March 10, 1936. W. P. REUTER 2,033,549

AUTOMATIC COAL SAMPLER

Filed June 21, 1935 2 Sheets-Sheet 1

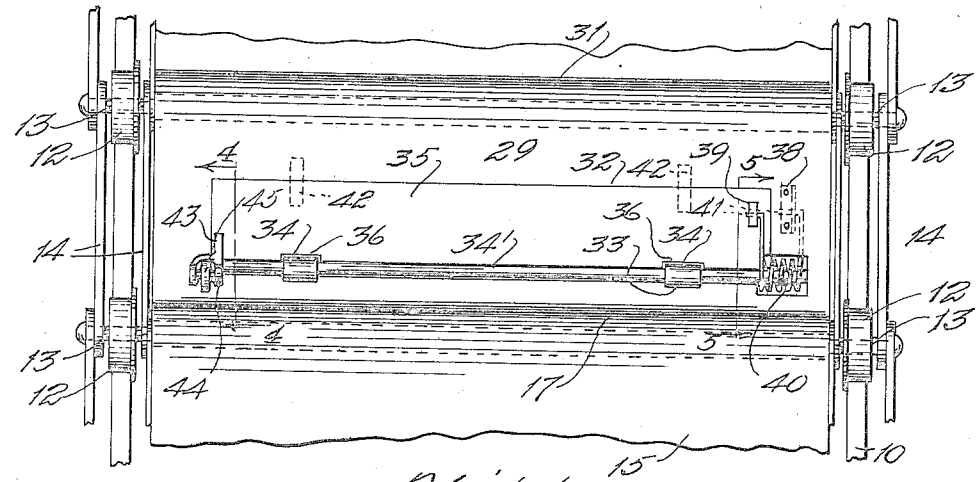


Fig. 1.

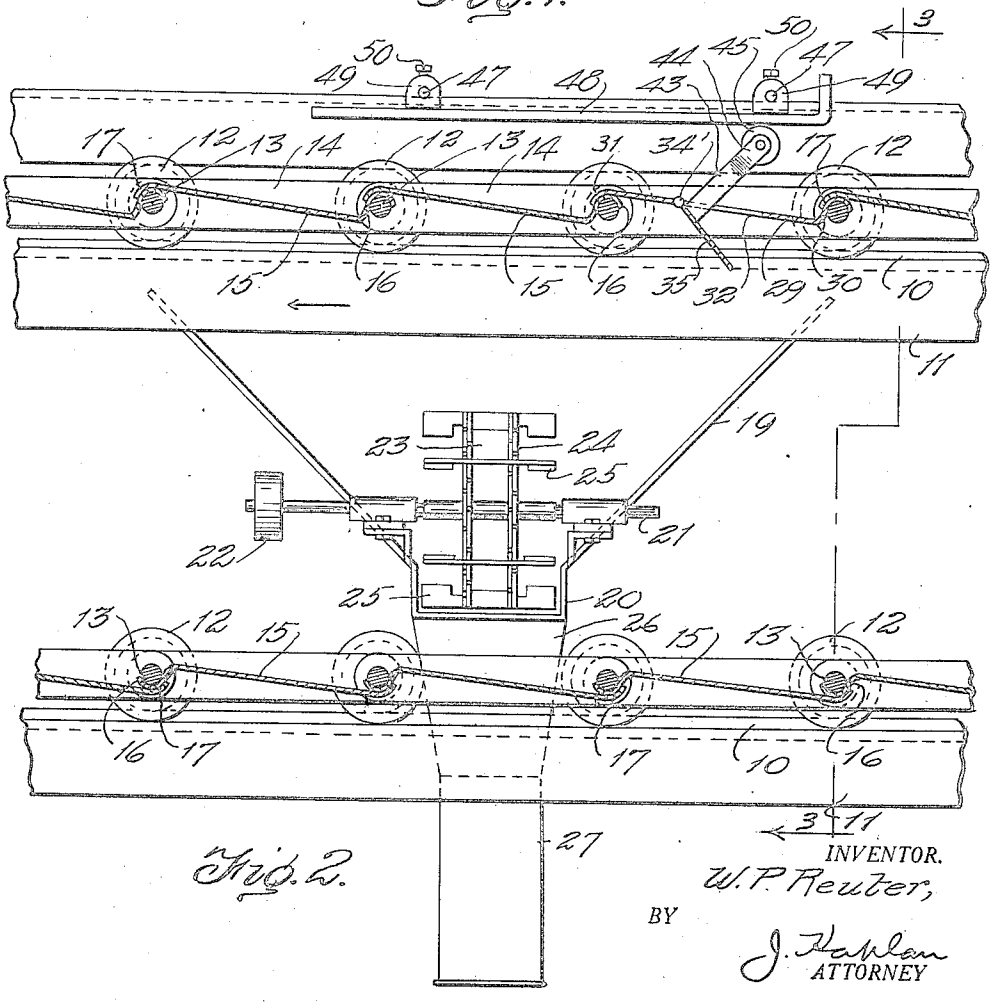


Fig. 2.

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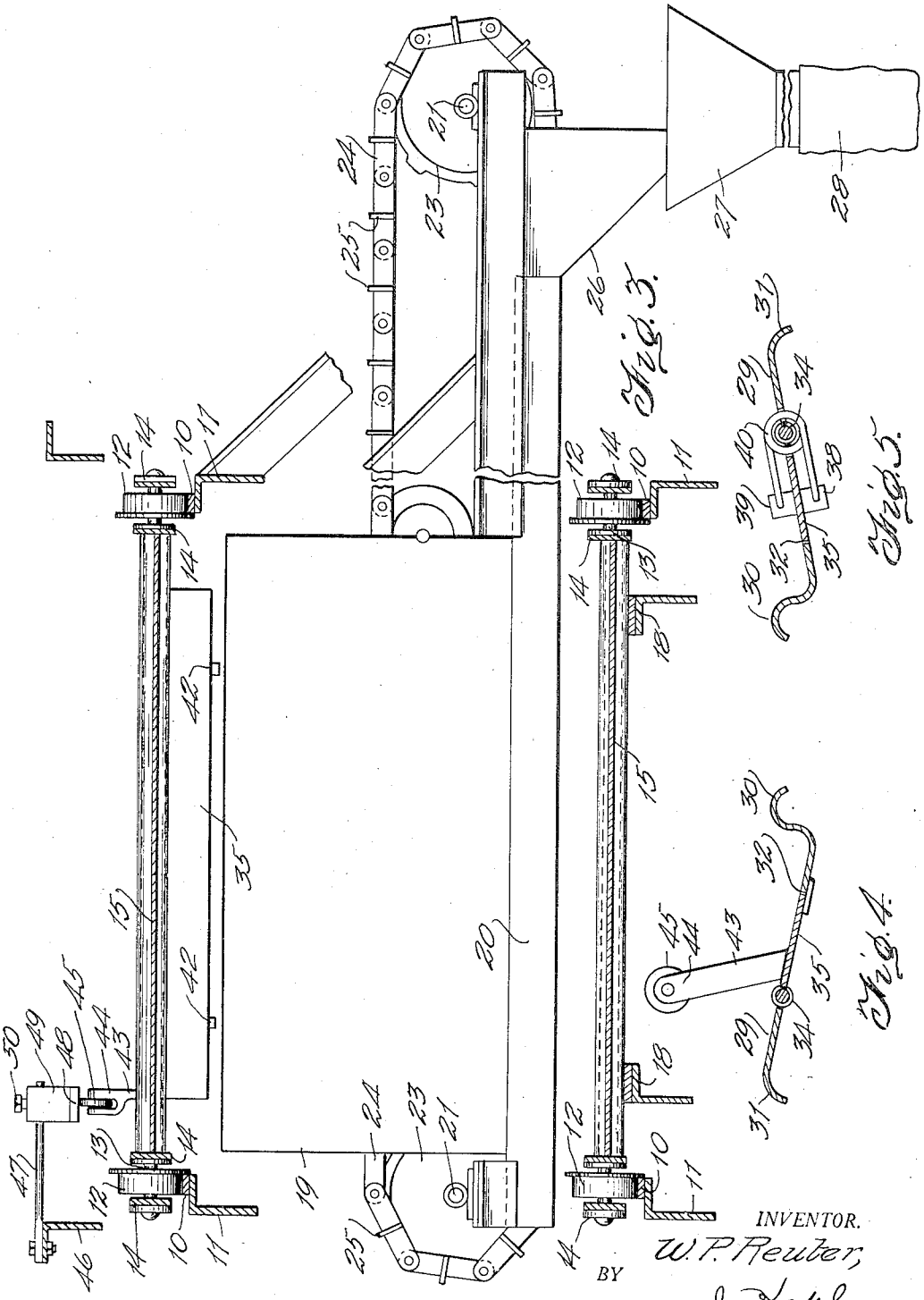


Fig. 3.

Fig. 4.

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2,033,549

AUTOMATIC COAL SAMPLER

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9 Claims. (Cl. 73—21)

This invention relates to coal handling machinery and has special reference to a coal sampling device for use in connection with conveyor mechanisms.

During recent years the competition between the coal mines and natural gas companies has forced the coal operators to establish coal preparation plants whereby they could prepare coal with a minimum of ash content for their commercial trade. To obtain the correct analysis on ash content of coal in each car loaded it has been necessary for the coal companies to establish laboratories for making this analysis. By following out this procedure the coal companies have a record of the ash content of coal in each car shipped.

Samples of the coal being loaded into the car must be taken at regular intervals while the car is being loaded. To take these samples it has been necessary, in the past, to obtain the samples with the human hand, and it was done by passing a shovel or vessel of some kind through the stream of coal being discharged from a loading boom or conveyor into the car. It was left to the party who was taking the sample when and how the sample was to be taken. It was almost impossible to obtain an accurate sample in this way, because part of the sample would roll off the shovel before it had traversed the full width of the coal stream.

There are also some large purchasers of coal who want to know just what kind of coal they are buying. These firms have also established laboratories for determining the correct analysis of the coal they are burning, and they also must have accurate samples taken.

With the foregoing in mind, one important object of the invention is to provide a novel automatic mechanism, operable at regular intervals, for taking coal samples from a moving stream of coal on a conveyor.

A second important object of the invention is to so arrange the aforesaid novel mechanism that it will take samples extending the full width of the stream.

A third important object of the invention is to provide a device of this character especially adapted for use in connection with sectional apron conveyors.

A fourth important object of the invention is to provide a device of this character part of which is so arranged that it may be substituted for any section of the apron of such a conveyor whereby the samples may be taken at such spacing along the conveyor as is found desirable.

A fifth important object of the invention is to provide a novel device of this character having a sampling gate and a gate opening cam wherein the cam may be readily removed for rendering the sampling gate inactive if it is desired that the conveyor operate without samples being taken.

With the above and other objects in view, the invention consists in general of certain novel details of construction and combinations of parts hereinafter fully described, illustrated in the accompanying drawings and specifically claimed.

In the accompanying drawings, like characters of reference indicate like parts in the several views, and:

Figure 1 is a plan view of a portion of an apron conveyor showing the present invention applied thereto, certain parts being omitted.

Figure 2 is a side elevation with the main conveyor in section.

Figure 3 is a side elevation partly in section on the line 3—3 of Figure 2.

Figure 4 is a detail section on the line 4—4 of Figure 1.

Figure 5 is a section on the line 5—5 of Figure 1.

The invention, as disclosed in the drawings is illustrated as applied to a standard form of apron conveyor wherein the apron is made up of a series of like sections. It is, however, to be understood that the invention is not necessarily linked in application to an apron conveyor of the construction shown but may be applied to any suitable form of conveyor. The description to follow is not, therefore, to be confined to the exact form shown but is limited only by the scope of the appended claims.

As shown there is illustrated rails 10 carried on angle-irons 11. On these rails run wheels 12 mounted on shafts 13 which connect the wheels in pairs. These shafts are connected at each wheel by links 14. Each apron section consists of a plate extending between the links at the opposite sides of the conveyor. Each of these plates has a flat portion 15 one edge of which is bent upwardly and then downwardly as at 16 to form a downwardly opening trough or channel to hook over a shaft 13 while its other edge is bent downwardly as at 17 to rest on the part 16 of the next apron section, this construction being well shown in Figure 2. This construction thus forms a pair of endless chains supporting a series of plates forming an apron on which the coal rests while being conveyed. Obviously, with this form of apron there is provided, for the lower run of the conveyor, guides or supports 18

for the apron sections to keep them from becoming disengaged from the shafts 13.

Positioned at a place in the length of the conveyor which is convenient for the operatives is a hopper 19 having a trough 20 in its bottom, which trough extends transversely of the conveyor and projects beyond one end of the hopper 19. This hopper 19 is located between the upper and lower runs of the conveyor carrying the mass of coal and which, for distinction, may be termed the main conveyor. At each end of the trough 20 there is supported a pair of bearings supporting shafts 21. One of these shafts is fitted with suitable driving means here indicated by the belt pulley 22. On the shafts 21 are fixed sprockets 23 which are central of the width of the trough 19 and carry a chain 24 equipped with scraper flights 25 for moving material in the trough. The extremity of the projecting portion of this trough has an inclined floor 26 forming, with the sides, a delivery spout for delivering samples to a funnel 27 so that they may be received in a bag 28 or other suitable receptacle.

The sample taking means, with this form of main conveyor consists of an apron section 29 having, like all other sections, a trough edge 30 and a curved edge 31. This section replaces any desired section of the conveyor and is provided with a slot 32 at the forward edge of which are formed notches 33 in which are welded alined bearings 34. A gate 35 is provided to close the slot and at one edge of the gate are notches 36 to receive the bearings 34. A hinge rod 34' passes through the bearings 34 and is welded to the notched edge of the gate 35. Removably bolted to the plate 29 is a bracket 38 and fixed on the upper side of the adjacent end portion of the gate 35 is a bracket 39. A coiled torsion spring 40 surrounds a projecting end of the rod 34' and has bent ends 41 engaging respectively in the brackets 38 and 39. The spring is so coiled as to hold the gate normally closed against the action of the weight of the coal when coal is under conveyance. In order to prevent the gate from moving too far under the influence of the spring, the free edge of the gate is provided with stop lugs 42 which engage the under side of the plate 29 when the gate is closed.

An arm 43 is fixed to the gate at its other end and close to the hinge rod 34'. This arm projects upwardly from the gate and is provided at its upper end with a fork 44 wherein is journalled a roller 45.

Fixed to a frame member 46 of the conveyor structure is a pair of spaced rods 47. A cam-bar or trip-bar 48 has fixed thereon a pair of sleeves 49 spaced to receive the rods 47 and these sleeves are provided with set-screws 50 for engaging the rods and thus holding the sleeves in place. It is to be noticed that the gate preferably extends entirely across that part of the apron which supports the coal and that the trip-bar is located over the hopper.

In operation the conveyor moves in the direction shown by the arrow in Figure 2 and as it thus moves the roller 45 engages the trip bar 48 and causes the gate 35 to open against the action of its spring 40. This delivers a definite amount of coal to the hopper 19 as a sample. The sample conveyor carries the samples along the trough 20 and delivers them to the spout from whence they flow through the funnel 27 into the bag 28.

Obviously, the gate and the opening closed thereby may be made of any desired width to deliver a certain proportion of the coal supported on the apron section wherein such gate is located and, since all apron sections are alike, the gate may be proportioned to deliver a desired percentage of the coal passing over the conveyor. Also, two or more gates may be arranged along the conveyor to effect a more frequent sampling of the coal under conveyance.

It is obvious that changes may be made in the form and construction of the invention without departing from the material principles involved. It is not, therefore, desired to confine the invention to the exact form herein shown and described but it is desired to include all forms which come within the scope of the appended claims.

There has thus been provided a simple and efficient device of the kind described and for the purpose specified.

What is claimed, is:—

1. The combination with a traveling conveyor having a gate opening therein extending transversely of the conveyor, a gate normally closing said opening and forming a section of the conveyor, a spring normally holding the gate closed, a trip arm carried by the gate, and stationary means adjacent the path of the trip arm engagable by the trip arm to open the gate.

2. The combination with a traveling conveyor having a gate opening therein extending transversely of the conveyor, a gate normally closing said opening and forming a section of the conveyor, a spring normally holding the gate closed, a trip arm carried by the gate, and a stationary trip bar extending along the conveyor in the path of said trip arm and engageable with said trip arm.

3. The combination with a traveling conveyor having a gate opening therein extending transversely of the conveyor, a gate normally closing said opening and forming a section of the conveyor, a spring normally holding the gate closed, a trip arm carried by the gate, a pair of spaced rods fixed adjacent said conveyor, a normally fixed trip bar provided with a pair of sleeves slidable on said rods into and out of the path of the trip arm, and set screws carried by said sleeves and engaging said rods to hold the trip bar in adjusted position.

4. The combination with a traveling conveyor having a gate opening therein extending transversely of the conveyor, a gate normally closing said opening and forming a section of the conveyor, a spring normally holding the gate closed, a trip arm carried by the gate, stationary means adjacent the path of the trip arm engageable by the trip arm to open the gate, and a second traveling conveyor extending transversely of the path of the first conveyor and receiving material from the gate opening.

5. The combination with a traveling conveyor having a gate opening therein extending transversely of the conveyor, a gate normally closing said opening and forming a section of the conveyor, a spring normally holding the gate closed, a trip arm carried by the gate, a fixed trip bar extending along the conveyor in the path of said trip arm, and a second traveling conveyor extending transversely of the path of the first conveyor and receiving material from the gate opening.

6. The combination with a traveling conveyor having a gate opening therein extending transversely of the conveyor, a gate normally closing said opening and forming a section of the conveyor, a spring normally holding the gate closed, a trip arm carried by the gate, a pair of spaced

rods fixed adjacent said conveyor, a normally fixed trip bar provided with a pair of sleeves slidable on said rods into and out of the path of the trip arm, set screws carried by said sleeves and engaging said rods to hold the trip-bar in adjusted position, and a second traveling conveyor extending transversely of the path of the first conveyor and receiving material from the gate opening.

7. The combination with a traveling conveyor having a gate opening therein extending transversely of the conveyor, a gate normally closing said opening and forming a section of the conveyor, a spring normally holding the gate closed, a trip arm carried by the gate, stationary means adjacent the path of the trip arm engageable by the trip arm to open the gate, a hopper below the point at which the gate opens, a trough extending transversely of the first conveyor and having a portion forming the bottom of said hopper, said trough projecting beyond the hopper and terminating in a spout, a second traveling conveyor in said trough, and a funnel beneath said spout.

8. The combination with a traveling conveyor having a gate opening therein extending transversely of the conveyor, a gate normally closing said opening and forming a section of the conveyor, a spring normally holding the gate closed, a trip arm carried by the gate, a fixed trip bar extending along the conveyor in the path of said trip arm, a hopper below the point at which the gate opens, a trough extending transversely of the first conveyor and having a portion forming the bottom of said hopper, said trough projecting beyond the hopper and terminating in a spout, a second traveling conveyor in said trough, and a funnel beneath said spout.

9. The combination with a traveling conveyor having a gate opening therein extending transversely of the conveyor, a gate normally closing said opening and forming a section of the conveyor, a spring normally holding the gate closed, a trip arm carried by the gate, a pair of spaced rods fixed adjacent said conveyor, a normally fixed trip bar provided with a pair of sleeves slidable on said rods into and out of the path of the trip arm, set screws carried by said sleeves and engaging said rods to hold the trip-bar in adjusted position, a hopper below the point at which the gate opens, a trough extending transversely of the first conveyor and having a portion forming the bottom of said hopper, said trough projecting beyond the hopper and terminating in a spout, and a second traveling conveyor in said trough, and a funnel beneath said spout.

WILLIAM P. REUTER.