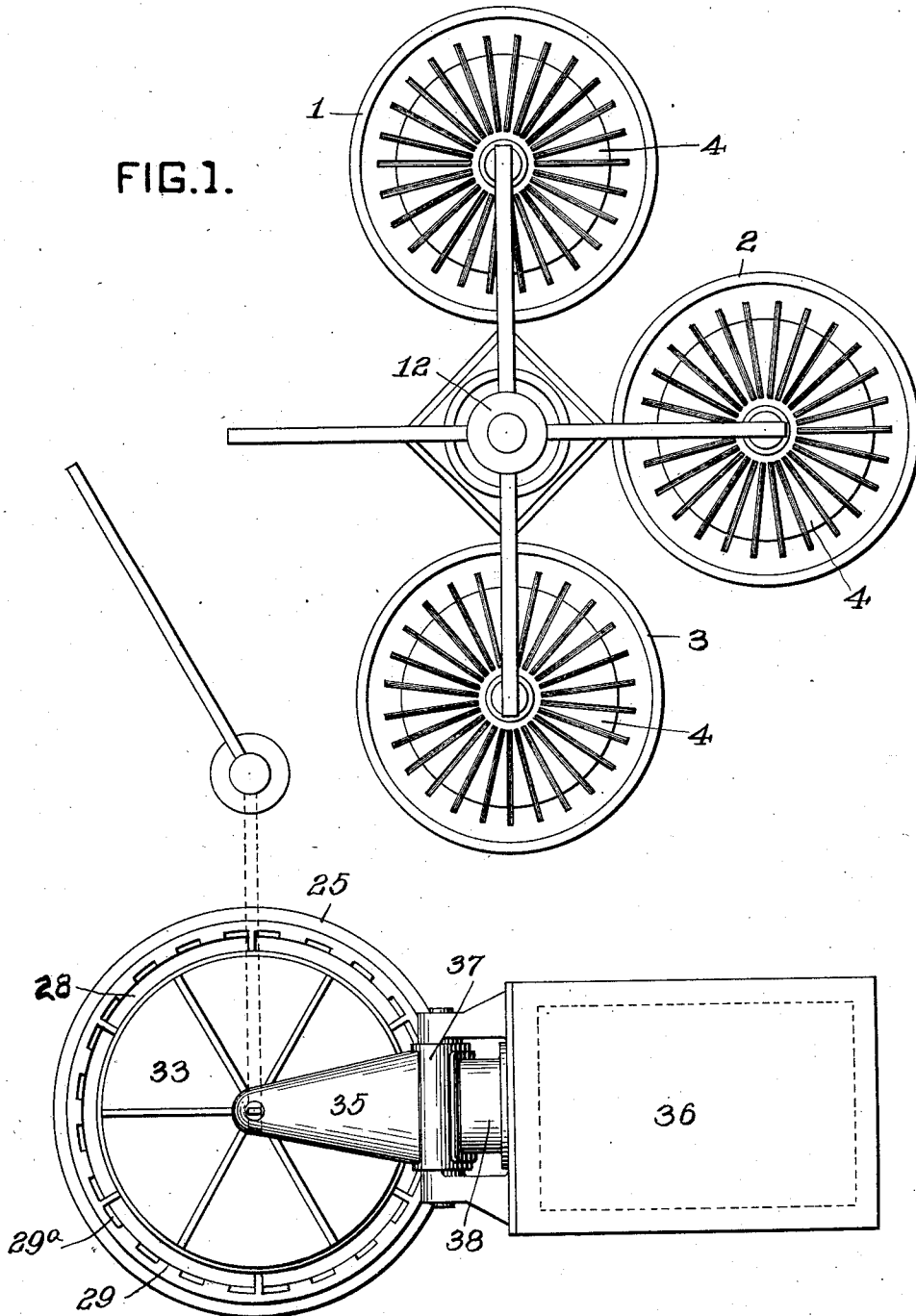


C. J. MESTA & S. E. DIESCHER.
 DRYING SHEETS.
 APPLICATION FILED NOV. 9, 1910.

1,010,511.

Patented Dec. 5, 1911.
 3 SHEETS—SHEET 1.

FIG. 1.



WITNESSES:

J. Herbert Bradley
Thomas Joyce

INVENTORS

Charles J. Mesta and
Samuel E. Diescher
by Samuel S. Wolcott Atty

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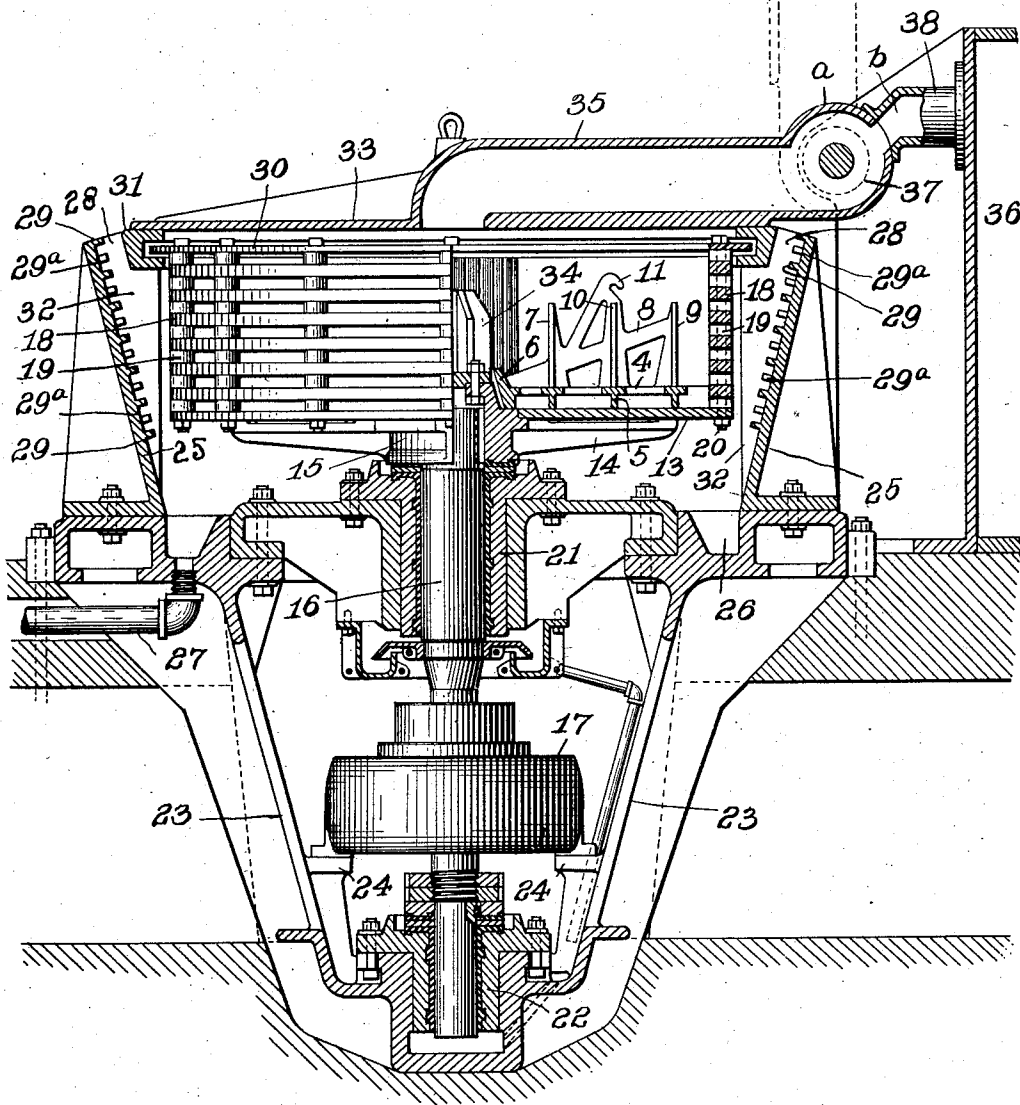
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3 SHEETS—SHEET 2.

FIG. 2.



WITNESSES:

J. Herbert Bradley.
Thomas Joyce

INVENTORS

Charles J. Mesta and
Samuel E. Diescher
 by *Darius B. Wolcott* Atty

C. J. MESTA & S. E. DIESCHER.

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3 SHEETS-SHEET 3.

FIG. 3.

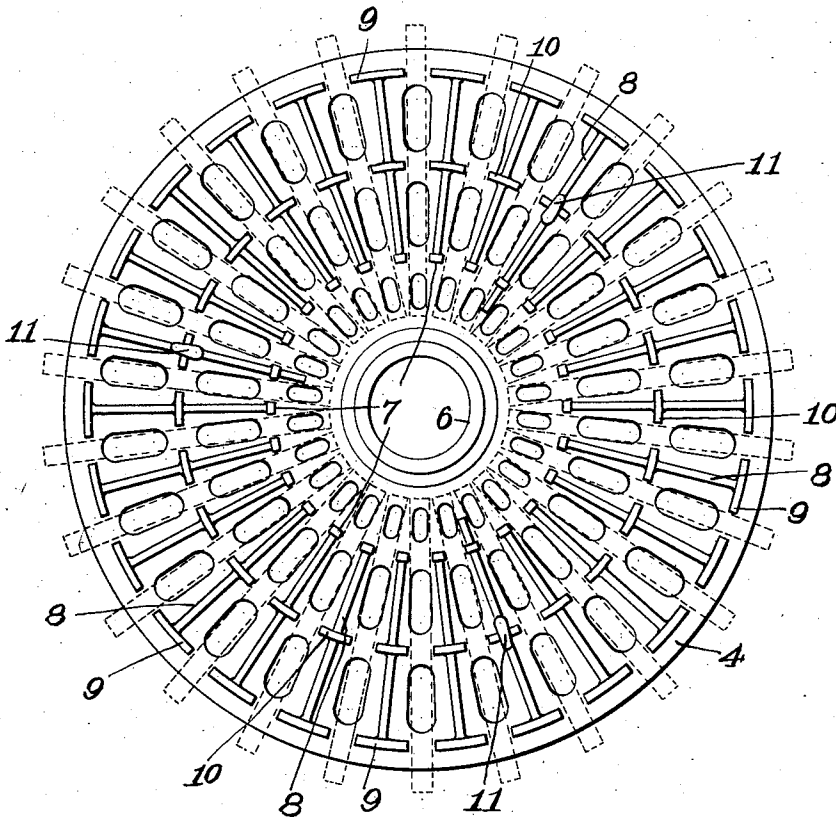
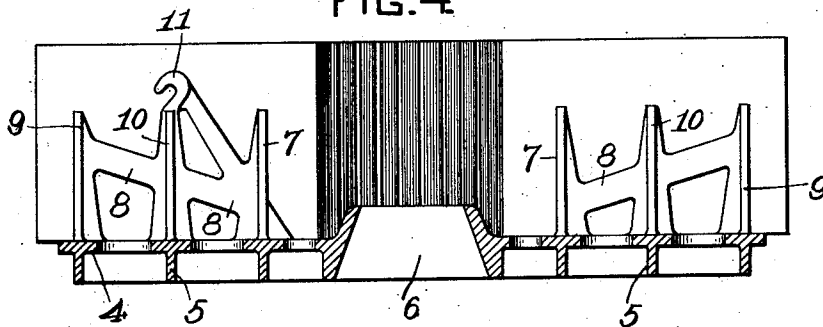


FIG. 4.



WITNESSES:

J. Herbert Bradley
Thomas Joyce

INVENTORS

Charles J. Mesta and
Samuel E. Diescher
by *Samuel B. Wolcott* Atty

UNITED STATES PATENT OFFICE.

CHARLES J. MESTA AND SAMUEL E. DIESCHER, OF PITTSBURGH, PENNSYLVANIA.

DRYING SHEETS.

1,010,511.

Specification of Letters Patent.

Patented Dec. 5, 1911.

Application filed November 9, 1910. Serial No. 591,508.

To all whom it may concern:

Be it known that we, CHARLES J. MESTA and SAMUEL E. DIESCHER, residing at Pittsburgh, in the county of Allegheny and State of Pennsylvania, citizens of the United States, have invented or discovered certain new and useful Improvements in Drying Sheets, of which improvements the following is a specification.

The invention described herein relates to an improvement in drying metal sheets, etc.

In an application filed October 12th, 1910, Serial No. 558,552, is described and claimed a method of manufacturing sheets in which after being rolled to gage, the sheets are black pickled, dried, cold rolled, etc., the treatment of the sheets subsequent to the cold rolling being dependent upon the kind of sheets desired.

The invention described herein has for its object the removal of the moisture on the sheets after black pickling by mechanical action, which may be supplemented by evaporation.

The invention is hereinafter more fully described and claimed.

In the accompanying drawings forming a part of this specification Figure 1 is a plan view of a plant for pickling and drying sheets, a desirable form of drying apparatus forming a part of the plant; Fig. 2 is a sectional elevation of the drying apparatus, Fig. 3 is a plan view of the crate for the sheets and Fig. 4 is a sectional elevation of the same.

As indicated in Fig. 1 the pickling apparatus consists of a vat 1 for strong acid, a vat 2 for a weaker acid, and the washing or neutralizing vat 3. These vats are preferably made circular as being more suitable for the reception of the circular crate, which consists of an annular base 4 having radially arranged spacing partitions on its upper side and supporting ribs 5 on its underside. The base, radial partitions, and ribs are preferably integral with each other being formed of cast metal. As in pickling and washing either the sheets or liquids are caused to move vertically relative to each other, numerous openings are formed through the base 4 for the free passage of the liquids. As the partitions are arranged radially and extend outward from the central eye 6 in the base, their outer ends are more widely separated than the inner ends, hence the partitions consisting of vertical

posts 7 connected by transverse webs 8, are provided with lateral wings 9 and 10 for affording proper support for the sheets. These wings on adjacent partitions project toward each other such a distance that the space between the ends of the wings on adjacent partitions will be approximately the same as that between the inner ends of the partitions, thereby affording sufficient lateral support for the packs of sheets when placed in position as shown in dotted lines in Fig. 3 and in full lines in Fig. 4. Three or more equally spaced partitions are provided with suitable means, as hooks 11, whereby the crates may be lifted. In the form of plant shown in Fig. 1, the vats are arranged on the arc of the circle at the center of which is arranged a suitable mechanism 12 known in the art, whereby the crates may be given an up and down movement in the vats and also shifted from vat to vat. After being thoroughly pickled and washed, the sheets are subjected to such mechanical treatment as will remove to a very great extent if not entirely, all liquid from the surfaces of the sheets. The mechanical action may be supplemented by currents of air or gas which may be highly heated.

In the embodiment of the invention shown herein, the liquid or moisture is removed by centrifugal action, the crate after removal from the washing vat being placed in a cage which can be rotated at such a speed that practically all the moisture will be thrown off. If desired the liquid in the washing vat may be highly heated so that the sheets will be hot when placed in the centrifugal drier, so that the heat of the sheets will cause the quick evaporation of any moisture not removed by centrifugal action.

While not limiting the invention as regards its broad features it is preferred to use a centrifugal machine of the character shown consisting of a circular cage having a closed bottom 13 supported by arms 14 radiating from a hub 15, which is keyed to a vertical shaft 16. This shaft may be rotated by any suitable means as for example by an elective motor indicated at 17. The outward movement of the sheets or packs when the cage is rotated, is prevented by a barrier which is preferably secured to the bottom 13 of the cage, but may be otherwise supported in position to prevent the dislodgment of the sheets or packs. This barrier may be constructed in any manner

whereby it may perform its double function of preventing the dislodgment of the sheets and permitting of the passage of the liquid thrown off the sheets. A suitable construction for the purpose consists of a series of rings 18 suitably spaced by tubular blocks 19 through which pass bolts 20 whereby the rings are secured to the bottom 13 or other support.

The shaft 16 is supported by a bearing 21 and a step 22 arranged in the frame 23 of the machine; and the motor is also supported on brackets 24 formed on or secured to said frame. In order to catch the liquid which will be thrown off from the sheets, a circular shield 25 is placed around the cage, being secured to the frame of the machine. A gutter 26 is formed in the frame 23 at the lower edge of the shield for the reception of the liquid, which can escape from the gutter through the pipe 27. The cage with the radially arranged packs therein will act as a centrifugal fan, the air entering through the central opening formed by the inner ends of the packs and flowing out between the packs and sheets which operate as the blades of the fan. This movement of the air along the sheets will facilitate the removal of moisture especially if the air be heated. As evaporation will be approximately proportional to the rate of movement of the air flowing outward between the packs and sheets, provision should be made not only to prevent back pressure within the shield but to accelerate its flow from within the shield. This result can be effected in many ways, as for example in the construction shown in Fig. 2, the shield 25 is inclined outwardly so that the space between the barrier and shield increases in width upwardly to an annular escape port 28. In order to prevent the liquid from passing out with the air through the port 28, several rows of staggered ribs or projections 29, 29^a, are formed on the inner surface of the shield as shown in Figs. 1 and 2. To insure the flow of air into the central opening formed by the inner ends of the packs and thence between the packs, its flow into the space between the barrier and shield is retarded or wholly prevented by a flat annulus 30 secured to the barrier and projecting into a groove formed in a ring 31 carried by inwardly projecting ribs 32 on the shield as shown in Figs. 1 and 2. As a further means to insure the proper flow of air, especially when the same is heated as hereinafter described, a cover 33 is provided, said cover being supported when lowered by the ring 31 and provided with a central opening in line with the axis of rotation of the cage. An approximately even distribution of the air between the several packs is insured by a distributing cone 34 provided with radial ribs and secured on the hub of the cage.

To hasten the drying of the sheets and to insure the removal of the slight film of moisture, which may not be dislodged by centrifugal action, it is preferred to heat the air which is caused to flow along the sheets by the fan action of the packs. To this end, a pipe 35 extending from any suitable oven or furnace indicated at 36, is connected to the central opening in the cover 33. It is preferred that the pipe should be secured to or made integral with the cover and that its outer end should form part of a hinge joint 37 connecting it to a pipe 38 leading from the air heating furnace. This joint is so constructed that when the cover is raised as shown in dotted lines, the outlet from the pipe 38 is closed by a blank portion *a* of the hinge portion of the pipe 35. When the cover is lowered onto the cage a port *b* will connect the pipes 35 and 38. In the heater through which the air is drawn by the fan action of the packs, the air is heated above the vaporizing temperature of the liquid on the sheets so that by the rapid flow of the highly heated air the mechanical removal of the liquid is supplemented. As is well known to those skilled in the art it is very difficult to remove or neutralize by washing all the acid on the sheets. Such residual acid may however be evaporated if the air or gas be heated to or above the vaporizing temperature of the acid.

While a desirable form of apparatus for carrying out our improved method is shown and described herein with some particularity, no claim is made herein for such apparatus, as such subject matter is presented in an application Ser. No. 613390 filed March 9, 1911.

We claim herein as our invention:

1. As an improvement in the art of drying sheets, etc., the method herein described, which consists in imparting such a movement to the liquid-carrying sheets as will cause a relative movement of the sheets and liquid and causing air to traverse the surfaces of the sheets in the direction of movement of the liquid from the sheets.

2. As an improvement in the art of drying sheets, etc., the method herein described, which consists in imparting such a movement to the liquid-bearing sheets as will cause a relative movement of the sheets and liquid and causing an evaporating action by heat and currents of air moving along the surfaces of the sheets.

3. As an improvement in the art of drying sheets, etc., the method herein described, which consists in imparting such a movement to the liquid-carrying sheets as will cause the liquid to leave the sheets at one edge thereof and supplementing such removal by a rapid evaporation of the liquid.

4. As an improvement in the art of drying sheets the method herein described, which consists in subjecting the sheets to

centrifugal action generating radial currents of air by the movement of the sheets and directing such currents of air to flow over the sheets.

5 5. As an improvement in the art of drying sheets, etc., the method herein described, which consists in arranging the sheets radially around a common axis parallel with the sheets, moving the sheets rapidly around
10 such axis and thereby removing the adherent liquid from the sheets by centrifugal action, and causing currents of air to flow radially over the surfaces of the sheets.

6. As an improvement in the art of dry-

ing sheets, etc., the method herein described, 15 which consists in causing a series of the sheets to move rapidly around a common axis thereby causing currents of air to move radially along such sheets, and heating the air prior to its movement along the sheets. 20

In testimony whereof, we have hereunto set our hands.

CHARLES J. MESTA.
SAMUEL E. DIESCHER.

Witnesses:

ALICE A. TRILL,
THOMAS JOYCE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."