

TRIMMING MECHANISM.

Patented Oct. 19, 1909.

937,684.



Fig. 1.

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5 SHEETS—SHEET 2.

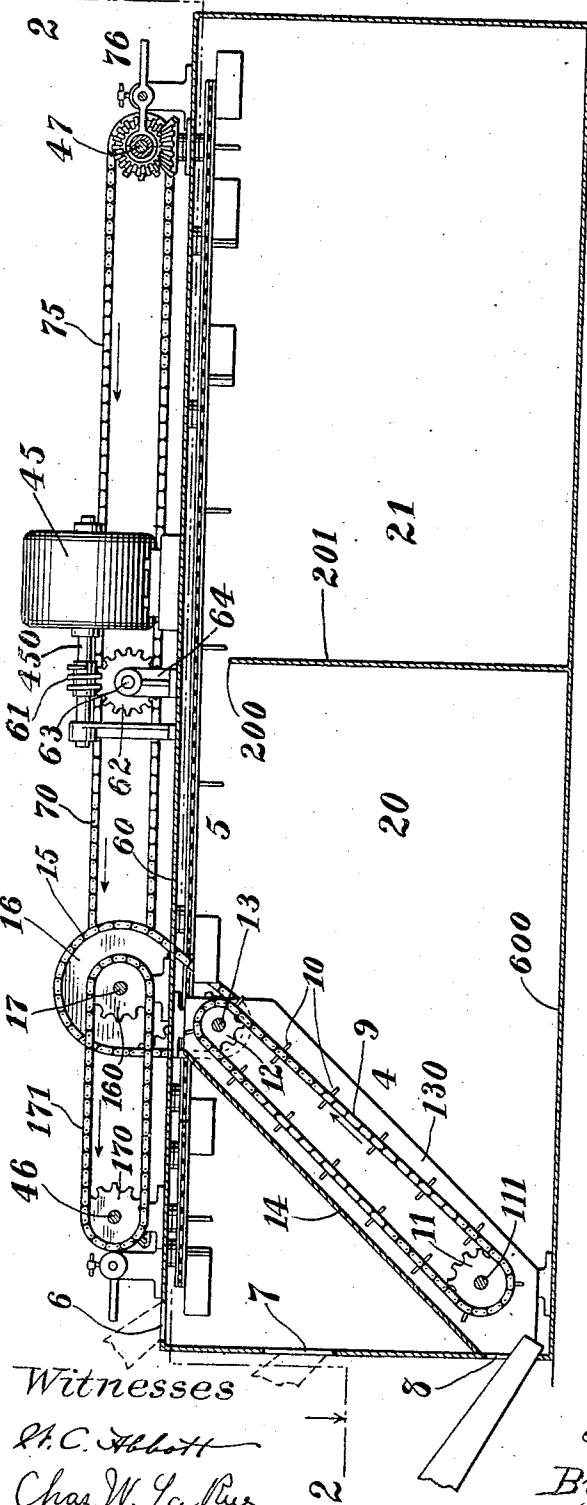


Fig. 2.

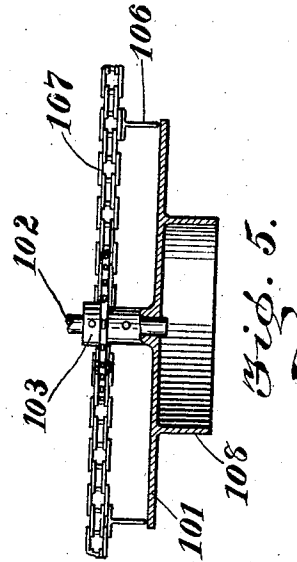


Fig. 5.

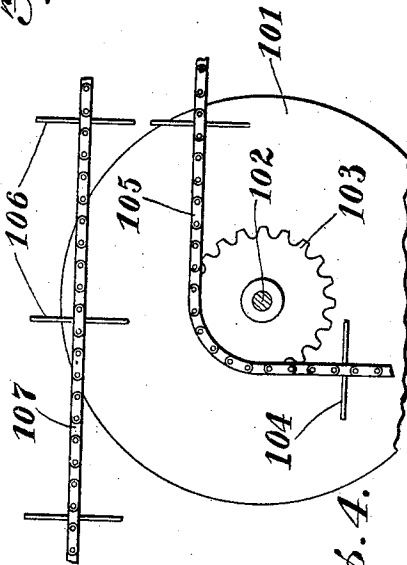


Fig. 4.

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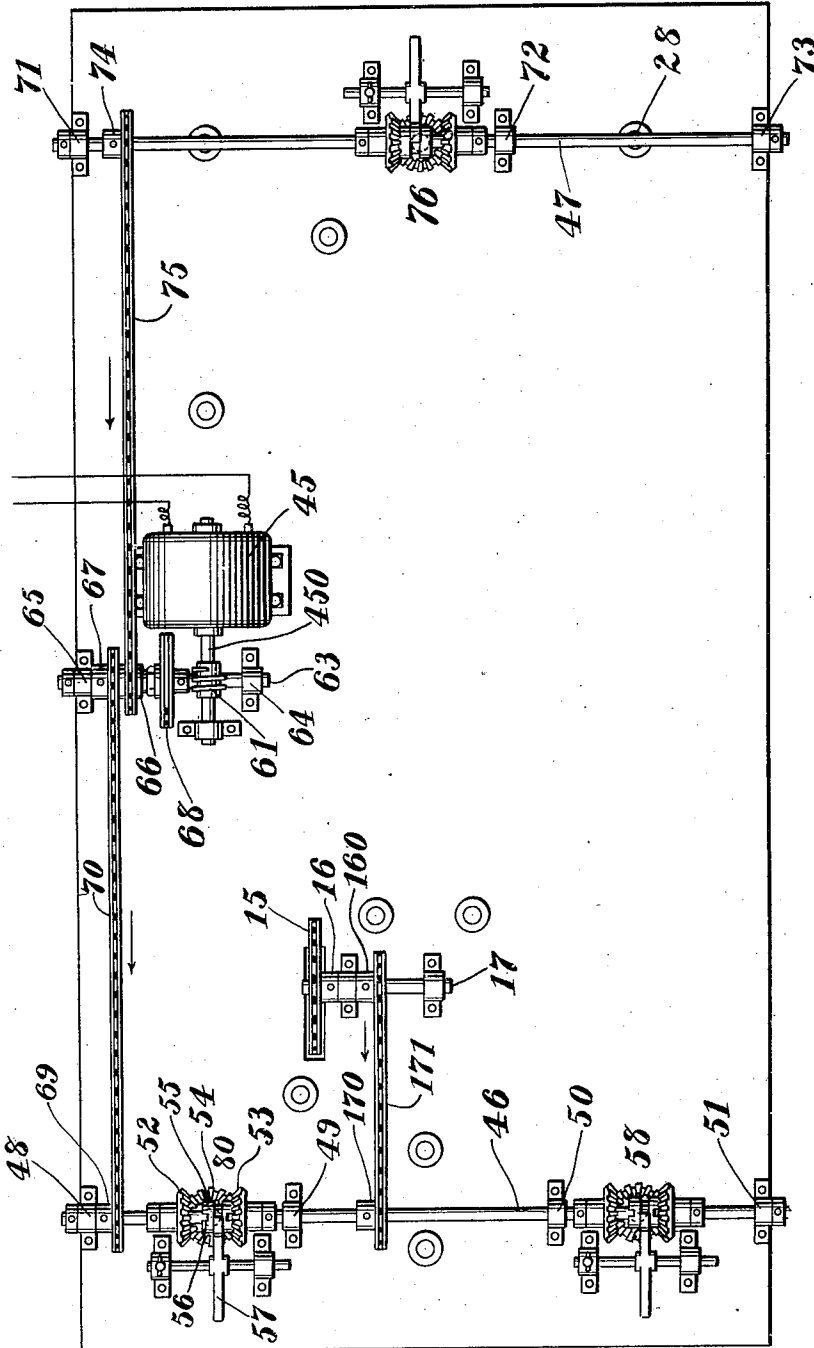


Fig. 3.

Witnesses

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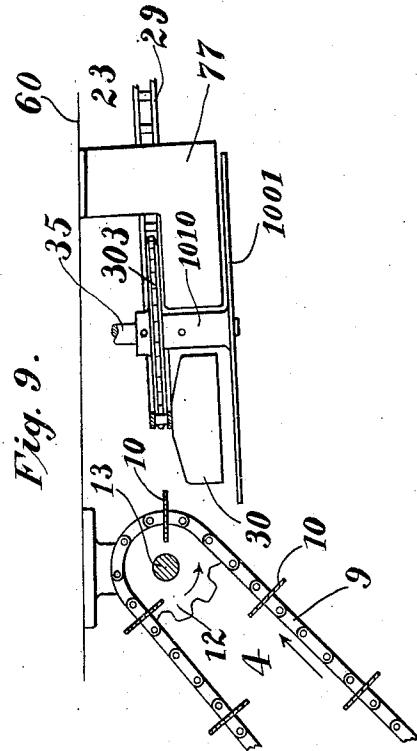
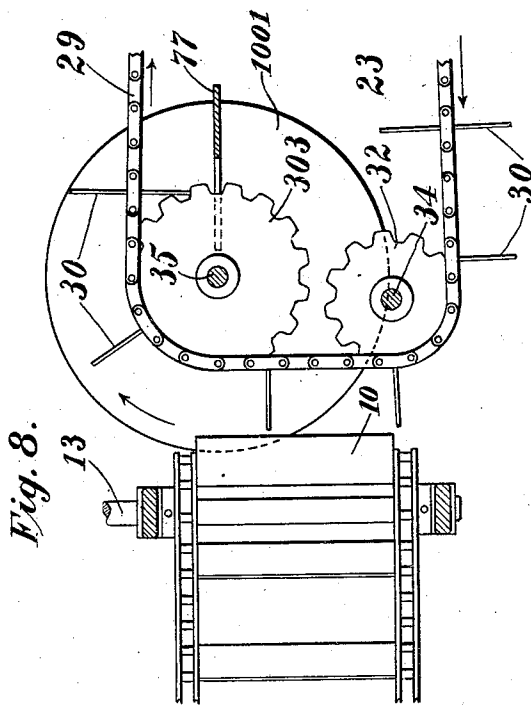
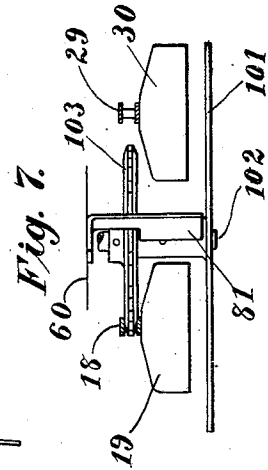
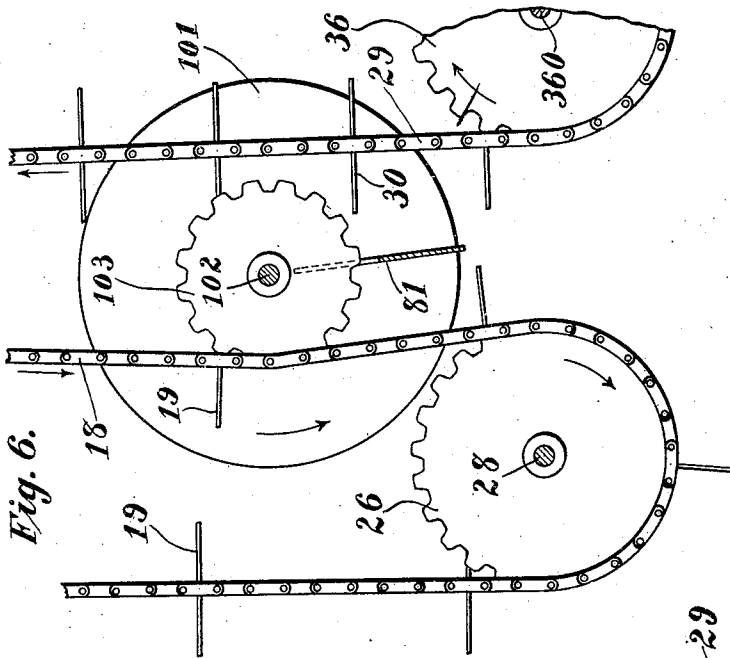
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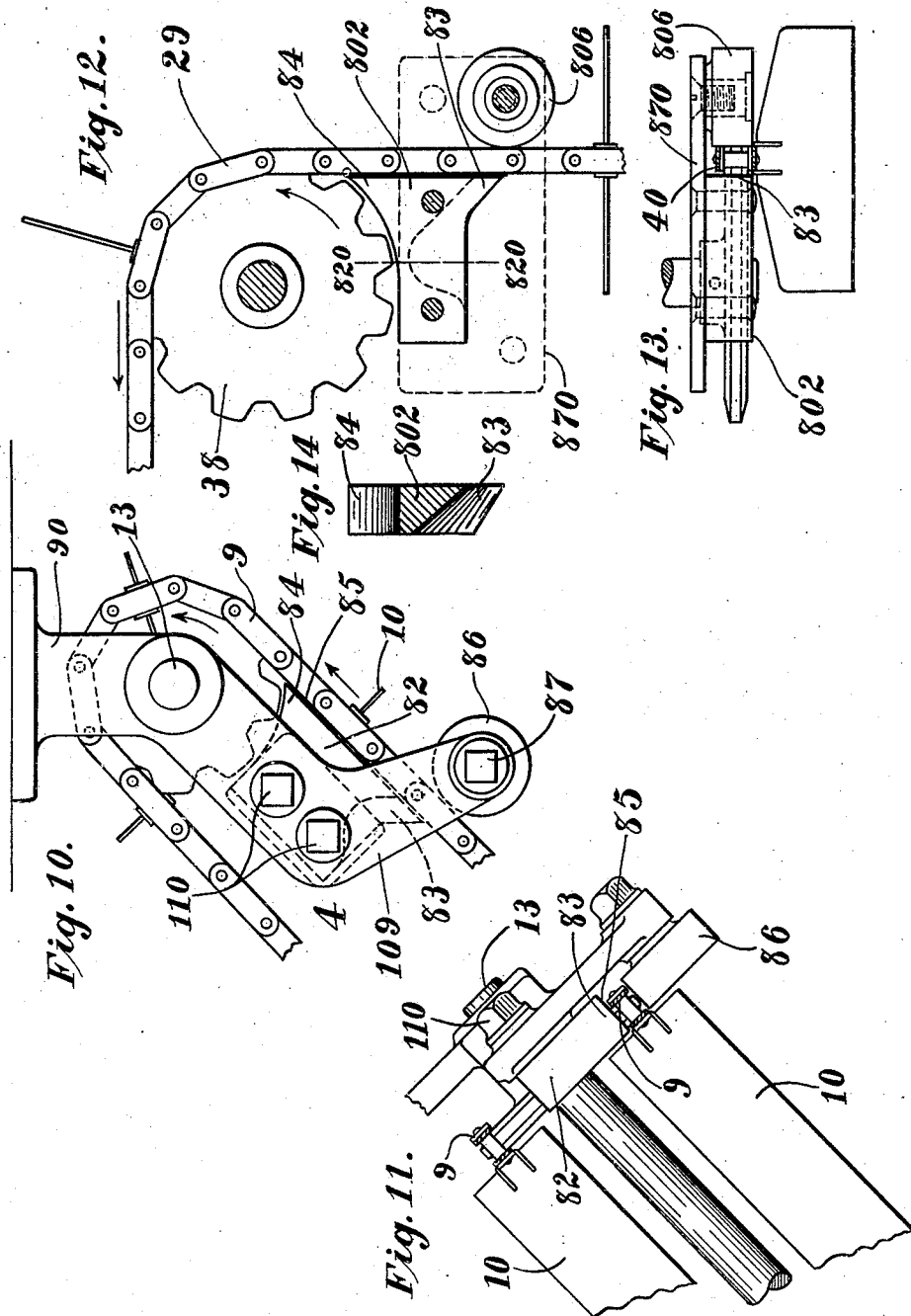
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5 SHEETS—SHEET 5.



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UNITED STATES PATENT OFFICE.

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TRIMMING MECHANISM.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOHN H. MICHENER, Jr., a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Trimming Mechanism, of which the following is a specification.

This invention relates to trimming mechanism and particularly to that class thereof which is permanently installed where it is to be used, as for instance in the coal bunkers of a steam-ship.

In the drawings accompanying this specification is illustrated one embodiment and which may be the preferred embodiment of my invention. Therein Figure 1 is a plan view of my improved mechanism with the deck thereabove removed on line 2, 2 of Fig. 2. Fig. 2 is a vertical sectional elevation on line 3, 3 of Fig. 1. Fig. 3 is a plan view of the driving portion of my improved trimming mechanism. Figs. 4 and 5 are a plan and sectional elevation respectively of means for transferring material from one distributing unit to another. Figs. 6 and 7 are a plan and elevation respectively of a modification of the mechanism of Figs. 4 and 5. Figs. 8 and 9 are a plan and elevation respectively of an application of the device of Figs. 4 and 5 to effect a transfer of the material from the elevator to one of the distributing units. Figs. 10 and 11 are an elevation and plan respectively of a device to prevent clogging between the chain and sprocket. Figs. 12 and 13 show the device of Figs. 10 and 11 applied to a horizontal distributing unit. Fig. 14 is a plan view of a part of the device of Figs. 10 to 13.

While my improved mechanism is applicable to the handling of a variety of materials within a wide range of environment, I have chosen to illustrate it as applied to the particular use of handling within the bunkers provided therefor, such coal as is commonly used for the stoking of steam-ship furnaces. I will therefore describe my improvements in their relation to this particular service.

General description.—In apparatus of the general type specified it is not only requisite that such apparatus shall perform its functions in an efficient and economical manner but relatively low cost of installation, simplicity of construction and operation, small

liability to derangement and breakage, low cost of repairs and accessibility for such repairs are highly desirable attributes. All of these features have been attained in large measure in my improved apparatus.

For many years inventors have been prolific in mechanism particularly intended for trimming bulk material in ships' holds and bunkers but it remains a fact that substantially all steam-ship coal bunkers are still trimmed by hand labor. My improvements are intended to supersede all hand labor within the bunker and to trim the bunkers where my apparatus is installed entirely automatically, and to do such trimming with higher efficiency and economy of stowage than is now accomplished by hand labor.

With these ends in view my improvements comprise two general elements; first, the elevating mechanism indicated in a general way at 4, Fig. 2, and second, the distributing mechanism indicated in a general way at 5, Fig. 2. When delivery of coal into the bunker is made overhead as at 6, Fig. 2, or near the top of the bunker as at 7, Fig. 2, the elevator element may be omitted, but when delivery is made at or near the bottom of the bunker as at 8, Fig. 2, the elevator element is required to raise the coal to a position to be engaged by the distributing mechanism.

In coaling vessels in port it is highly desirable, but it has been generally considered impracticable because of the great width of many ships, to coal entirely from the off side, thus allowing unobstructed access to the vessel on the dock side for loading and unloading cargo. By means of my improvements I am able to coal entirely from one side and I have therefore illustrated my improved mechanism as serving adjoining bunkers 20, 21, said bunkers supposedly occupying the entire width of the ship. The division partition 201 has the upper portion thereof cut away as at 200 Fig. 2, to allow my distributing units as 22, 23, 24 to pass from bunker to bunker. I have thereby illustrated my mechanism as trimming bunker space the entire width of the ship with coal delivered from one side only.

Elevating mechanism.—While any one of several devices are efficient to elevate the coal for engagement by my distributing mechanism, I prefer to use endless chains 9, 9 having flights 10 carried therebetween.

Said chains are supported below by sprockets as 11 mounted on shaft 111 supported from floor 600 of bunker 20; and above by sprockets 12 mounted on shaft 13 rotating in bearings depending from deck 60. Said elevator is inclined upwardly to the horizontal at any desired angle, about 45 degrees being used in the illustrated embodiment. Said elevator is preferably inclosed on the sides and top by suitable plates as 130, 140 and 14 respectively to prevent the accumulated coal from falling back into the upper run of chains 9 and thus interfering with the operation of the device. The lower run of elevator 4 is left exposed for engagement with the accumulating coal pile. Power may be communicated to sprocket 112 of shaft 13 of said elevator by any suitable means such as chain 15 driving from sprocket 16 on jack-shaft 17 suitably supported on the deck above bunker 20 in which the elevator is installed. Said jack-shaft has also fixed thereto sprocket 160 driven by chain 171 from sprocket 170 on shaft 46.

Distributing mechanism.—This mechanism is preferably divided into a plurality of units as 22, 23, 24 particularly if the bunker is large or irregular in shape or if two or more bunkers are served from one porthole. Referring now particularly to distributing unit 22, said unit comprises an endless chain 18 supported on sprockets 25, 26 on vertical shafts 27, 28 respectively. Said chain has fixed thereto and depending therefrom at suitable intervals blades or flights 19 for engagement with the coal as said coal is delivered within the path of travel thereof. In the illustrated arrangement unit 23 is located to have one run of chain 29 thereof pass closely adjacent to the upper portion of elevator 4 as at 31, Fig. 1, whereby blades 30 engage the coal immediately upon its being raised to the higher point of delivery by said elevator. At said locality 31 chain 29 is supported on sprockets 32, 33 turning freely on shafts 34, 35 respectively. At the farther end of bunker 21 chain 29 passes around sprocket 36, thence around sprocket 37 and then backward around sprocket 38. By this arrangement said chain 29 is caused to serve a corner of bunker 21 not reached by any other distributing unit. Unit 24 comprises endless chain 40 carrying blades 41 and is carried by several sprockets as 42, 43, 44. Sprockets 42, 43 are so located as to lead chain 40 over the receiving part of elevator 4 for conveying the coal to completely fill, in conjunction with unit 22, that side of bunker 20 contiguous to the receiving parts thereof. It will thus be seen that my distributing elements have great mobility of arrangement and that by proper positioning of supporting sprockets said distributing elements may be made to serve bunkers of various shapes and sizes.

Driving mechanism.—While my improved trimming mechanism may be driven by any one of several different means variously located, I have chosen to illustrate driving means located on the deck directly above the bunker containing the various units that directly engage the coal. This location allows of accessibility for various purposes including that of starting and stopping the elevating and distributing units, and of reversing the direction of travel of said distributing units if desired. Said driving mechanism comprises one or more horizontal shafts, in the present instance two are used, 46, 47, receiving power for rotation from some suitable source of power such as electric motor 45.

Connected to motor 45 is some suitable speed reducing mechanism such as worm 61 on motor shaft 450 engaging worm-gear 62 on shaft 63. Said shaft 63 is supported in brackets 64, 65 upstanding from deck 60. Fixed to said shaft 63 are sprockets 66, 67. Between sprocket 66 and worm-gear 62 I preferably interpose a friction drive 68 so that any overload or obstruction in operation will cause the friction to slip rather than break the mechanism. Said shaft 46 is mounted in suitable bearings 48, 49, 50, 51 upstanding from deck 60 and is located vertically above shafts 27, 440 carrying sprockets 25, 44 of distributing chains 18, 40 all respectively. Sprocket 69 fixed to shaft 46 receives power from sprocket 67 on shaft 63 through chain 70.

A reversing mechanism indicated in a general way at 80 is provided for reversing the direction of rotation of shaft 440. Turning freely on shaft 46 are two bevel gears 52, 53 meshing on opposite sides with bevel gear 54 fixed to the upper end of sprocket shaft 440. Between gears 52, 53 and slidably keyed to shaft 46 is clutch sleeve 55. Said sleeve is provided in each end thereof with a radial slot as 56 for engagement with a corresponding pin not shown in the gear adjacent thereto. A lever 57 is provided for sliding sleeve 55 into engagement with either gear 52 or 53. Thereby from shaft 46, always turning in one direction, motion in either direction may be transmitted to vertical shaft 440. A similar reversing mechanism indicated in a general way at 58 is provided for actuating in either direction vertical shaft 27, from shaft 46.

Mounted in bearings 71, 72, 73 upstanding from deck 60, and vertically above shaft 360 of sprocket 36 is shaft 47. Said shaft is parallel with shafts 46, 17 and 63. Sprocket 74 fixed on shaft 47 is driven from sprocket 66 on shaft 63 by chain 75. For reversing the direction of rotation of shaft 360 I have provided at 76 a reversing mechanism similar to reversing mechanism 80 already described.

Under some conditions of arrangement I find it advantageous to assist the delivery of material from one distributing unit to another by means illustrated in Figs. 4 and 5. Therein I provide a rotating table 101 concentric with and fixed to sprocket shaft 102. Said table is located sufficiently below sprocket 103 to allow blades 104 of chain 105 on said sprocket to pass freely over said table and said table is of sufficient diameter to extend well under blades 106 of adjacent chain 107 whereby coal conveyed onto table 101 is thrown in large measure into the path of travel of blades 106 of chain 107. I also, in some cases, provide a downwardly extending flange 108 on table 101 to prevent friction by the accumulation of coal under said table.

When it is desired to transfer coal from a given run as 29, of a distributing unit, to another run, as 18, of another unit parallel therewith I prefer to arrange rotating table 101 as shown in Figs. 6 and 7 wherein said table has its sprocket 103 driven by the chain of receiving run 18. In this instance I also provide a stop blade or scraper 81 supported rigidly from deck 60 above for engagement with table 101; also in this instance flange 108 of Figs. 4 and 5 has been omitted.

In Figs. 8 and 9 I have illustrated the application of a rotating table 1001 similar to table 101 to assist the delivery of coal from elevator 4 to distributing unit 23. In this instance I have chosen to locate chain 29 with its blades 30, 30 lower relative to the delivery head of elevator 4 than illustrated for instance in Fig. 2. This provides freer delivery of coal from the elevator to the rotating table. Said table 1001 is fixed to a downwardly extending portion of shaft 35 of sprocket 303 and which latter is larger than and used in place of sprocket 33 of Fig. 1. Said increase in size is required to allow blades 30 to pass around hub 1010 of table 1001 (Fig. 9). Table 1001 is provided with fixed scraper 77 depending from deck 60 for holding the coal in the path of travel of blades 30 and preventing the return of the coal in front of the elevator.

To prevent lumps of coal from becoming wedged between chains and sprockets, I have found it advantageous to provide a plow as 82, Figs. 10 and 11, at the point where the chain passes into engagement with the sprocket. For use at the upper end of elevator 4 said plow is mounted on a downwardly extending arm 109 of supporting bracket 90 of shaft 13 by suitable means such as bolts 110. Said plow has a flat face 85 lying in the plane of chain 9 and contiguous to said chain, and has a point 83 extending in the direction of approach of said chain. Said point 83 is beveled as

shown best in Fig. 14 so as to turn inwardly any coal that may be carried against it by said chain. The rearward portion 84 of said plow is formed to occupy substantially all the triangular space between the chain and sprocket so as to exclude all coal or dirt therefrom. For causing chain 9 to travel in close relation to face 85 of said plow a roll 86 is mounted for rotation on fixed axis 87 in arm 109 for engagement with said chain opposite to point 83. It will be understood that the other chain of elevator 4 is also provided with a plow and retaining roll similar, except that they are of the opposite hand, to plow 82 and roll 86 just described. The horizontal chains, as 29, are also equipped with safety devices similar to that just described, and are illustrated in Figs. 12, 13 and 14 wherein 802 is the plow and 806 the roll. The section of Fig. 14 is taken on line 820, 820 of Fig. 12. Said plow 802 and roll 806 are suitably mounted on plate 870 fixed to under side of deck 60 not shown.

Operation.—It will be understood that the arrangement of distributing units illustrated is only one of many that may be employed and that the present one is chosen arbitrarily to set forth the general operation of my improved mechanism. The mechanism now being started in motion in the direction of the several arrows, coal is delivered continuously through porthole 8 and is engaged by blades 10 of elevator 4 and scraped upwardly over the inclined face of the accumulating pile until said pile reaches a height within the path of travel of blades 30 of distributing unit 23. Said blades 30 thereupon continuously scrape off the top of the accumulating pile, moving the coal in the direction of travel of chain 29, first upwardly in the plan view of Fig. 1 and then as the pile is increased in area thereby, said blades move the coal to the right hand in said Fig. 1. In case the revolving table of Figs. 8 and 9 is used the coal is scraped upwardly by elevator blades 10 until it is delivered onto said table. The revolution of said table in the direction of its arrow thereupon carries the coal around against scraper 77 by which it is either spilled off in the path of blades 30 or held until removed from said table by said blades of chain 29 which thereupon carry said coal onwardly to the right (Figs. 1 and 8). As the coal is carried onwardly and the pile accumulates beyond said table the surplus coal is crowded off the ends of said blades 30 and will pile up sufficiently to be engaged by the contiguous blades 41 of unit 24 running in the same direction as blades 30 of unit 23. In case the revolving table of Figs. 6 and 7 is used between contiguous runs of chains 29 and 40 the operation will be in accordance with the following description pertaining to

contiguous runs of chains 29 and 18. Blades 30 of chain 29 will deliver onto table 101 and the coal will be carried around thereon until it reaches scraper 81 against which it will be heaped up and held until removed from said table by blades of chain 18 and carried onward in the usual way. Thus as soon as the coal banks up against partition 201 of bunker 20 it is carried over said partition and proceeds to discharge into bunker 21 thereby tending to equalize the weight cross-wise the vessel. By the combined effect of those runs of units 23 and 24 traveling toward the right hand in Fig. 1 the coal is now carried farther and farther toward the right side of the vessel and presently accumulates to such an extent that it banks up against the right side of bunker 21 and is then carried upwardly (Fig. 1) until it banks up against the upper side of said bunker. Said coal is then carried downwardly by the right hand end run of unit 23 and thence forwardly to the left hand by the return run of said unit. Said return run of unit 23 also spills into the path of blades 19 of unit 22 moving in the opposite direction and which blades 19 thereupon do their portion of the labor of spreading the coal in bunker 21 and eventually convey it back into the lower middle portion of bunker 20.

I claim:

1. In a trimming mechanism the combination of an endless chain, sprockets for supporting and actuating the chain in a horizontal plane, blades depending from said chain, means for preventing the entrance of coal between said chain and sprockets and means for revolving the sprockets.

2. The combination of a chain and sprocket, means for revolving the sprocket, a plow having a face parallel and contiguous to that run of said chain moving toward said sprocket and having a blade extending forwardly in the direction of and contiguous to the approaching chain, said plow having its rearward portion formed and positioned to occupy the triangular opening between said chain and sprocket at their point of first engagement.

3. The combination of an upwardly inclined and upwardly moving chain having blades thereon for engagement with a coal

pile thereunder, a disk revoluble in a horizontal plane adjacent to the upper end of said chain for receiving the coal scraped up the pile by the blades of said chain, a fixed blade for scraping material from the disk and means for revolving the disk.

4. The combination of a disk revoluble in a horizontal plane, a chain having fixed blades thereon arranged and actuated to pass over the face of said disk, and means for revolving the disk in a direction opposite to the direction of travel of the blades.

5. The combination of a disk revoluble in a horizontal plane, a circumferential flange depending therefrom for holding material from engagement with the lower face thereof, a chain having blades thereon arranged and actuated to pass over the upper face of said disk, and means for revolving the disk.

6. The combination of a disk revoluble in a horizontal plane, a fixed blade arranged for scraping material therefrom, a chain having blades thereon arranged and actuated to pass over the face of said disk adjacent to the fixed blade, and means for revolving the disk.

7. The combination of a sprocket wheel arranged on a vertical axis and having a disk mounted coaxially therebelow for revolution therewith, a chain in engagement with said sprocket, blades on said chain arranged to pass over the face of said disk, a second chain having blades thereon arranged to pass over the face of said disk, and means for actuating the chains.

8. The combination of a sprocket wheel arranged on a vertical axis and having a disk mounted therebelow for revolution therewith, a chain having blades thereon, in engagement therewith, and arranged to pass over the face of said disk, a second chain having blades thereon and arranged to pass over the face of said disk, a fixed blade located between said chains and arranged for scraping material from said disk and means for actuating the chains.

Signed this 29th day of August, 1908, before two subscribing witnesses.

JOHN H. MICHENER, Jr.

Witnesses:

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CHAS. W. LA RUE.