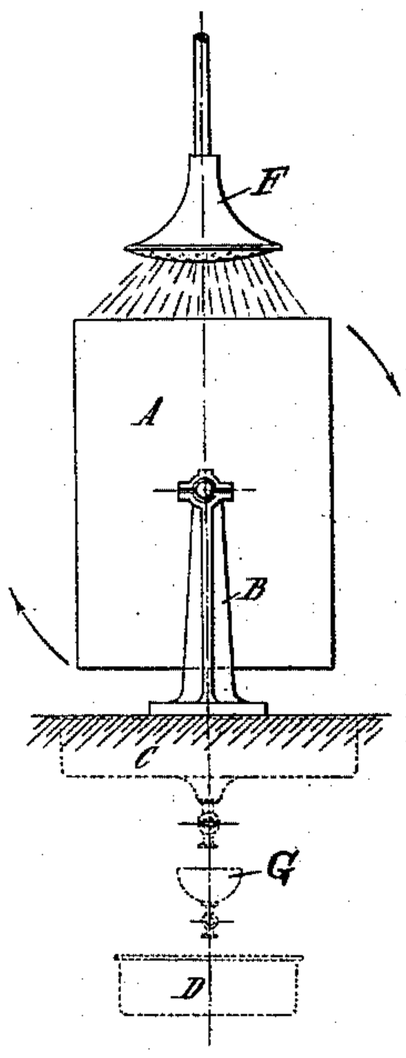
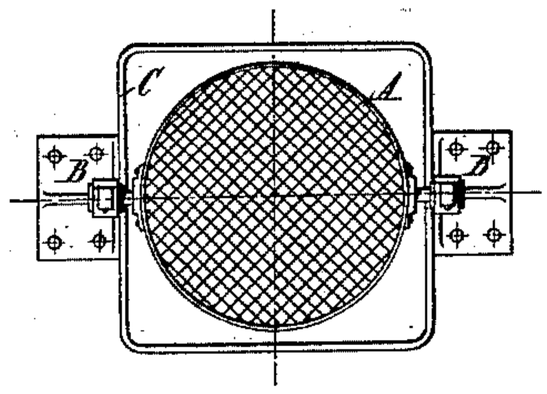


FIG. 3.



WITNESSES:
Jona B. Kelley
Arthur H. Abell.

INVENTORS.
I. A. F. Bang and M. C. A. Ruffin
by their
ATTORNEYS.
Pollock & Mann

UNITED STATES PATENT OFFICE.

IVAR AXEL FERDINAND BANG AND MARIE CHARLES ALFRED RUFFIN, OF PARIS, FRANCE.

PROCESS OF SEPARATING TIN FROM OTHER METALS.

SPECIFICATION forming part of Letters Patent No. 483,245, dated September 27, 1892.

Application filed July 26, 1890. Serial No. 360,043. (No specimens.) Patented in France December 30, 1889, No. 202,865; in Belgium January 2, 1890, No. 89,052, and in England January 2, 1890, No. 70.

To all whom it may concern:

Be it known that we, IVAR AXEL FERDINAND BANG and MARIE CHARLES ALFRED RUFFIN, both of Paris, in the Republic of France, have invented a new and useful Improvement in Processes of Separating Tin from other Metals, (which improvement has been patented to us in France by Patent No. 202,865, dated December 30, 1889; in Belgium by Patent No. 89,052, dated January 2, 1890, and in Great Britain by Patent No. 70, dated January 2, 1890,) of which improvement the following is a full, clear, and exact description.

This invention relates more particularly to the recovery of tin from scrap, old preserve-cans, and the like; but the improvements constituting the same are of course included for all the uses to which they may severally be adapted.

The invention consists, mainly, in subjecting the tinned iron to the action of a stream of lye in presence of oxygen, the latter being obtained by inducing a natural draft through the mass under treatment. In practice we may employ soda-lye of 15° to 20° Baumé, heated to about 60° centigrade, or lye of potash may be used instead.

The mode of procedure is as follows, reference being had to the accompanying drawings, which form part of this specification, and in which—

Figure 1 is a vertical section, Fig. 2 a side view, and Fig. 3 a plan, of apparatus used in the process.

The cylinder A is provided with perforated heads and is mounted on trunnions in supports B, so that it can be turned over at will. Under it is a receptacle C, having a stop-cock in the bottom, by which its contents can be run into the gutter G, to be thence conducted by one or other of the two stop-cocks on said gutter into the reservoir D or the reservoir E, as may be required. Above the cylinder is a rose or spraying-nozzle F. Other convenient arrangements could of course be used.

The reservoir D holds the lye of soda or potash for the operation. The strength of this lye may vary, as already stated, but preferably approaches 15° to 20° Baumé. It is heated in the reservoir by any convenient means to about 60° centigrade. The cylinder A being charged with the scrap to be treated, the lye is delivered from reservoir D to the upper part of the cylinder by means of a pump and conveyer-pipe terminating in the rose F or other device for finely dividing the liquid. The lye trickles slowly through the tinned iron and, falling into the receptacle C, is returned to the reservoir D to be again pumped up over the scrap.

From the commencement of the operation the action is established on which the present system is based—that is to say, the lye at 60° centigrade having raised the temperature inside the cylinder A, in which is the tinned iron, the air therein becomes heated and tends to rise, so that a natural draft is formed. This draft or air-current distributes there its oxygen through the mass and has the advantage over a pump of a more regular operation. The hot lye, meeting thus a strong current of air, tends strongly to lose water by evaporation. The loss thus occasioned is compensated for, preferably, by the use of the wash-water obtained as hereinafter described.

The operation being started, the work goes on rapidly enough; but to render perfect the contact of the lye and the oxygen with the tinned iron it is well to turn over the cylinder from time to time, so as to change the surfaces, and to continue this until the tinned iron is completely deprived of its tin. The duration of the operation is very variable and depends upon the conditions of working. In general twelve hours will suffice.

If in consequence of operating on a very large scale it is found inconvenient to use the reversible cylinder, use may be made of a pipe fixed in the middle of the cylinder and running its whole length, which pipe has its walls perforated and is open at one end for the introduction of the air from a ventilator or other source. When the tin has been removed, the pump is stopped and the contents of cylder A are allowed to drain. The adherent liquid is then removed by washing with cold water, care being taken to reverse the cylinder. This wash-water, feebly alkaline, is received in the reservoir E and seems to sup-

ply to the lye in reservoir D the water lost by evaporation, as already mentioned. For greater security the detinned material may be washed a second time, the wash-water being saved for effecting the first washing of another batch. The tin-plate, deprived of its tin, has now become sheet-iron capable of use in various industries. The alkaline lye now contains the tin in solution in the state of alkaline metastannate; but a certain portion of the alkali has also been carbonated by contact with the carbonic acid of the air. From the solution the stannic acid is precipitated by lime, which also deprives the carbonate of soda of a part of its carbonic acid. To remedy the inconvenience occasioned by this latter reaction, use is made of the fact that the carbonate of lime will precipitate wholly the stannic acid contained in alkaline solutions by forming insoluble stannate of lime and carbonate of soda. This treatment has a considerable practical importance, since it permits the passage of the alkaline lyes over lime which is entirely carbonated, so that stannate of lime almost pure can be thus obtained, whereas by the use of hydrated lime the stannate is obtained mixed with considerable quantities of carbonate of lime, which diminishes its commercial value. The carbonated lyes, deprived of their stannic acid, are rendered caustic with lime, and the carbonate of lime thus formed serves for precipitating a new quantity of stannic acid.

We claim as our invention or discovery—

1. The described process of separating tin from tinned iron by subjecting the latter to the action of a stream of hot alkaline lye and at the same time inducing by natural draft a current of air through the mass, as and for the purpose described.

2. The process of separating tin from a mass of stanniferous metal by subjecting the mass to a spray of hot lye, the mass being supported in such manner that the action of the hot spray induces upwardly a natural draft of air, substantially as described.

3. The process of separating tin from a mass of stanniferous metal by subjecting the latter to the action of hot lye, the mass being supported in such manner that a natural draft of air can circulate upwardly through the same, and from time to time inverting the charge, so as to reverse the direction of the air-current, substantially as described.

4. In apparatus for separating tin from iron or other metals, the combination of a vessel having perforated heads, so that air and liquid can freely circulate through the same, said vessel being mounted on trunnions, so that its position can be reversed at will, a rose or sprinkler for showering lye on the upper end of the vessel, and a receptacle for receiving it beneath said vessel, substantially as described.

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

IVAR AXEL FERDINAND BANG.
MARIE CHARLES ALFRED RUFFIN.

Witnesses:
EUGENE DUBUIL,
R. J. PRESTON.