

March 19, 1935.

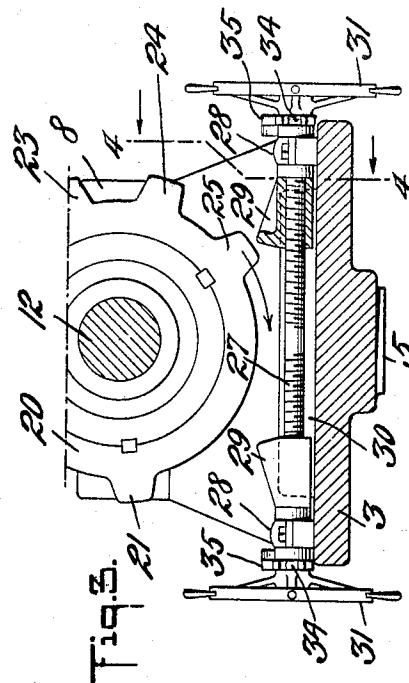
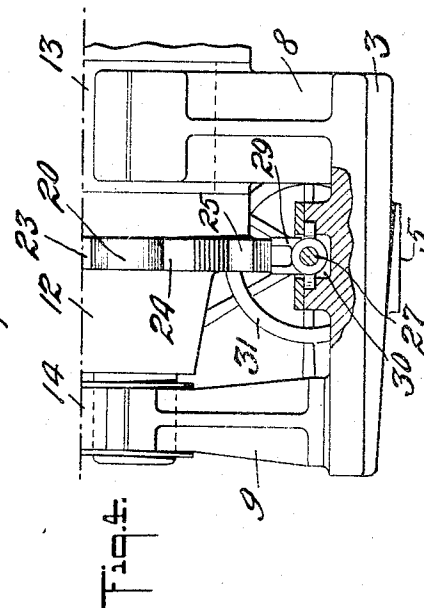
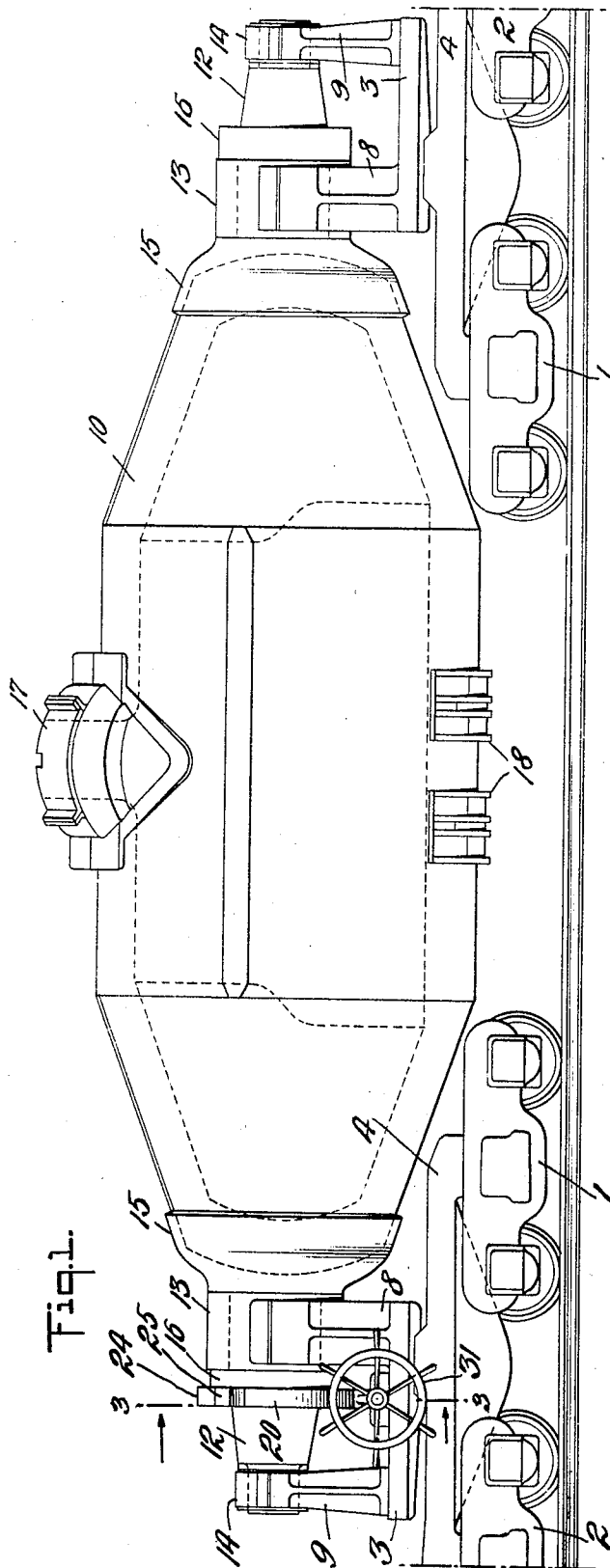
C. P. ASTROM

1,995,166

HOT METAL CAR

Filed Feb. 23, 1934

2 Sheets-Sheet 1



INVENTOR
CARL P. ASTROM
BY *J. M. M. M.*
ATTORNEY

March 19, 1935.

C. P. ASTROM

1,995,166

HOT METAL CAR

Filed Feb. 23, 1934

2 Sheets-Sheet 2

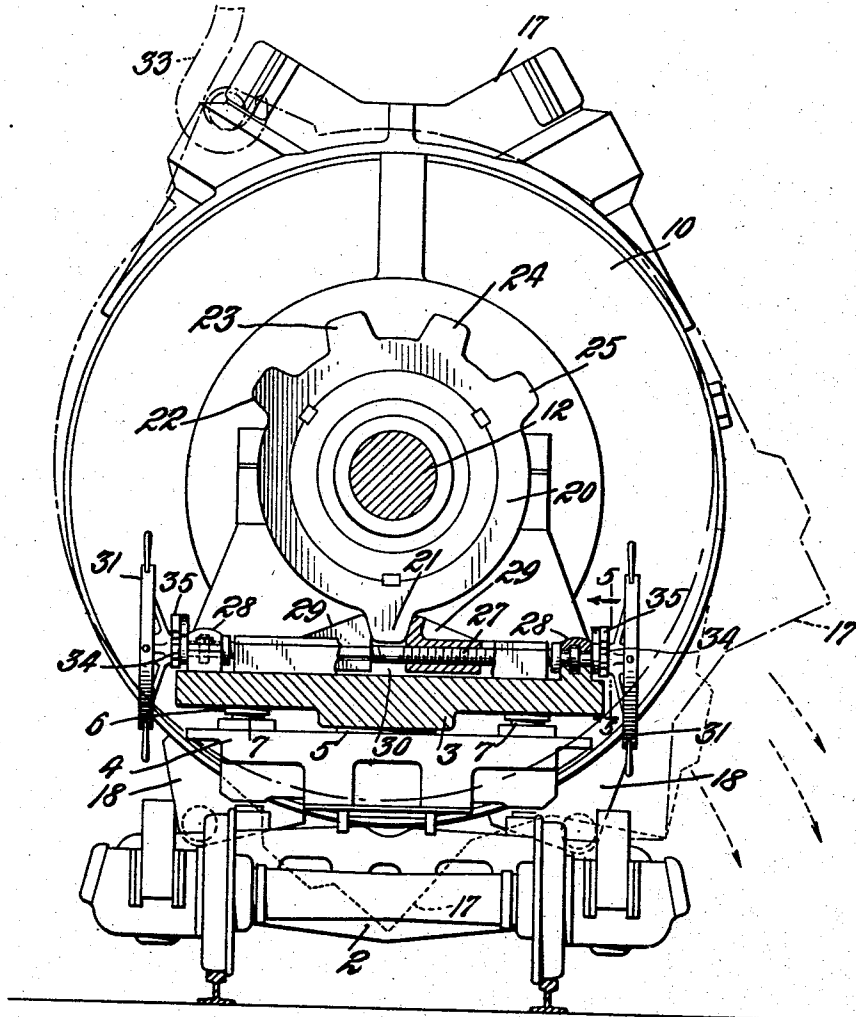
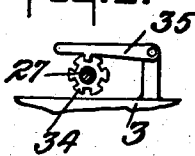


Fig. 2.

Fig. 5.



INVENTOR
CARL P. ASTROM
BY *J. P. Mott*
ATTORNEY

UNITED STATES PATENT OFFICE

1,995,166

HOT METAL CAR

Carl P. Astrom, East Orange, N. J., assignor to
M. H. Treadwell Company, Inc., New York,
N. Y., a corporation of New York

Application February 23, 1934, Serial No. 712,476

5 Claims. (Cl. 266—39)

This invention relates to hot metal conveying and dumping cars which are emptied by a tilting movement induced by a crane or other external means and has for its object to provide a simple and efficient mechanism for locking the car body in upright and tilted positions.

Hot metal cars of the horizontal type referred to are used to transport molten metal from blast furnaces to open hearth furnaces, converters, or casting pits which are at some distance from the furnace, or at a separate plant. The cars vary in size and capacity, some of them weighing up to 125 tons when empty and being capable of carrying up to 175 tons of hot metal at a time.

Hot metal cars of this type have heretofore been mounted on trunnions and dumped by a motor carried on the car. An object of this invention is to dispense with the expense of a motor and the necessary reduction gearing by tipping the body on center trunnions with a crane or other external means. A further object of the invention is to provide a locking mechanism, preferably constructed for dumping on either side of the track, for holding the body upright when empty, full or during transportation, in tilted intermediate dumping position, and extreme tilted draining position, independently of the external operating means. Thus a traveling crane need not be tied up while a car is positioned for draining, but may be used elsewhere. After a car has discharged the contained hot metal, there is a residue of slag and kish which has to be drained out after moving the car to a dump, by further tilting it and holding it tilted for some time. Heretofore, a practice has been to have men at the dump rake out the slag and kish while the car is held in dumping position. Such practice is expensive, and is avoided by this invention in that the body can be completely inverted and locked to drain slag and kish between the rails to a dump below, while the crane can be used elsewhere.

A further object is to eliminate in a car of such type an underframe between the trucks, which saves weight and cost, and also reduces derailments heretofore common to underframe cars, especially long ones. In the latter, in order to go round banked curves at all, more clearance has to be given on the side bearings to prevent jamming and twisting of the frame, but increased side bearing clearance makes for instability in transportation. With the construction shown herein without an underframe, such difficulties are overcome, and by locking only one end of the car body, no distorting or twisting moments are

transmitted to the body even in going around sharp and highly banked curves, and a lower center of gravity is obtained than in an underframe type of horizontal hot metal car.

In the preferred form of the invention, the car body has a plurality of spaced engaging members which may be selectively engaged with the co-operating locking mechanism on the end supports according to the angular position of the body. Five such engaging members are preferred, one for locking the body in the upright or non-dumping position, two for locking the body in the intermediate dumping positions on either side of the car, and two for draining positions.

The body carries at each end elongated trunnions with thrust means on each side, each trunnion carrying a platform, and each platform supported by a standard form of truck, so that draft and buffing strains are transmitted between the platforms by the body itself.

The invention will be described in connection with the accompanying drawings, in which:

Fig. 1 is a side elevation of a car embodying the invention;

Fig. 2 is an end elevation with portions of the trunnion, end frame and locking mechanism shown in section;

Fig. 3 is a transverse section taken on line 3—3 of Fig. 1;

Fig. 4 is a section taken on line 4—4 of Fig. 3; and

Fig. 5 is a detail of the locking mechanism.

The hot metal car shown in the drawings has a capacity of upwards of 150 tons and is provided with trucks 1, 2 at each end, making four trucks in all, although two trucks may be used for cars of smaller capacity, depending on permissible wheel loads under I. C. C. and A. R. A. regulations.

End frames 3 are journaled on the respective truck frames or bolsters 4 as at 5 with standard king pins and hemispherical bearings providing universal pivots. The end frames carry the usual draft gears and couplers, not shown. At the sides, each end frame carries pad 6 having a slight clearance from bearing rollers 7 at each side of the truck frame, this being of standard construction and allowing the truck and car body to pivot independently of each other as well as a certain amount of tilting of the end frames on the trucks in going around curves.

Each end frame 3 carries two trunnion pedestals 8, 9, providing an elongated trunnion support at each end, either integral with the end frame in one heavy casting or of built up construction heavily braced thereto to resist draft

strains. By draft strains is meant either the ordinary strains due to the locomotive, or opposite strains due to coupling, bumping, etc., or more generally, the ordinary end thrust transmitted through the trunnions.

Horizontal car body 10 is of substantially cylindrical shape and has elongated end trunnions 12 rigidly secured thereto with the horizontal centerline of the body below the centerline of the trunnions. The trunnions 12 are supported in bearings 13, 14 in the upper ends of the respective pedestals 8, 9. Heavy collars 15, 16 on the trunnions are disposed on opposite sides of the bearings 13 and take all the stresses from pushing and pulling the car. The outside or secondary bearings 14 take the bending stresses occasioned by the center truck bearings of the end frames being spaced from the trunnion centers, the stresses from the couplers being transmitted to the trunnions through the truck bearings and thereby setting up the said bending moments.

The body 10 is interiorly lined with refractory material of the type commonly used in hot metal containers and is provided with a filling and pouring spout 17 at any desired place, or may have a separate spout on each side. The body is also provided with lugs 18 for the attachment of a dumping crane hook whereby the body may be tilted on its trunnions and the contents dumped on either side of the car as desired.

One of the trunnions 12 carries a ring 20 which is either integral with the trunnion or keyed thereto in any suitable manner. This ring has one or more peripheral lugs or projections, there being five such lugs numbered 21 to 25 in the form shown in the drawings. The cooperating locking mechanism includes a rotatable shaft 27 which is journaled in pillow blocks 28 carried by the end frame 3 adjacent trunnion ring 20, the shaft having suitable collars disposed within the pillow blocks and other collars on opposite sides of said blocks for taking up thrusts. The respective end portions of shaft 27 are threaded in opposite directions and blocks 29 are threaded on the respective end portions of shaft 27 and are seated in a track or slot 30 which extends transversely of end frame 3 coextensive with shaft 27 as shown in Figs. 2, 3 and 4. Hand wheels 31 are secured to both ends of shaft 27 for rotating said shaft from either side of the car.

Rotation of shaft 27 in one direction causes blocks 29 to slide toward each other in track 30, while rotation of the shaft in the opposite direction causes the blocks to move apart. When the blocks are spread apart the maximum distance, as in Fig. 3, they are outside the path of lugs 21, 22, etc. on trunnion ring 20, permitting the lugs to clear the blocks when the body is tilted by the crane. In Fig. 2 the blocks 29 are clamped against lug 21 thereby locking the car body in upright position. The body is made bottom heavy when empty or full, so as not to accidentally tilt. When it is desired to tilt the body, the dumping crane hook 33 is engaged with the lug 18 on the side opposite that on which the body is to be dumped; shaft 27 is rotated by either hand wheel 31 until blocks 29 are spread apart the maximum distance as shown in Fig. 3; the crane is operated to tilt the body, for example to the first dotted line position shown in Fig. 2, thereby rotating ring 20 until lug 25 clears the adjacent block 29 as illustrated in Fig. 3 and arrives in the central position formerly occupied by lug 21; whereupon shaft 27 is rotated in the opposite direction to clamp lug 25 between blocks 29 thereby locking the body in

an intermediate dumping position and allowing the hot metal to drain off.

After car body 10 has discharged the contained hot metal, the car is moved to a dump and the body is further tilted in a clockwise direction as viewed in Figs. 2 and 3 and is locked in the extreme dotted tilted position in Fig. 2 by clamping lug 24 between blocks 29. In this position the body 10 is inverted almost 180 degrees from the upright position, allowing the slag and kish to drain between the rails to a dump below while the crane is withdrawn and used elsewhere. The car body may likewise be tilted in the opposite direction, in which case lug 22 serves for locking the body in the intermediate dumping position and lug 23 for locking the body in position to drain the slag and kish.

Shaft 27 preferably carries ratchets 34 at its opposite ends for engagement with pawls 35 on end frame 3, as shown in Figs. 2, 3 and 5, for positively locking the shaft to prevent it from turning under load.

By this invention a large capacity, low cost, low center of gravity, safe and economical horizontal type car is provided which will give much better operating results than the open top upright types in common use.

Various changes may be made in the foregoing details of construction without departing from the scope and spirit of the invention as defined in the appended claims.

The invention claimed is:

1. A hot metal conveying and dumping car comprising end supporting means, bearings carried thereby, an outside operated car body having a pouring spout, a center trunnion at each end journaled in said bearings for rotatably supporting said body, an engaging member carried by said body, a slidable block on one support adapted to engage said member, and means for sliding said block into and out of engagement with said member to lock and unlock said body in tilted position.
2. A hot metal conveying and dumping car comprising end supporting means, bearings carried thereby, a car body having a pouring spout, a center trunnion at each end journaled in said bearings for rotatably supporting said body, a plurality of spaced peripheral lugs carried by said body, a block movable transversely on said support adapted to selectively engage said lugs according to the angular position of said body, and means for moving said block into and out of engagement with said lugs to lock and unlock said body.
3. A hot metal conveying and dumping car comprising independent end supporting means, bearings carried thereby, a separate truck under each end, a bottom heavy elongated cylindrical car body having a pouring spout, a center trunnion at each end journaled in said bearings for supporting said body, said trunnions and bearings including thrust and draft transmitting means, a plurality of spaced peripheral lugs carried by said body, cooperating clamping means movable transversely on one support adapted to selectively lock said lugs according to the angular position of said body, and means for clamping and releasing said lugs, said body having means to cooperate with outside dumping means.
4. A hot metal conveying and dumping car comprising a support, bearings carried thereby, a car body having a pouring spout and trunnions journaled in said bearings for supporting and tilting said body, a rotatable shaft on said support having its respective end portions threaded in opposite directions, a track on said support adjacent said

- shaft, a pair of blocks on said track threaded on the respective end portions of said shaft and adapted to be moved toward and away from each other according to the direction of rotation of said shaft, a lug carried by said body and movable into the path of said blocks upon tilting of said body into pouring position, and means for rotating said shaft to move and clamp said blocks against said lug.
- 5 5. A hot metal conveying and dumping car comprising a support, bearings carried thereby, a car body having a pouring spout and trunnions journaled in said bearings for supporting and tilting said body, a rotatable shaft on said support having its respective end portions threaded in opposite directions, a track on said support adjacent said shaft, a pair of blocks on said track threaded on the respective end portions of said shaft and adapted to be moved toward and away from each other according to the direction of rotation of said shaft, a lug carried by said body and movable into the path of said blocks upon tilting said body into pouring position, means for rotating said shaft to move and clamp said blocks against said lug, and means for locking said shaft against rotation under load.
- 10 10

CARL P. ASTROM.