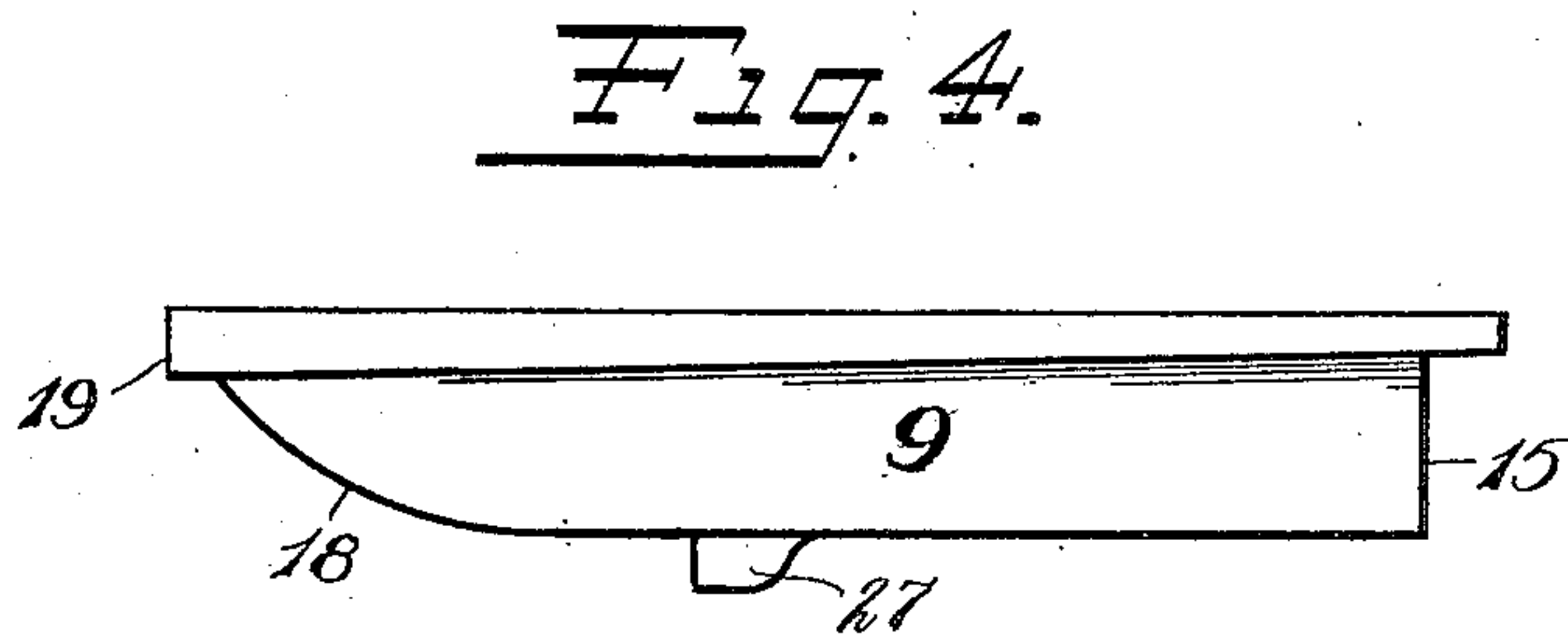
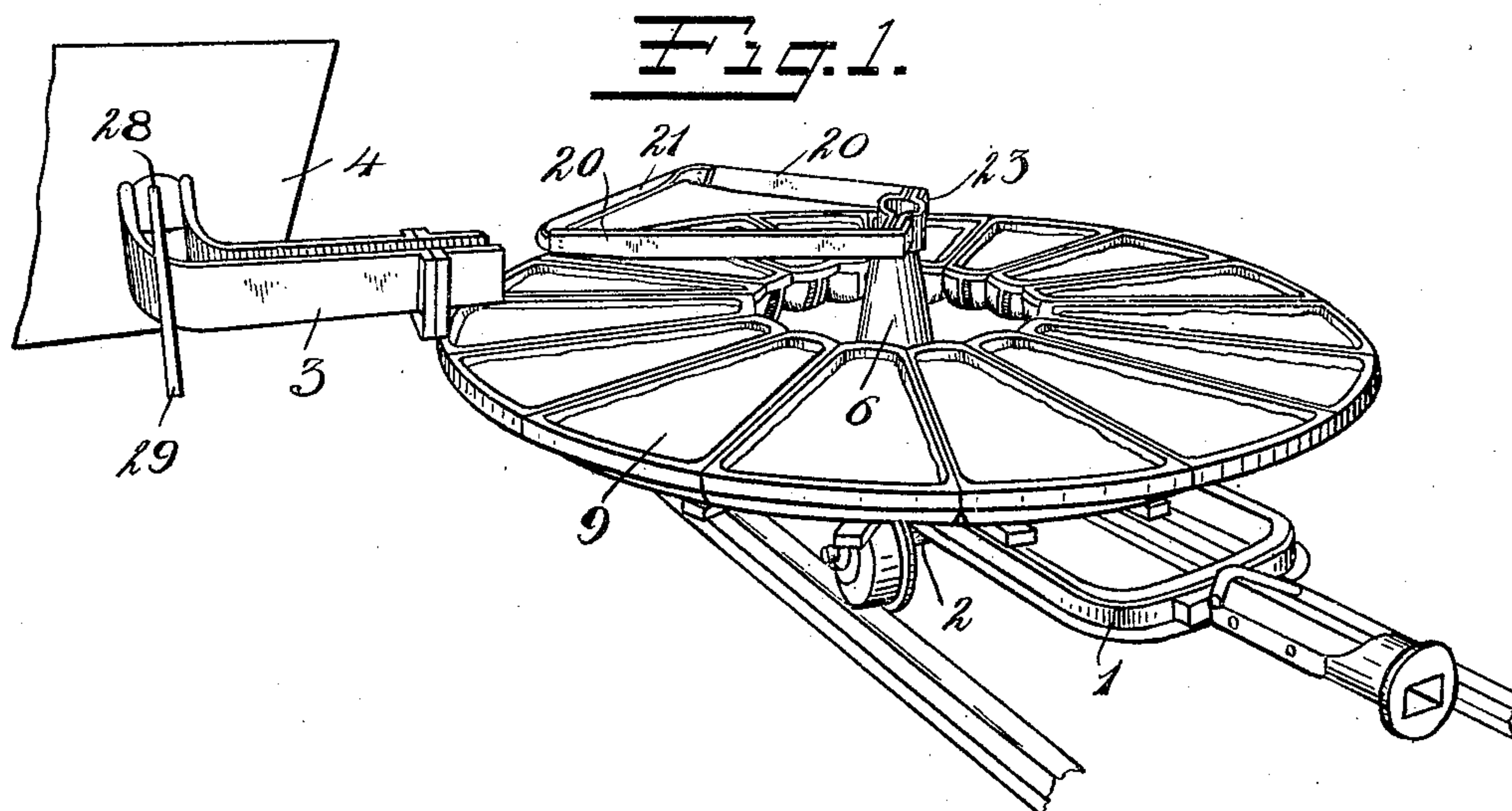


J. C. KILKER.
REVOLVING MATTE CAR.
APPLICATION FILED JAN. 2, 1909.

921,999.

Patented May 18, 1909.
2 SHEETS—SHEET 1.



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Fig. 2.

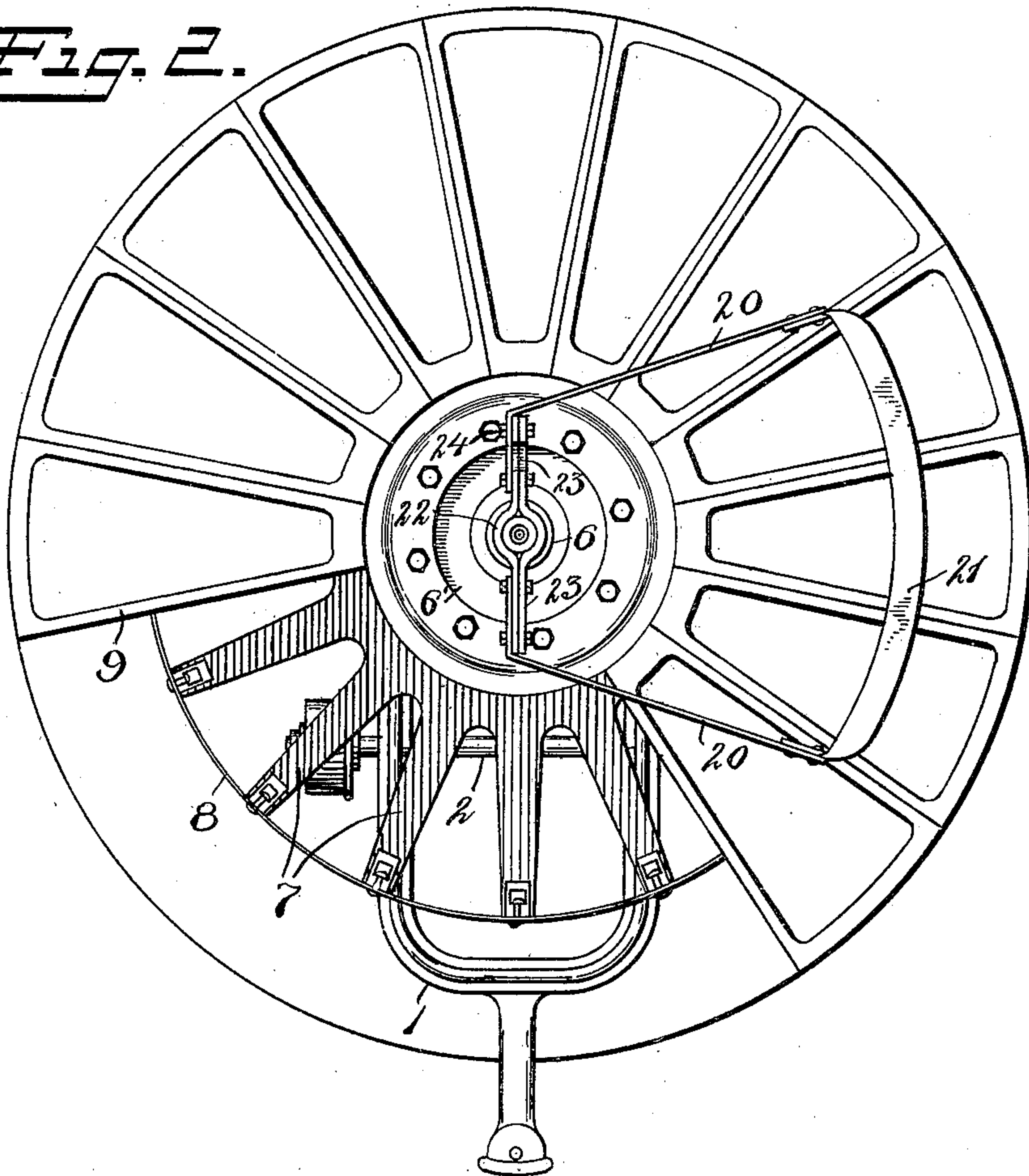
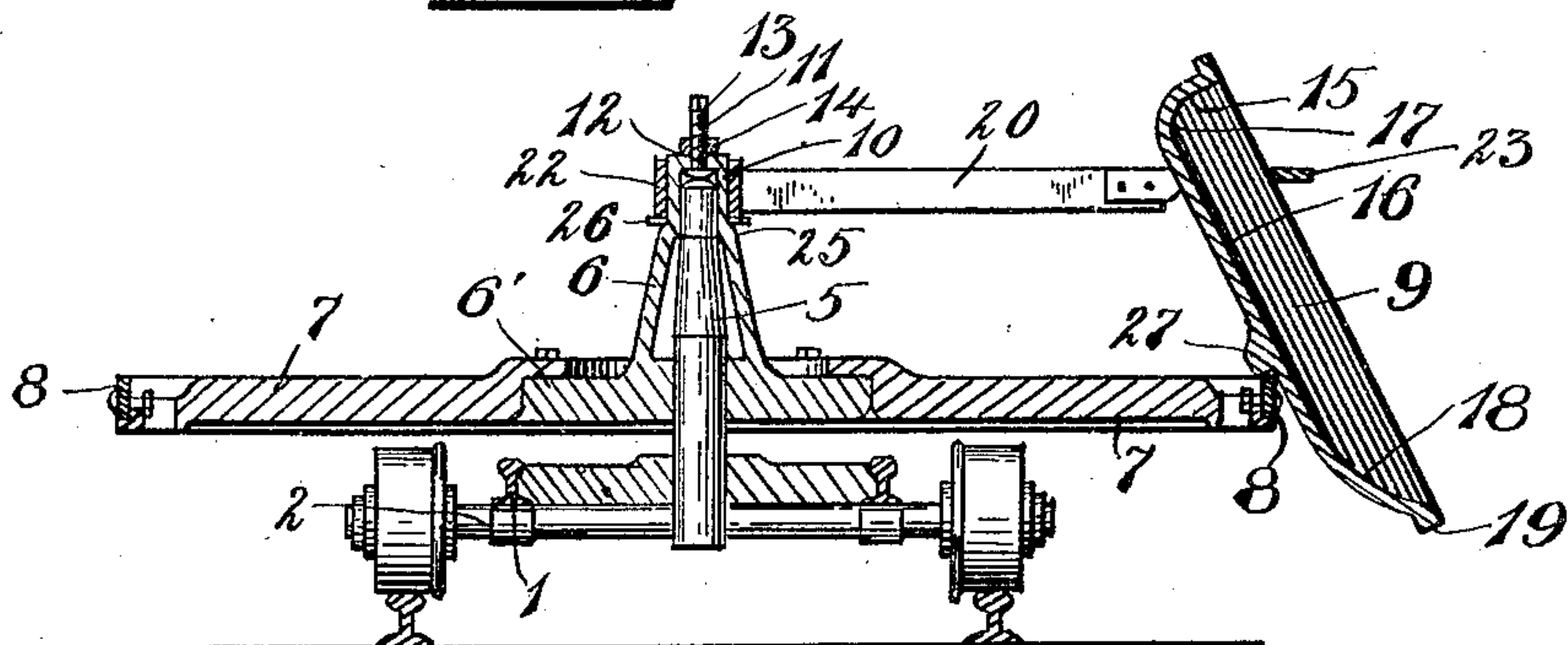


Fig. 3.



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UNITED STATES PATENT OFFICE.

JAMES C. KILKER, OF EAST HELENA, MONTANA.

REVOLVING MATTE-CAR.

No. 921,999.

Specification of Letters Patent.

Patented May 18, 1909.

Application filed January 2, 1909. Serial No. 470,482.

To all whom it may concern:

Be it known that I, JAMES C. KILKER, a citizen of the United States, residing at East Helena, Lewis and Clark county, Montana, have invented certain new and useful Improvements in Revolving Matte-Cars, of which the following is a full, clear, and exact description.

My invention relates to the apparatus and the processes employed in the reduction of metallic ore in blast furnaces and the like, and is particularly concerned with improvements in apparatus for, and the method of, handling the matte from such furnaces.

In accordance with the methods at present employed the matte is run off into comparatively deep receptacles or vessels which are afterward conveyed to a suitable point where the matte is allowed to cool, after which it is broken up into sizes suitable for the further processes of reduction. The difficulty encountered in this manner of handling the matte is that by reason of the comparatively large masses into which the matte is formed, the cooling process takes a considerable length of time and considerable force is required to crush the mass to the proper size to prepare it for subsequent processes.

The object of my invention is to provide means for running off the matte into conveniently positioned comparatively shallow vessels or pans, whereby it will be formed into thin cakes or masses, which not only cool rapidly, but may be easily broken up or reduced to the required size.

A further object of the invention is to provide means which will prevent the matte, when discharged from the receiver of the blast furnace, from spilling over the sides of the receptacles or pans into which it is discharged from the receiver; and a further object is to devise a method for handling the matte, whereby burning out of the cooling pans will be prevented, and finally to improve such methods generally.

With these and other objects in view, the invention consists in the processes herein-after described, and in the apparatus, a preferred embodiment of which is illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view of an improved matte car shown in position to receive the matte from the discharge spout of the blast furnace receiver. Fig. 2 is a plan view of the matte car with some of the cooling pans removed therefrom for clear illus-

tration of the construction. Fig. 3 is an end view in vertical section of the parts shown in Fig. 2, one of the pans being shown in dumping position. Fig. 4 is a detail view of one of the cooling pans employed in the apparatus.

In the embodiment of my invention herein selected for illustration, the so-called matte car consists of a suitable frame 1 mounted upon trucks 2 adapted to run upon a railway adjacent the blast furnace, whereby the pans of the matte car may be brought beneath the discharge spout 3 of the blast furnace receiver 4.

Upon a suitable standard 5 secured to the frame 1 of the matte car, is mounted a rotatable sleeve 6, to which is secured a pan support 6', which may be of spider form, as here shown, and comprises the radial arms 7 having suitably secured to the ends thereof a wrought iron ring 8 by which the arms are connected together and reinforced, which ring also forms a support and tilting ledge for the matte pans 9. The upper end of the sleeve 6 of said support is provided with an adjusting screw 11, which is arranged to operate in a threaded aperture 12 in the top of said sleeve and has its end properly shaped as at 13 to receive a suitable adjusting tool or wrench. A lock nut 14 may also be provided to hold the sleeve and consequently the matte pan support in adjusted position at the proper height above the frame of the matte car and with respect to the discharge tube 3 of the furnace receiver 4.

While I have here described a particular form of support for the matte pans, it is to be understood that the same may be varied in detail as by casting the same in a single piece as desired. The matte pans 9, as here shown, preferably have the outline of sectors of a circle and the rear wall 15 of each pan is preferably formed perpendicular to the base or bottom 16 of the pan, with an easy curve 17 joining said wall to said base, whereby the matte will be the more readily freed therefrom. The forward or outer end of each pan is formed with an inclined discharge surface 18 terminating in a reinforced lip 19, whereby when the pans are tilted to dumping position, as illustrated in Fig. 3, the mass of matte will be readily discharged therefrom. The discharge of the matte is further facilitated by the flaring outline of the pans from the rear to the front or discharge end.

In order to retain the pans upon the support 6 during the dumping operation, a rota-

table stop frame is provided, consisting of the arms 20—20 and the stop bar proper 21, which connects the outer ends of said arms and is preferably formed in the arc of a circle concentric with the circular outline of the pan support 6'. The stop frame is rotatably connected with the sleeve 6 of the support 6' by means of a hub 22 and the arms 23—23 to which the frame arms 20 are secured, as by bolts 24. The sleeve 6 is provided with a shoulder 25 between which and the hub 22 of the stop frame, a washer or bearing ring 26 may be interposed. By the construction just described, the stop frame may be rotated to any desired position over the matte pans 9 and to that side of the car at which the dumping operation is to take place, so that when the pans are tilted, as shown in Fig. 3, to dump the matte therefrom, the stop frame will engage the upper ends of said pans to retain them upon the frame 6 without interfering with the dumping operation. Each of the pans furthermore is provided on the bottom with a shoulder 27, which engages the rim 8 of the support 6' to properly position the pans upon the support and to retain them thereon during the dumping operation.

The furnace receiver 4 is provided with a suitable matte tap 28, controlled by a tapping rod 29. When the matte is to be run off from the receiver, the car is positioned beneath the spout 3 as shown in Fig. 1, and as the tapper opens the matte tap 28, a second operator revolves the support 6', together with the matte pans 9, beneath the end of the spout. Owing to the shallow depth of the matte pans, it is essential to successful operation that the matte may be run off slowly from the receiver 4. To this end the spout is made of curved form as shown, whereby the friction of the matte against the sides thereof will retard the flow sufficiently to insure an easy discharge into the matte pans. The curved form of the spout also enables the tapper to work to advantage in opening and stopping the tap hole.

By revolving the support carrying the matte pans during the discharge of the matte, each of the pans is partially and gradually filled step by step, whereby the matte is stratified in the pans and each stratum becomes oxidized, all of which renders the mass easily friable. The hot matte never strikes for more than an instant at any one place, thereby preventing the burning out of the pans or molds, which is a serious defect in the methods heretofore employed, and furthermore, the matte is discharged uniformly into each of the pans. The matte pan support should be given about eight or ten revolutions in order to fill the pans completely. If the pans are caused to revolve too rapidly, the liquid matte will be thrown out by centrifugal force. If revolved too slowly, it is difficult to fill the pans evenly.

The pans will hold about 200 lbs. of matte each, or approximately 3200 lbs. per car.

While I have here described a support for the matte pans which is rotatable relatively to the vehicle by which it is carried, it is to be understood that the invention also contemplates broadly a construction in which the pan support and vehicle may be fixed rigidly to one another and that in the filling operation the entire apparatus may be made to rotate, as for example upon a turn table.

As soon as the matte has crusted sufficiently in the pans, which requires but a few moments, the loaded car is conveyed to the dumping point where it is allowed to stand until the matte is cool enough to dump, as into a railroad car, by which it is to be conveyed away for further operations.

While I have herein shown and described a preferred embodiment of my invention, it is to be understood that the same may be altered in details and arrangement of parts without departing from the spirit and scope thereof.

What I claim is:

1. A matte handling apparatus comprising a matte pan support, a vehicle therefor, a plurality of shallow matte pans carried by said support, the adjacent sides of successive pans being contiguous, said support adapted to be actuated relatively to said vehicle to bring said pans successively under the point of discharge of the matte, said pans being arranged to be tilted on said support to discharge the matte therefrom.
2. A matte handling apparatus comprising a rotatable matte pan support, a vehicle therefor, a plurality of shallow matte pans carried by said support, the adjacent sides of successive pans being contiguous, said support adapted to be rotated relatively to said vehicle to bring said pans successively under the point of discharge of the matte, said pans being arranged to be tilted on said support to discharge the matte therefrom.
3. A matte handling apparatus comprising a matte pan support, a vehicle therefor, a plurality of matte pans arranged in a continuous circle on said support each pan gradually shallowing from its rear to its discharge end, said support adapted to be rotated relatively to said vehicle to bring said pans successively under the point of discharge of the matte, said pans being arranged to be tilted on said support to discharge the matte therefrom.
4. A matte handling apparatus comprising a matte pan support, a vehicle therefor, a plurality of shallow matte pans carried by said support the adjacent sides of successive pans being contiguous and adapted to be tilted to dumping position, and means to retain said pans on said support when so tilted and to limit their tilting movement.
5. A matte handling apparatus comprising

a matte pan support, a vehicle therefor, a plurality of matte pans carried by said support and adapted to be tilted to dumping position, and a stop arm extending over said support and adapted to limit the tilting movement of said pans.

6. A matte handling apparatus comprising a matte pan support, a vehicle therefor, a plurality of matte pans carried by said support and adapted to be tilted to dumping position, and a lug on the bottom of each pan engaging the periphery of said support to retain the pans thereon when so tilted.

7. A matte handling apparatus comprising a rotatable matte pan support, a vehicle therefor, a plurality of matte pans carried by said support, said support adapted to be rotated relatively to said vehicle to bring said pans successively under the point of discharge of the matte and a stop arm mounted on said vehicle and rotatable relatively to said support whereby said arm may be positioned over said pans to retain the latter on said support when tilted to dumping position.

8. A matte handling apparatus, comprising a matte pan support, a vehicle therefor, a plurality of matte pans each having its bottom inclined from the rear to the discharge end carried by said support, said pans arranged to be actuated to bring the same successively under the point of discharge of the matte and to be tilted on said support to discharge the matte.

9. A matte handling apparatus comprising a matte pan support, a vehicle therefor, a plurality of shallow matte pans carried by said support the adjacent sides of successive pans being contiguous, said apparatus being arranged to be rotated to bring said matte pans successively under the point of discharge of the matte said pans being arranged to be partially tilted on said support to discharge matte therefrom, and means to limit the tilting movement of said pans.

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