

T. J. MITCHELL & J. A. McCREARY.
 COKE SCREEN AND CONVEYER.
 APPLICATION FILED NOV. 13, 1909.

1,012,214.

Patented Dec. 19, 1911.

5 SHEETS—SHEET 1.

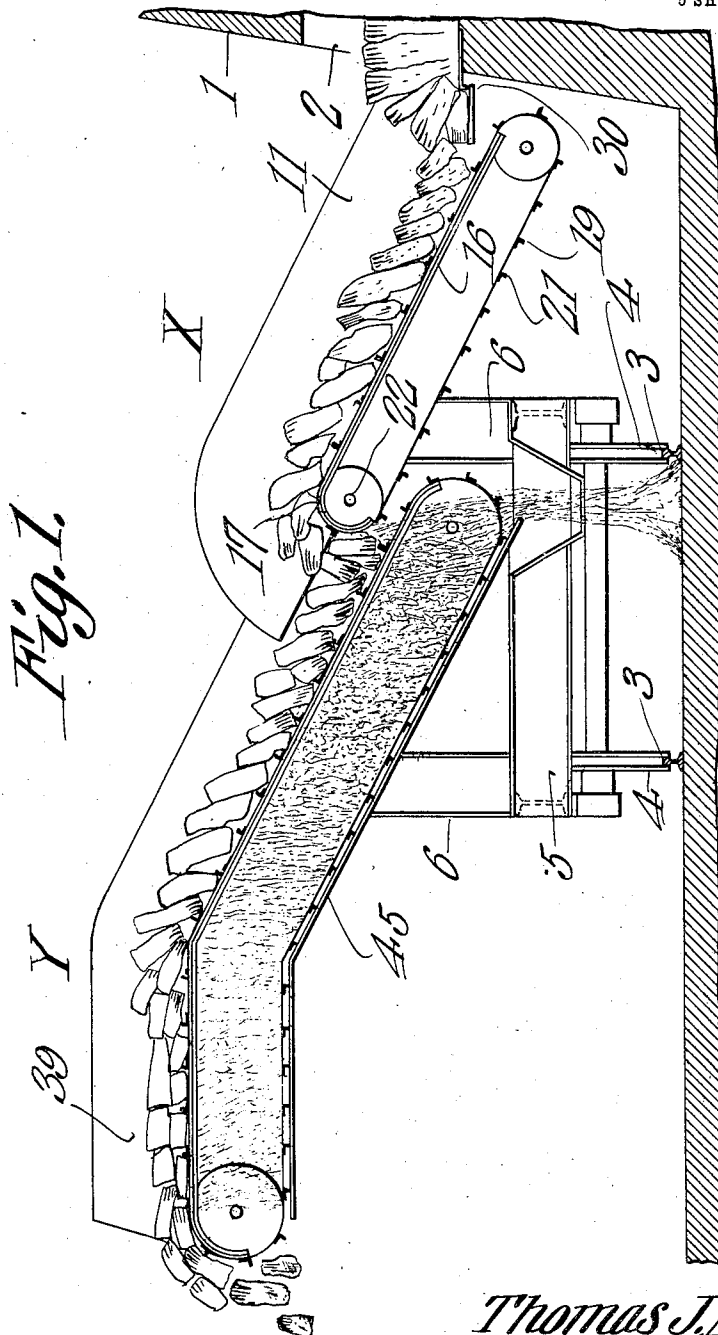


Fig. 1.

Y

39

Witnesses

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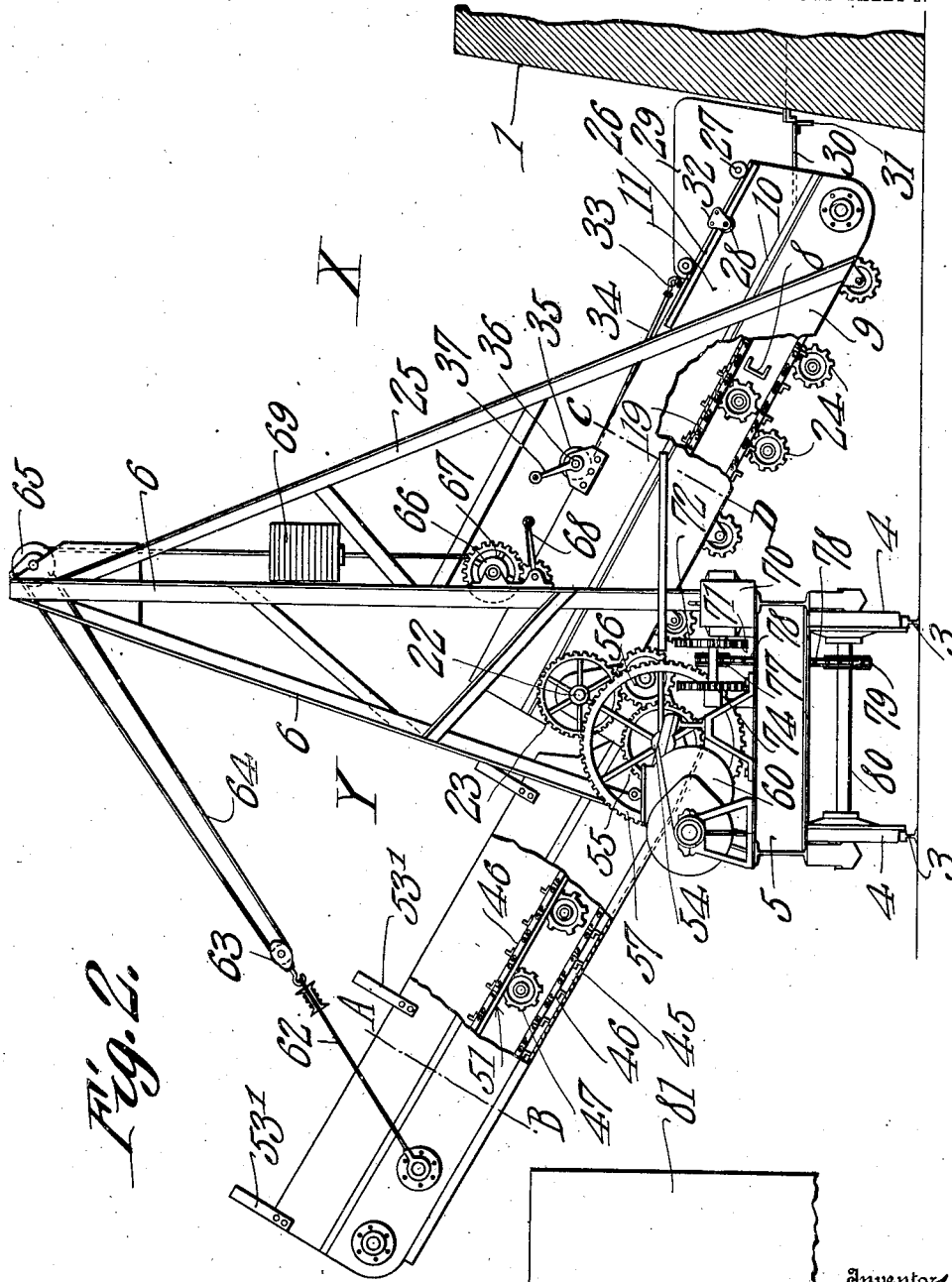


Fig. 2.

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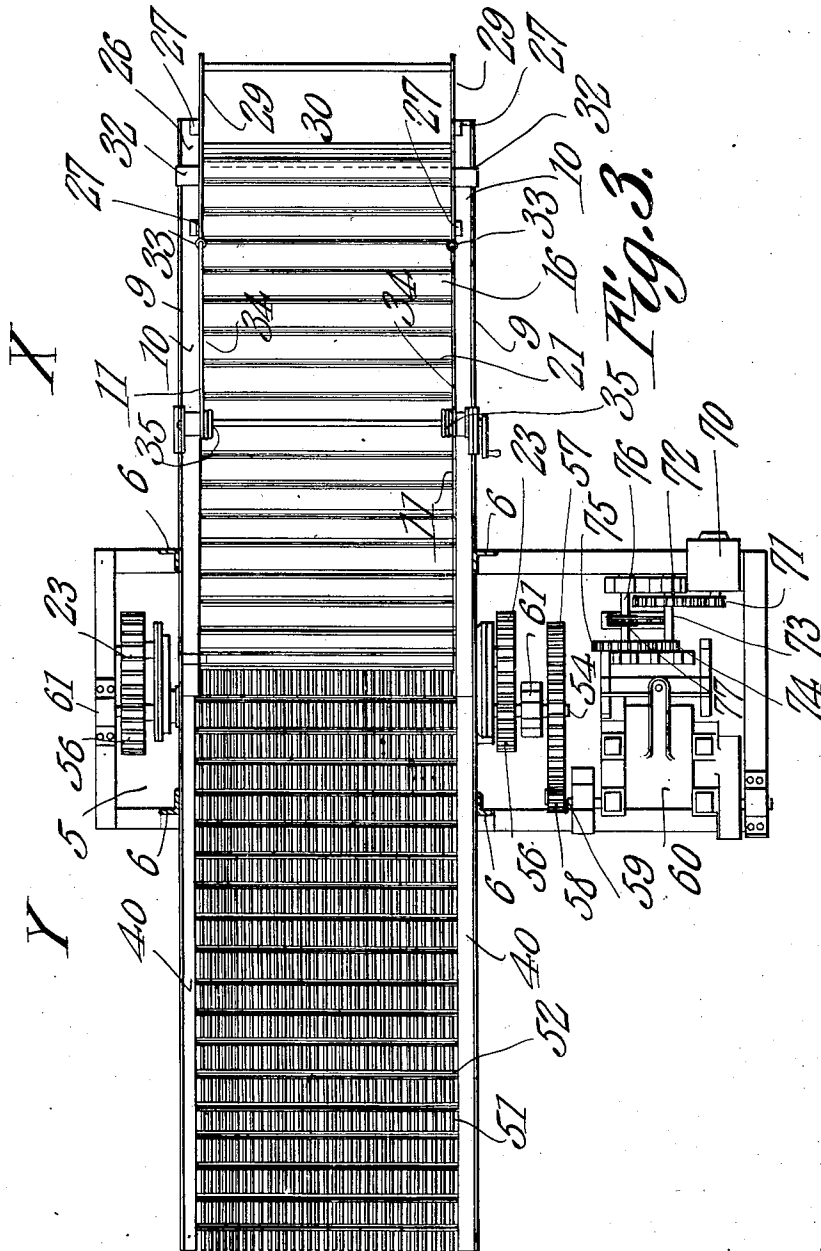
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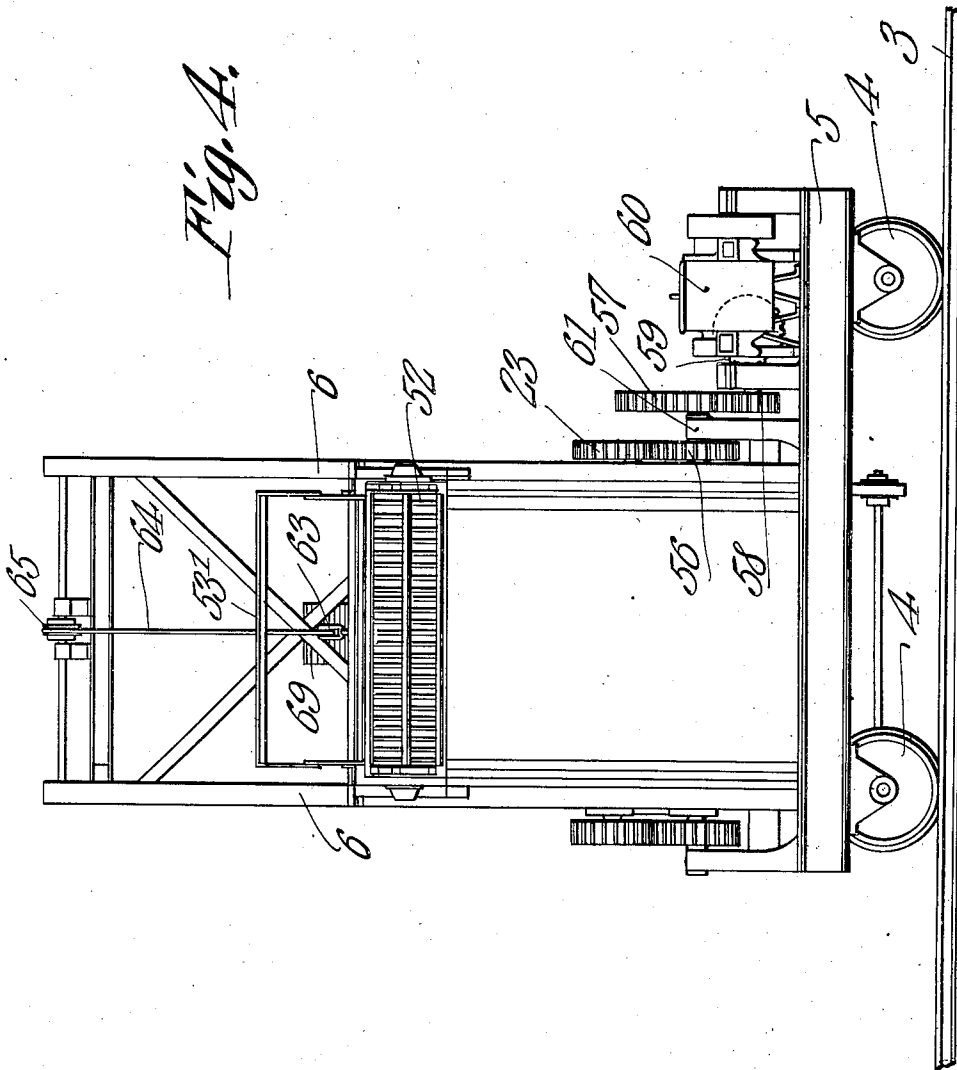
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5 SHEETS—SHEET 4.

Fig. 4.



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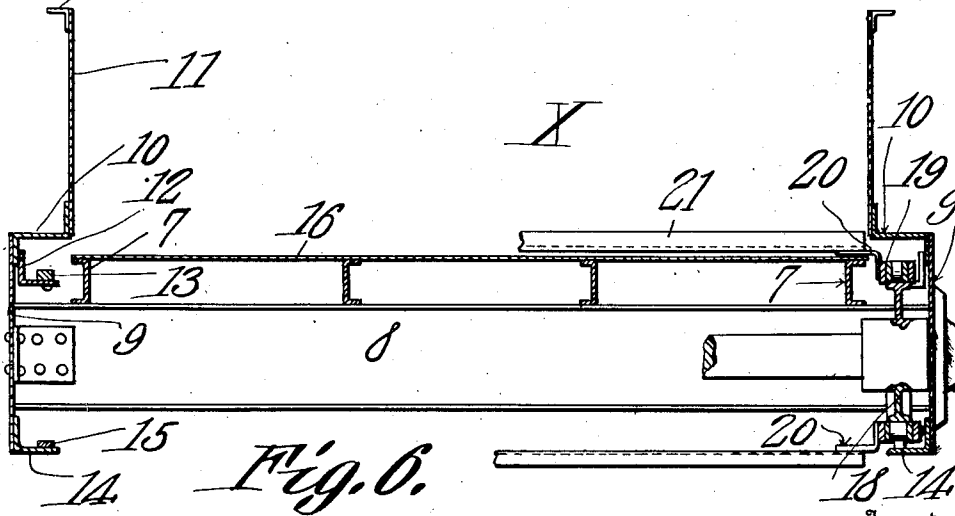
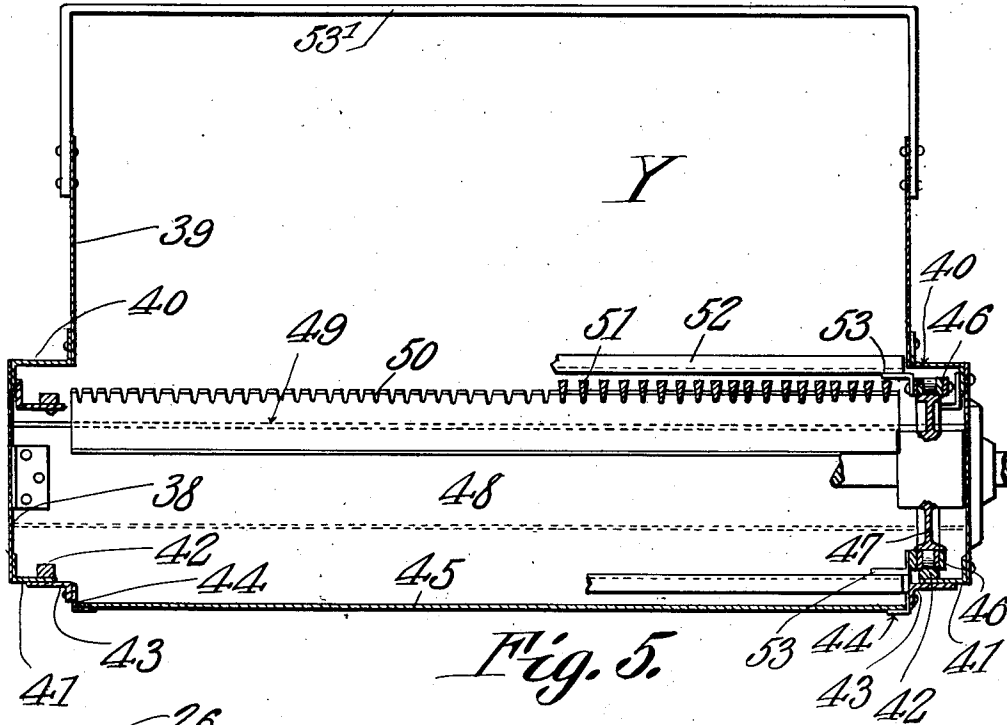
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5 SHEETS—SHEET 5.



Witnesses

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UNITED STATES PATENT OFFICE.

THOMAS J. MITCHELL AND JAMES A. McCREARY, OF UNIONTOWN, PENNSYLVANIA.

COKE SCREEN AND CONVEYER.

1,012,214.

Specification of Letters Patent.

Patented Dec. 19, 1911.

Application filed November 13, 1909. Serial No. 527,953.

To all whom it may concern:

Be it known that we, THOMAS J. MITCHELL and JAMES A. McCREARY, citizens of the United States, residing at Uniontown, in the county of Fayette, State of Pennsylvania, have invented a new and useful Coke Screen and Conveyer, of which the following is a specification.

This invention has reference to improvements in coke conveyers and its object is to provide means for conveying coke from the discharge end of the coke oven to a car or other receptacle, the construction being such as to deliver the coke into the car in a clean condition free from dust or ashes or like material.

The invention is designed for use particularly with the type of coke oven wherein the coke block is pushed bodily out of one end of the oven by means of a suitable pusher acting at the other end of the oven, the arrangement being such that the coke block will break up into large pieces and fall on the conveyer which is designed to carry the coke to a car or other receptacle.

It is customary to build coke ovens in long series with a railroad track for the cars to which the coke is to be delivered for shipment extending lengthwise of each series separated therefrom by a yard along which between the railroad track and the corresponding face of the series of coke ovens there is laid another track for a truck upon which the conveyer is mounted so that such conveyer may be brought into proper relation to the discharge end of the coke ovens in succession.

In accordance with the present invention the conveyer is made in two sections, one of which receives at one end the coke directly from the coke ovens and elevates the coke sufficiently so that on reaching the top of the first conveyer or conveyer section the coke will fall into another elevating conveyer which ultimately discharges the coke into the car placed in position to receive such coke. The second conveyer or conveyer section is formed with a longitudinal grating through which dust and ashes and other material it is desired to separate from the coke before it enters the car may fall to be returned by the lower run of the conveyer over an imperforate plate which will direct the separated matter to a suitable point of deposit.

It has been found in practice that in order

to properly free the coke from adherent ashes or dust it is necessary that the coke be turned over and this is accomplished by allowing the coke to have a comparatively slight drop from the upper end of the first conveyer or section of the conveyer onto the second conveyer or conveyer section, thus overturning the coke and giving it the necessary shock or jar or simple reversal of position which will dislodge any adherent dust or ashes. This saves the necessity of unduly elevating the coke to then direct it over a screen to free it from ashes before entering the car.

The first conveyer or conveyer section does not screen the coke. This section is continued from the receiving end to a point over the carrying truck for the conveyer as a whole. The coke then falls on the second conveyer or conveyer section where it is freed from most of the fine matter it is desired to remove from the coke, which fine matter is directed to a point of deposit between the rails of the track carrying the conveyer structure, from whence the deposited matter may be readily removed, and any further ashes or dust which may escape through the grated portion of the second conveyer or conveyer section beyond the truck will be brought back by the lower run of the flights of the conveyer belt to the same point of deposit.

The invention will be best understood from a consideration of the following detail description taken in connection with the accompanying drawings forming a part of this specification, in which drawings,

Figure 1 is a structural diagram illustrating the invention without showing details of the structure. Fig. 2 is a view similar to that of Fig. 1 except that the structure is shown in detail. Fig. 3 is a plan view of the conveyer structure shown in Fig. 2. Fig. 4 is an elevation of the structure viewed from the side remote from the coke ovens. Fig. 5 is a section on the line A—B of Fig. 2. Fig. 6 is a section on the line C—D of Fig. 2.

Referring first to Fig. 1 there is shown illustratively a portion of a coke oven 1 and the discharge end 2 thereof. The coke oven may be of the type shown in Letters Patent No. 899,886 granted to Thomas J. Mitchell for improvements in coke ovens on September 29, 1908. With such a coke oven the coke is formed in substantially one piece,

and is, by means of a suitable pushing apparatus acting at the remote end of the oven, discharged through the opening 2 in substantially one block, but this block
5 readily breaks into smaller pieces by its own weight if unsupported.

Without at the present part of the description going into details of the construction of the conveyer it may be stated generally that the conveyer comprises two sections X and Y. The section X has its lower end adjacent to the discharge end 2 of the coke oven but at a lower level so that the coke block as it is discharged from the
10 oven will be unsupported for a sufficient distance to cause it to break up into smaller pieces which fall upon the conveyer section X the operating parts of which are in motion in a direction to move the coke toward the upper end of the conveyer section X.
20 Under-riding this end of the conveyer section X is the lower end of another conveyer section Y and these two portions of the two conveyer sections are so related that the coke blocks are overturned on gravitating from the section X to the section Y. During the travel of the coke up the first conveyer section X any ashes and dust which may escape from the coke and fall on
30 the conveyer are carried to the top of the conveyer and fall therefrom to the lower end of the second conveyer section Y. As will hereinafter appear this second conveyer section is provided with a screen bottom or grating so that any ashes or dust will gravitate therethrough so that when the coke reaches the discharge end of the second conveyer section Y to fall into a waiting car, the coke is thoroughly cleansed of
40 ashes and dust.

An important feature of the invention lies in the fact that the coke is overturned on its travel from one conveyer section to the other and therefore all dust and ashes
45 which might otherwise become pocketed in the coke block and dislodged therefrom and escape through the screen section of the second conveyer. Furthermore all the matter removed from the coke is carried to a single point of deposit from whence it may be readily gathered up and carted away. The coke thus delivered to the cars is particularly free from all adherent dust and dirt and is therefore markedly clean.

It is not necessary that the two sections X and Y be distinct sections of the conveyer since a sudden dip in the onward course of the conveyer will serve to cause the overturning of the coke blocks, and the dislodgment of any dust or ashes which would otherwise be carried to the car.

In the following description of the details of construction of the conveyer, the double conveyer form is illustrated and described, but it will be understood that the

invention is not limited to this particular form of conveyer and embraces any type of conveyer causing the overturning of the coke blocks, during their progress from the coke oven to the car or other receptacle.

Referring to Figs. 2 to 6 both inclusive, there is shown a suitable track 3, also shown in Fig. 1, this track being located adjacent to the discharge end of a bank of ovens after the usual practice. The track is designed to receive wheels 4 of a suitable truck 5 which latter may be made of longitudinal and cross beams of structural steel in a manner common to vehicles of this type and therefore needs no special description.

Erected on the truck 5 in spaced relation one to the other in the direction of the length of the truck are two posts 6 of open construction suitably cross braced and tapering toward the upper end, these posts sustaining the conveyer sections X Y to be described more in detail hereinafter.

The conveyer section X is composed of longitudinal channel beams 7 upheld by cross beams 8 which latter are secured at their ends to longitudinal plates 9 extending above the top of the channel beams 7 and below the bottoms of the cross beams 8. At the top of the side plates 9 there are Z beams 10 and these Z beams extend inward one toward the other and have secured to their inner ends other side plates 11. Attached to the under side of each bar or beam 10 there is an angle strip 12 extending lengthwise of the conveyer section and carrying a wear
100 bar 13.

Attached to the lower edge of each side plate 9 below the cross beams 8 is an angle strip 14, carrying a wear bar 15. The channel irons 7 have attached to their upper edges a plate 16 and at the upper end this plate 16 may be bent around into the form of substantially a half cylinder as indicated at 17, Fig. 1.

Adjacent to the inner faces of the side plates 9 there are mounted sprocket wheels 18 for supporting endless sprocket chains 19 on each side of the conveyer structure. These chains have secured to them by means of angle brackets 20 flights 21 of angle strips in spaced relation one to the other and in a continuous series throughout the length of the sprocket chain.

The upper run of each chain 19 is supported between the sprocket wheels upon the wear bar 13 and the under run of the chain is supported upon the wear bars 15.

The sprocket wheels 18 at the upper end of the conveyer section X are supported upon a shaft 22 extending beyond each side plate 9 and there carrying a gear wheel 23 driven by gearing to be described and imparting motion to the sprocket chains and the parts carried thereby, these parts together forming the conveyer belt.

The lower run of the conveyer belt of the conveyer X is further supported upon idler sprocket wheels 24. The conveyer structure X is carried by the post 6 at an incline and the lower end is further supported by braces 25 extending from the top of the post 6, suitable cross bracing being employed to impart rigidity to the structure.

Along the top edges of the side plates 11 at the lower end of the conveyer are angles 26 constituting tracks for rollers 27 and 28 on corresponding wing plates 29. These wing plates 29 are located within and in close relation to the lower ends of the side plates 11 and are joined at their lower ends by an apron plate 30 strengthened at the outer edge by an angle bar 31. The rollers 27 ride along the top flanges of the angle bars 26 while each roller 28 is carried by a suitable bracket 32 and underrides the top flange of the corresponding angle track 26.

The upper end of each plate 29 is provided with an eye 33, to which eyes are attached ropes or cables 34 leading to drums 35 on a shaft 36 mounted on the side plates 11 and provided with a crank 37 by means of which the shaft may be rotated at will. By moving the apron 30 with its side plates 29 longitudinally of the conveyer structure X the relation of the apron 30 to the surface of the conveyer belt remains constant, while the other end may be moved farther from or closer to the corresponding end of the conveyer structure. The object of this movable apron is to close the gap or clearance between the conveyer belt and the oven when the coke is being pushed from the oven onto the belt. When the oven is emptied of coke the apron is moved back so as to allow the entire conveyer to be clear of the oven front or wall when the conveyer is moved to the next oven and the apron again advanced in place ready to receive the coke.

In the operation of the structure the apron 30 is lodged a short distance below the level of the floor of the oven so that when coke is projected from the discharge opening it will overhang the apron without being supported thereby and the weight of the coke will cause a large portion thereof to break off and drop upon the apron and be ultimately moved into engagement with the flights of the conveyer belt in the conveyer section X and be carried by these flights toward the upper end of the said conveyer section.

The conveyer section Y is composed of side plates 38, 39 joined by Z bars 40 similar to the corresponding plates 9, 11 and Z bars 10 of the section X. At the bottoms of the plates 38 are angle strips 41 with wear bars 42 similar to the angle strips 14 and wear bars 15 of the structure X. In the conveyer section Y, however the angle strips 41 carry other angle strips 43 which in turn have secured to them angle strips 44 and these

latter on the opposite sides of the structure support the corresponding edges of a plate 45 extending from the upper end of the conveyer structure X to the lower end thereof.

The conveyer structure Y carries endless sprocket chains 46 on each side thereof supported by sprocket wheels 47, these parts being similar to sprocket wheels 18 and the sprocket chains 19 of the conveyer section X. The side plates 38 are joined at intervals by cross beams 48 similar to the cross beams 8 of the conveyer section X and fast to the upper portions of these cross beams 48 are channel beams 49 formed along the upper edge with grooves 50 for the reception of screen bars 51, the screen surface thus formed extending substantially throughout the length of the upper run of the conveyer belt of conveyer section Y. The conveyer belt is similar to that of section X being formed of flights 52 of angle structure made fast to the chains 46 by angle brackets 53.

The upper run of the conveyer belt passes over the screen grating formed on the bars 51 while the lower run of the belt is along the top of the plate 45.

The upper edges of the side plates 35 are joined at intervals by tie bars 53'. The sprocket wheels at the lower end of the conveyer section Y are mounted on a shaft 54 carrying at each end gear wheels 55 coupled to the gear wheels 23 by transmission pinions 56 so that the corresponding runs of the belts of the two conveyer sections may travel in the same direction. The shaft 54 also carries a gear wheel 57 in mesh with a pinion 58 on another shaft 59 receiving motion from inclosed gearing carried by the casing of an electric motor 60. The shaft 54 is supported in suitable bearings 61 carried by the truck frame and the corresponding end of the conveyer section Y has bearings on this shaft so as to move about the longitudinal axis of the shaft as a pivot. The outer or free end of the conveyer section Y is carried by a yoke 62 in turn supported by a block 63 through which extends a rope or cable 64 fast at one end to the upper end of the post structure 6 and from thence carried through the block 63 and back to the post where it passes around a sheave 65 and then is passed downward to a drum 66 of a windlass structure 67 which may be manipulated by means of a suitable crank 68. The rope or cable 64 between the windlass structure 67 and the sheave 65 carries a counter weight 69 serving to counterbalance the weight of the upper or free end of the conveyer section Y.

For the purpose of moving the truck from point to point as may be needed, the truck carries an electric motor 70 on the shaft of which is a pinion 71 meshing with a gear 72 on a shaft 73 which in turn carries a pinion 74 in mesh with a gear wheel 75 on another

shaft 76 and this last named shaft carries a sprocket wheel 77 coupled by a sprocket chain 78 with another sprocket wheel 79 on the axle 80 of the wheels 4.

5 In practice the device is provided with suitable controllers and means for collecting current from stationary conductors, but as these means are all well known they have been omitted from the drawings.

10 By means of the motor 70 and the gearing connecting the same to the axle 80 of the truck, the whole structure may be propelled from point to point along the track 3 and stopped in line with the discharge openings of the ovens in succession or wherever desired. By means of the crank 37 and drums 35 the apron 30 may be brought into proper relation to the discharge end of the oven from which the coke charge is to be
15 expelled and this charge may be expelled from the oven while the motor 60 is in operation driving the conveyer belt at the desired speed. The outer or free end of the conveyer section Y is adjusted with relation
20 to a car illustratively shown at 81 in Fig. 2 so that material leaving the upper end of the conveyer section Y will gravitate into the car.

As the coke leaves the oven it breaks off
30 into large size lumps which fall upon the apron 3 and from thence pass to the conveyer belt of the conveyer section X and these lumps are there caught by the flight 21 and moved toward the upper end of the conveyer section X, the dirt or ashes escap-
35 ing from these lumps being conveyed along with them by the flights 21. On reaching the upper end of the conveyer section X the lumps of coke are discharged therefrom and
40 fall a short distance to the other conveyer section. This drop of the coke lumps or blocks is sufficient to cause these blocks to overturn and any ash that may have become lodged in the coke is readily jarred
45 or shaken therefrom and falls through the spaces between the screen bars 51 to the plate 45 where this material is caught by the flights on the under-run of the conveyer belt and is moved by the same toward the
50 lower end of the plate 45 which terminates above the body of the truck near the middle thereof and from thence may fall to the space within the track 3 to be afterward collected and conveyed away.

55 It has been found in practice that a comparatively large amount of ash and dust is lodged on top of the coke block within the oven and by the screening methods heretofore employed a large proportion of the ash and dust so lodged remains in the coke when
60 it reaches the car. By the present invention however when the coke lumps are overturned as they reach the screening portion of the conveyer practically all the ash and
65 dust is dislodged from the coke, and the

consequence is that when the coke passes to the car it is markedly free from any fine material whatsoever.

From the foregoing it is apparent that the discharge or upper end of the screen section Y need only be sufficiently elevated
70 to clear the top of the car 81 and the coke need not be unduly raised so that it may pass over a screen in order to dispose of the ash and dust ordinarily present in the coke
75 discharged from the ovens.

What is claimed is:

1. In a coke conveyer, an elevating section impervious to dust and ashes deposited thereon from the coke, and another elevating
80 section in line with the first elevating section and pervious to ashes or dust deposited thereon from the coke, said second named section having its receiving end below the discharge end of the first named
85 elevating section.

2. In a coke conveyer, an elevating section impervious to fine material deposited thereon from the coke, and another elevating section in line with the first named elevating section and having its receiving end below and overlapped by the discharge end of the first named elevating section, the second elevating section having its receiving surface pervious to fine material deposited
90 from the coke and provided with an impervious surface underriding the lower run of the conveyer passing thereover.

3. In a coke conveyer, an elevating section for the coke provided with an endless
100 conveyer belt and having an impervious wall underriding the upper or active run of the belt, and another elevating section in line with the first named elevating section and provided with an elevating belt, the said second section having its receiving end below and overlapped by the discharge end of the first named elevating section and provided with a pervious wall beneath the upper run of the belt and an impervious wall below the
105 lower run of the belt.

4. In a coke conveyer, an elevating section for the coke, a support for said section to which it is immovably related, another elevating section carried by the support in
115 line with the first named elevating section and having its receiving end below and overlapped by the discharge end of the first named elevating section, the second named elevating section being pivoted at its lower end to the support and adjustable about said pivot connection.
120

5. In a coke conveyer, a suitable truck or vehicle, a coke receiving and elevating section in immovable relation to the truck, an
125 apron at and carried by the receiving end of and adjustable in the direction of the length of the receiving conveyer section, and another coke elevating section with its receiving end underriding the discharge
130

end of the first named section and in adjustable relation to the truck or vehicle, said second named section being in line with the first named section.

5 6. In a coke conveyer, an elevating section for coke, and another elevating screen section having its receiving end below and overridden by the discharge end of the first named elevating section and its elevated end, constituting the discharge end of the second section being in line with the first named section.

7. A coke conveyer comprising a coke-receiving section and a coke-discharging section in line one with the other, both acting to elevate the coke and the second named section being provided with means for screening the coke, the discharge end of the first named section overriding the receiving end of the second named section.

8. A coke conveyer comprising two elevating conveyer sections in line one with the other and in superposed inclined planes, the first conveyer section in order being adapted to receive coke from an oven and elevate the same into overriding relation to the receiving end of the second named section, and the second named section being provided with screening means for the coke, the receiving end of the first section being lower than the like end of the second section.

9. A coke conveyer comprising two conveyer sections in line one with the other, the section first in order having its discharge end in over-riding relation to the receiving end of the second conveyer, and a movable means carrying both conveyer sections in transverse relation to the direction of travel of said movable means.

10. A coke conveyer comprising two elevating conveyer sections in line one with the other, the section first in order having its discharge end in over-riding relation to the receiving end of the second conveyer, and a movable means carrying both conveyer sections in transverse relation to the direction of travel of said movable means.

11. A coke conveyer comprising two conveyer sections in line one with the other, the first section in order having its discharge end in overriding relation to the receiving end of the second section, the first section being impervious to fine material deposited thereon, and the second section being pervious to such material, and a movable means carrying both conveyer sections in transverse relation to the direction of travel of said movable means.

12. A coke conveyer comprising two ele-

vating conveyer sections in line one with the other, the first section in order having its discharge end in over-riding relation to the receiving end of the second section, the first section being impervious to fine material deposited thereon and discharging at the upper end, and the second section being pervious to such material and provided with an impervious surface thereunder discharging at the lower end of said second section adjacent to the discharge end of the first section.

13. A coke conveyer comprising two elevating conveyer sections in line one with the other, the first section in order having its discharge end in overriding relation to the receiving end of the second section, the first section being impervious to fine material deposited thereon, and discharging it at the upper end and the second section being pervious to such material and provided with an impervious surface thereunder discharging at the lower end of said second section adjacent to the discharge end of the first section, and a truck carrying both conveyer sections in transverse relation to the direction of travel of the truck.

14. A coke conveyer having two elevating conveyer sections in line one with the other, the first section in order having its discharge end over-riding the receiving end of the second section and impervious to fine material deposited thereon and the second section having a screening portion receiving the coke and fine material discharged from the first section and an impervious member underlying said second section and discharging at the lower end thereof.

15. A coke conveyer having two elevating conveyer sections in line one with the other, the first section in order having its discharge end over-riding the receiving end of the second section and impervious to fine material deposited thereon and the second section having a screening portion receiving the coke and fine material discharged from the first section and an impervious member underlying said second section and discharging at the lower end thereof, and a movable means carrying both conveyer sections in transverse relation to the direction of travel of said movable means.

In testimony that we claim the foregoing as our own, we have hereto affixed our signatures in the presence of two witnesses.

THOMAS J. MITCHELL.

JAMES A. McCREARY.

Witnesses:

CHARLES T. CRAMER,

JAMES M. SMITH.