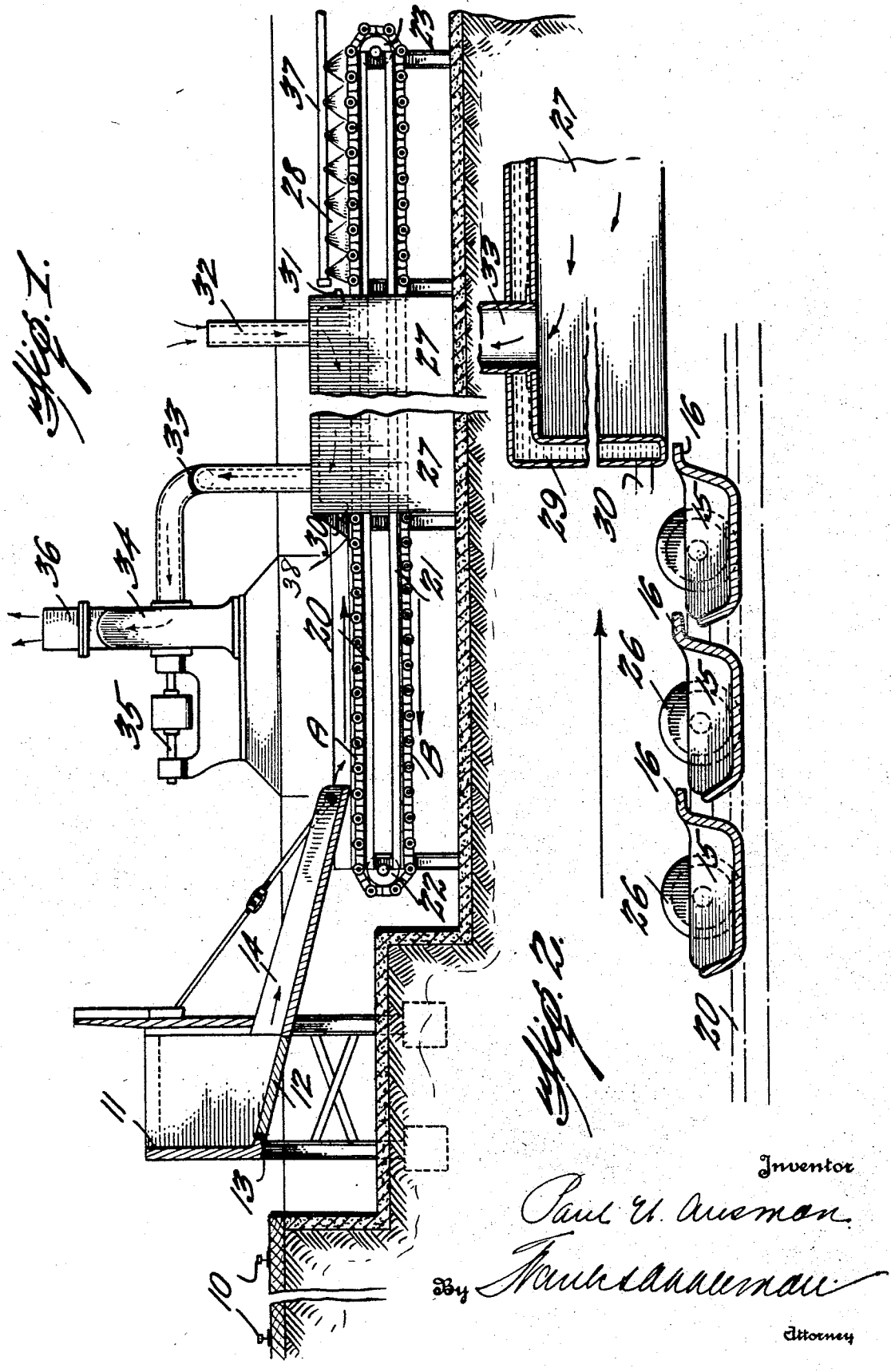
May 5, 1931. P. W. AUSMAN 1,803,886

SLAG COOLING APPARATUS

Filed Feb. 20, 1929 2 Sheets-Sheet 1



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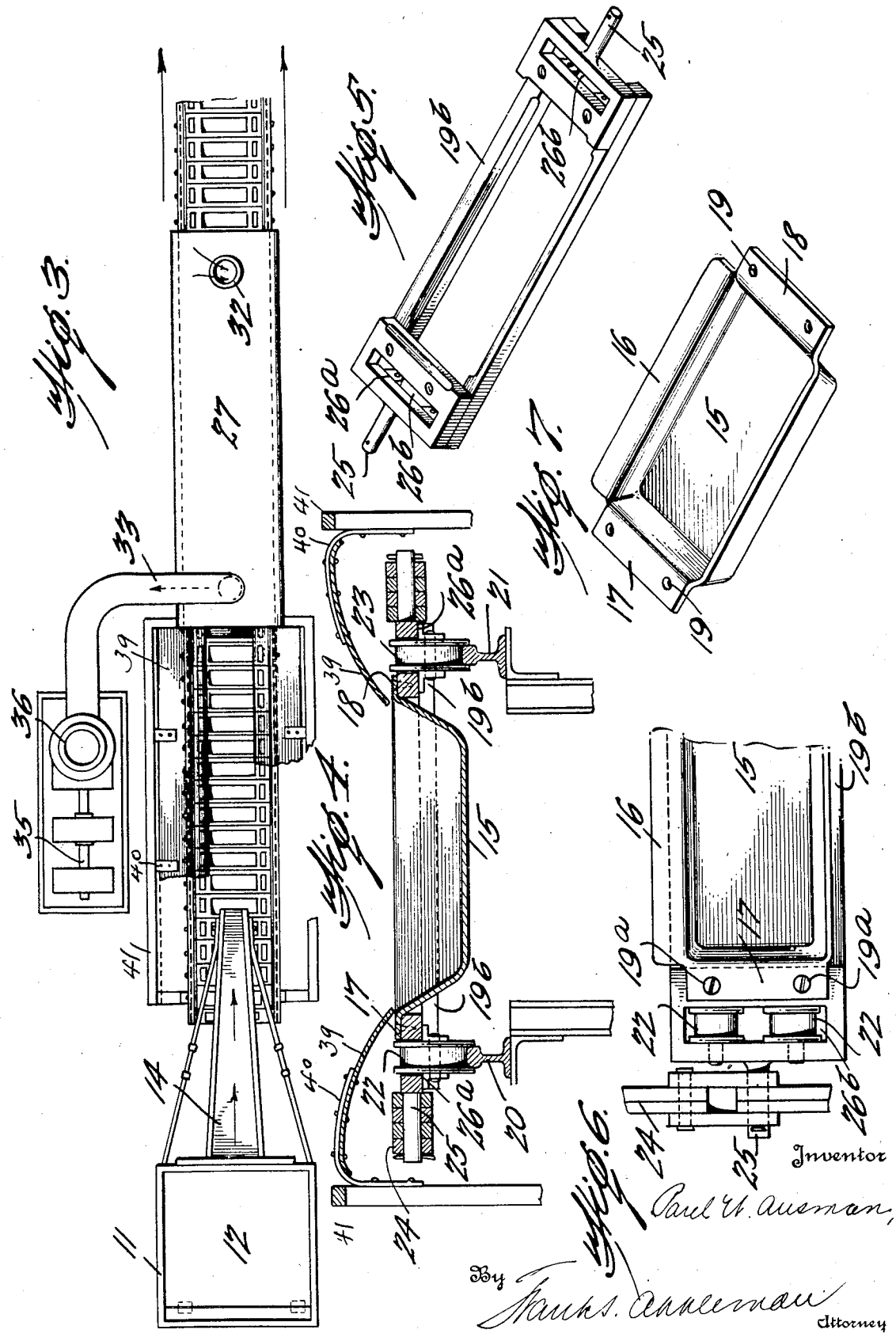
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UNITED STATES PATENT OFFICE

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SLAG COOLING APPARATUS

Application filed February 20, 1929. Serial No. 341,509.

This invention relates to coolers for slag, and has for an object the provision of novel means whereby slag is conveyed from a dump or a location where it is delivered from hot pots now used in blast furnaces, the said slag being conveyed while undergoing a cooling process and thereafter delivered to a location where it is ground or otherwise treated.

It is an object of this invention to produce novel means whereby slag is delivered to a carrier and the carrier preferably comprises a plurality of receptacles, each of suitable capacity, the said carrier being caused to travel through a preliminary cooling zone and thereafter through a sprinkling or immersing zone in order that the slag may be disposed of expeditiously and inexpensively.

It is a further object of this invention to provide a process by which the slag is gradually cooled and reaches a temperature in a certain zone of its movement, whereby it can be subjected to the action of water without the water being flashed; in other words, the slag is cooled to a temperature where the water will remain liquid when in contact with the slag and hence the cooling effect of the water will continue from the zone where it first receives the water until the end of the zone where water is applied to the slag, so that when it reaches the end of the zone where water is applied, the slag is cool and in condition for the grinder.

It is a still further object of this invention to produce novel conveyers having a plurality of receptacles, and the invention consists further in details of construction to be hereinafter set forth.

In describing the invention in detail, reference will be had to the accompanying drawings forming part of this application, wherein like characters denote corresponding parts in the several views, and in which—

Figure 1 illustrates a view in elevation, partly in section, of an apparatus embodying the invention;

Figure 2 illustrates a detail sectional view of the receptacles for the slag and a fragment of the secondary cooling zone;

Figure 3 illustrates a plan view of the apparatus with a portion of the end omitted;

Figure 4 illustrates an enlarged sectional view of the conveyer;

Figure 5 illustrates a perspective view of one of the frames for a mold or slag container;

Figure 6 illustrates a plan view of a fragment of a mold and parts associated with it; and

Figure 7 illustrates a perspective view of one of the molds or containers.

In these drawings, 10 denotes the track from which slag is dumped into the receiver 11 consisting of a hopper with an inclined bottom 12, which bottom is preferably hinged in appropriate manner, in order that it may be removed for the purpose of cleaning the interior of the receiver. The bottom is shown as being mounted on a pivot 13, but appropriate hinges or means for holding the bottom in place may be supplied.

A chute 14 communicates with the receiver and extends outwardly and downwardly with a discharge end in proximity to a conveyer having molds or receptacles, as will presently appear.

In the present embodiment of the invention, the conveyer comprises a plurality of molds or receptacles 15, each of which has a forward lip 16 which is curved to project over the rear edge of the next mold in advance of it. Each mold, in the present embodiment of the invention, has end flanges 17 and 18 with apertures, such as 19, for the reception of fastenings 19^a, such as bolts, screws, or the like, whereby the mold is secured on a supporting frame 19^b, to be presently described more in detail. The conveyer is associated with wheels, to be presently described, which travel on rails 20 and 21 forming the track of the conveyer, it being shown that the runway of the conveyer will have an upper track, identified by the letter A, and a lower track, identified by the letter B. Conveyer wheels 22 and 23 are rotatably mounted at each end of the track and either or both of which may be power driven in any suitable way, as is usual in the operation of conveyers. Since the means for communicating power to these wheels is an obvious expedient, the said means are not shown in detail.

The conveyer may comprise a chain having links 24 in which trunnions or spindles 25 of the frame 19[b] are mounted. It is seen by reference to Fig. 4 that the end flanges 17 and 18 of the molds are located on the frame and that the wheels 26 are mounted for rotation through the employment of bearings or brackets 26[a] on the under side of the frame. It is also shown that the frame has slots 26[b] forming clearances for the wheels. It is intended that the molds shall be so secured to the frame to prevent their dislodgment from the conveyer chain when they are traveling on the lower run of the track.

The conveyer operates through a housing or what may be termed a "secondary cooling zone" 27 and thereafter under a spraying zone 28. The preliminary cooling occurs but in a limited measure between the end of the chute 14 and the secondary cooling zone, but in the secondary cooling zone provision is made for the circulation of air under what may be termed "forced draft" in order that the cooling action will be augmented, as compared with that in the primary zone. The housing 28 is associated with a jacket section 29 and water is to be circulated in this jacket in order that its walls may be kept cold while the slag is moving through it. The water may be admitted to the jacket at one end, as, for instance, through a nipple 30 and it may flow out of the jacket through a nipple 31, but these are details of construction which can be changed to suit particular requirements.

The housing at one end has an air intake pipe 32 and an air outlet or exhaust pipe 33 which communicates with an exhaust fan 34, and when the fan is driven through power applied to the shaft 35 or otherwise, air is drawn through the pipe 32 and exhausted through the pipe 33 to an outlet 36 of the fan so that cool air under rapid circulation is in contact with the slag and practically surrounds the molds as they travel through the secondary cooling zone or through the housing.

A feed water pipe 37 may be arranged above the zone where the molds are to travel after they leave the housing and any suitable jets or other means for delivering water to the top surfaces of the slag in the molds will fulfill the requirements of the invention. The capacity of the jets will, of course, be determined by other dimensions of the apparatus and the inventor does not wish to be limited with respect to the above details.

The inventor does not wish to be limited with respect to the manner of forming the water compartments, nor the particular type of cooler.

A scraper or leveling device 38 extends downwardly and forwardly from the housing in order that it will engage slag carried by the conveyer which is abnormally high and spread it over the surface of the slag in the molds as the conveyer moves within the zone of action of the scraper.

In order to protect the links of the chain and the operating parts of the conveyer, shields 39 are supported by straps or brackets 40 through the use of a frame 41 at each side of the conveyer. These shields may be of any appropriate construction, but preferably of metal of proper gauge which will prove effective to prevent slag carried by the conveyer from gaining access to the wheels 23 or the chain links of the conveyer.

I claim:

1. In a slag cooling apparatus, a receiver for slag, a chute leading therefrom, a conveyer having a plurality of receptacles located in operative relation to the said chute, a housing constituting a cooling zone through which the conveyer operates, a water jacket in the said cooling zone through which water may circulate from modifying the temperature of the wall of the said cooling zone, means for circulating air therethrough, and means for applying water to the slag in the receptacles as they leave the cooling zone.

2. In a slag cooling apparatus, a receiver for slag, a chute leading therefrom, a conveyer having a plurality of receptacles located in operative relation to the said chute, a housing constituting a cooling zone through which the conveyer operates, a water jacket in the said cooling zone through which water may circulate for modifying the temperature of the wall of the said cooling zone, and means for applying water to the slag in the receptacles as they leave the cooling zone.

3. In a slag cooling apparatus, a conveyer having a plurality of receptacles adapted to carry slag, a housing constituting a cooling zone through which the conveyer operates, a water jacket in said cooling zone through which water may circulate for modifying the temperature of the wall of said housing, means for circulating air through the cooling zone, and means for applying water to the slag in the receptacles as they leave the cooling zone.

4. In a slag cooling apparatus, a conveyer having a plurality of receptacles located in operative relation to means for delivering slag thereto, a housing constituting a cooling zone through which the conveyer operates, a water jacket in said cooling zone through which water may circulate for modifying the temperature of the wall of said housing, and means for applying water to the slag in the receptacles as they leave the cooling zone.

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