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C. I. LEVEKE

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APPARATUS FOR REMOVING SHALE, COAL, AND LIKE FROM GRAVEL

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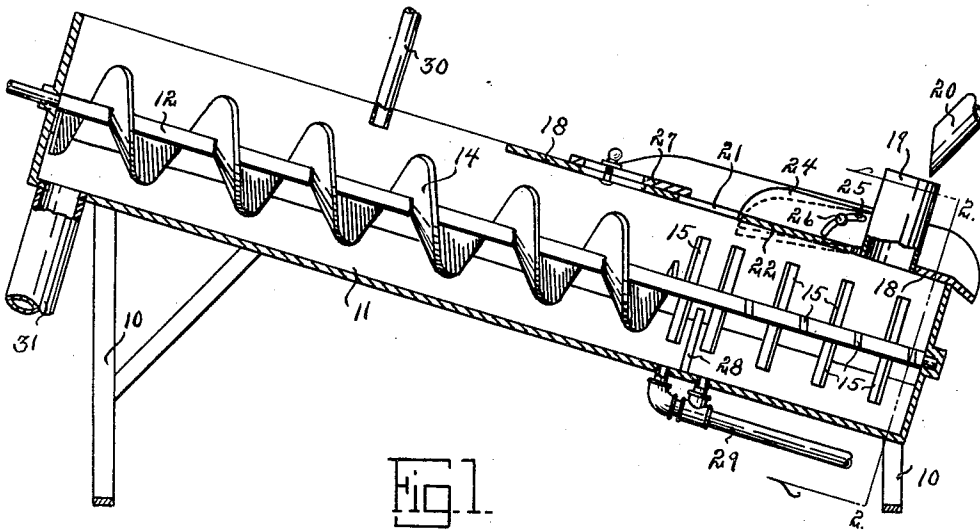


Fig. 1.

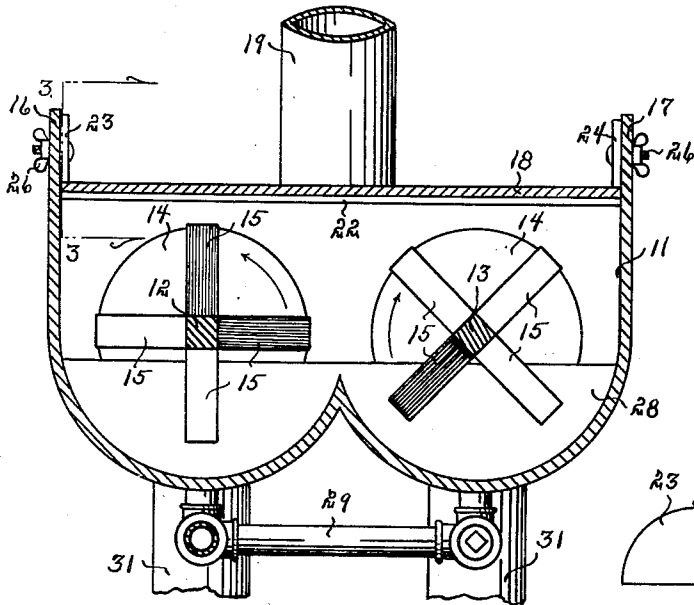


Fig. 2.

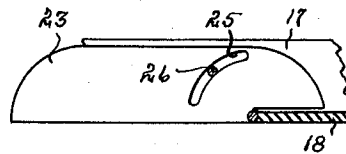


Fig. 3.

INVENTOR.

C. I. LEVEKE

BY

M. Talbert Dick

ATTORNEY

UNITED STATES PATENT OFFICE

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APPARATUS FOR REMOVING SHALE, COAL,
AND LIKE FROM GRAVEL

Chester I. Leveke, Des Moines, Iowa

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5 Claims. (Cl. 209—464)

The principal object of my invention is to provide an apparatus that will deliver washed gravel substantially free from coal, shale and other undesirable matter.

5 A further object of this invention is to provide a device for removing shale, coal and like from gravel that is simple in construction and easily operated.

10 A still further object of my invention is to provide a machine for washing and removing shale, coal and like from gravel that is economical in manufacture, and durable in use.

These and other objects will be apparent to those skilled in the art.

15 My invention consists in the construction, arrangement and combination of the various parts of the device, whereby the objects contemplated are attained as hereinafter more fully set forth, pointed out in my claims and illustrated in the accompanying drawing, in which:

20 Fig. 1 is a side sectional view of my apparatus ready for use.

25 Fig. 2 is an enlarged cross sectional view of my apparatus taken on line 2—2 of Fig. 1 and more fully illustrates its construction.

Fig. 3 is a side view of a portion of my apparatus taken on line 3—3 of Fig. 2.

30 Gravel is used for a variety of purposes and in many instances it is highly desirable and necessary that the gravel be free from soft material such as shale, coal and like. To remove such undesirable substances, I have provided a device that not only successfully removes such undesirable pieces of shale, coal and like, but delivers the gravel in a clean washed condition.

35 Referring to the drawings, I have used the numeral 10 to designate the supporting framework of my apparatus. This frame work 10 holds and supports the trough portion of my apparatus which I have designated by the numeral 11. This trough 11 extends forwardly and upwardly as shown in Fig. 1 and has its forward end and rear end closed. The numerals 12 and 13 designate two parallel shafts rotatably mounted longitudinally within the trough 11 as shown in Fig. 2. These two shafts 12 and 13 extend through the forward end of the trough 11 and are designed to have their forward ends operatively secured to any suitable prime mover for causing the shaft 12 to rotate to the left and the shaft 13 to rotate to the right at times. The numeral 14 designates an auger on the forward end portion of each of the shafts 12 and 13 as shown in Fig. 1. The numeral 15 designates a plurality of propeller teeth bars on each of the

shafts 12 and 13. These projecting lug bars 15 are spaced apart on the rear portions of the shafts 12 and 13 and are located just back of the augers 14. The forward ends of the augers 14 terminate adjacent the forward end of the trough 11 and the rearmost bars 15 are located near the inside rear end of the trough 11. As the shaft 12 rotates to the left and the shaft 13 to the right, the bars 15 on the shaft 12 are pitched diametrically opposite from the pitch of the bars 15 on the shaft 13 in order that material will be forced forwardly and upwardly by these bars when the shafts are rotated. Obviously, these bars 15 extend radially from their shafts and are not only so pitched as to force the material in the trough forwardly and upwardly, but to strike and break up soft material such as coal and shale when the shafts are rotated. With the shaft 12 rotating to the left and the shaft 13 to the right, material will be forced not only forwardly and upwardly, but toward the center of the trough and directly upwardly in the trough. The bottom of the trough may have its bottom formed in two curved lines as shown in Fig. 2, in order to conform to and loosely surround the lower portions of the augers and breaking bars as shown in Fig. 2. The numerals 16 and 17 designate two side wall portions on the rear upper portion of the trough 11 which extend substantially above the upper plane of the trough 11 as shown in Fig. 2. The numeral 18 designates a cover over the rear upper end portion of the trough 11. This cover portion 18 extends between the side board members 16 and 17 and past the plane of the rear end portion of the trough 11. The rear portions and portion 18 provide a downwardly and rearwardly inclined runway for the undesirable coal, shale and like. The numeral 19 designates a conduit extending through the upper central rear portion of the member 18 and communicates with the inside rear end portion of the trough 11. The numeral 20 designates a material supply pipe designed to lead to a source of gravel and like supply and capable of feeding the gravel or like into the receiving conduit 19. The numeral 21 designates an opening in the member 11 forward of the conduit 19. If desired, this opening 21 may be created by having the member 18 in two pieces, i. e., forward section and rear section. The numeral 22 designates a scoop element having its rear end hingedly secured to the rear marginal edge of the opening 21. This scoop element has two side portions 23 and 24 slidably adjacent the inner sides of the portions 16 and 17. The numeral

25 designates a curved slot opening in each of the side walls 23 and 24. The numeral 26 designates a wing bolt extending through each of the slots 25 and adjacent portion 16 or 17 as the case may be. By this arrangement of parts, the scoop element 22 may be adjusted forwardly or downwardly by the wing bolts 26 as shown by dotted lines in Fig. 1. If desired, the wing bolts 26 may be left in a loosened condition, and scoop element 22 permitted to freely move upwardly or downwardly on its hinged point. To fasten the member 22 against movement, it is merely necessary to tighten the wing bolts 26. The forward end of the scoop element 22 terminates a substantial distance from the forward marginal edge portion of the opening 21. The numeral 27 designates a closing plate slidably adjustably mounted on the top of the forward end portion of the member 18. By adjustably moving this plate 27 forwardly or rearwardly, the desired opening forward of the scoop element 22 may be had. The numeral 28 designates a partition in the lower rear end portion of the trough 11. This partition is located below the opening 21 forward of the scoop element 22 and with a few of the bar members 15 rotating forward of it as shown in Fig. 1. The numeral 29 designates a water supply pipe designed to be in communication with a suitable source of water supply and communicating with the inside portion of the trough 11 at points forward of the partition 28 and at points in the rear of the partition 28. These points of communicating are directly below the shafts 12 and 13 respectively. The numeral 30 designates a second water supply pipe communicating with the inside top portion of the trough 11 forward of the member 18. The numeral 31 designates two washed gravel outlet pipes communicating with the inside bottom of the trough 11. These two pipes 31 exit from the trough 11 at points directly below the shafts 12 and 13 respectively, and at locations near the forward end of the trough 11.

The practical operation of my device is as follows: With the shafts 12 and 13 rotating as heretofore described, and with water flowing into the trough 11 through the pipes 29 and 30, the gravel to be cleaned is injected into the receiving conduit 19. This gravel with its undesirable soft material such as coal and shale, will be attacked and agitated by the beating and breaking propeller bars 15. As gravel is very hard, this action of the bars 15 will not effect it except as to move it forwardly and upwardly in the trough to the auger conveyers 14. Soft material, however, such as coal, shale and like will be broken up by the action of the bars 15 and as other material such as sand or like, broken loose from the gravel. As this mass is operating under water, the agitation caused by the bars 15 will force the softer and lighter material such as coal, shale, dirt, sand and like forwardly and upwardly with the water exiting through the opening 21. This undesirable material will, therefore, be encouraged to pass upwardly and outwardly with the flow of water by the action and agitation of the bars and by the direction of flow of the water through the pipe 29. The water and undesirable matter will pass through the opening 27 onto the scoop element 22 and thence downwardly and rearwardly by gravity over the rear portion of the member 18 and to the rear outside of the trough 11. The washed gravel free from undesirable soft rock, coal and like, will be moved forwardly and upwardly by the auger

conveyers 11 to the outer conduit pipe 21. As this material moves forwardly, it will be additionally washed by water from the pipe 30, as this water from the pipe 30 will run backwardly and downwardly in the trough 11, it will also aid in carrying undesirable dirt, sand, shale and like that might still be present in the gravel, backwardly in the trough 11 and out through the opening 21. If the element 22 is not held in rigid position by the tightening of the wing bolts 26, the element 21 will ride on the material as it moves forwardly in the trough 11, thereby being in a position at all times to receive the rearward flow of the water carrying the dirt, sand, shale, coal and like. The partition 28 will aid in guiding the water from the pipe 29 upwardly and out of the opening 21, thereby carrying with it the undesirable foreign matter. It will also be noted that all of the shale, coal, gravel and foreign matter with the water will have to pass upwardly over the partition 28 which will not only cause the proper agitation of the mass, but will aid in bringing the foreign matter, coal, shale and like upwardly where it will flow with the water out through the opening 21.

From the foregoing, it will be obvious that by the use of my apparatus, washed clean gravel substantially free of soft rock, coal and like, will exit from the outer gravel pipes 31.

Some changes may be made in the construction and arrangement of my improved apparatus for removing shale, coal and like from gravel without departing from the real spirit and purpose of my invention, and it is my intention to cover by my claims any modified forms of structure or use of mechanical equivalents which may be reasonably included within their scope.

I claim:

1. In a device of the class described, an elongated trough member extending forwardly and upwardly, a shaft rotatably mounted in said trough member and extending longitudinally of the same, an outlet passageway in the forward end portion of said trough member, radially extending spaced apart breaker arms on the rear portion of said shaft, an auger secured to the forward portion of said shaft, a water supply pipe communicating with the inside bottom of said trough below said breaker arms, and a second water supply pipe terminating at the inside upper forward end portion of said trough member.

2. In a device of the class described, an elongated trough member extending forwardly and upwardly, a shaft rotatably mounted in said trough member and extending longitudinally of the same, an outlet passageway in the forward end portion of said trough member, radially extending spaced apart breaker arms on the rear portion of said shaft, an auger secured to the forward portion of said shaft, a water supply pipe communicating with the inside bottom of said trough below said breaker arms, and a spillway element on the upper rear top of said trough member.

3. In a device of the class described, an elongated trough member extending forwardly and upwardly, a shaft rotatably mounted in said trough member and extending longitudinally of the same, an outlet passageway in the forward end portion of said trough member, radially extending spaced apart breaker arms on the rear portion of said shaft, an auger secured to the forward portion of said shaft, a water supply pipe communicating with the inside bottom of said trough below said breaker arms, and a scoop member hingedly secured on the upper rear of

said trough member capable of adjustment relative to the longitudinal axis of said trough member.

5 4. In a device of the class described, an elongated trough member extending forwardly and upwardly, a shaft rotatably mounted in said trough member and extending longitudinally of the same, an outlet passageway in the forward end portion of said trough member, radially extending spaced apart breaker arms on the rear portion of said shaft, an auger secured to the forward portion of said shaft, a water supply pipe communicating with the inside bottom of said trough below said breaker arms, and a cover element having an opening on the rear upper 15 portion of said trough member.

5. In a device of the class described, an elongated trough member extending forwardly and upwardly, a shaft rotatably mounted in said trough member and extending longitudinally of the same, breaker arms on the rear portion of said shaft, an auger on the forward portion of said shaft, a partition wall in the bottom portion of said trough member and extending transversely of the length of said trough member, and a water supply pipe communicating with the inside bottom of said trough member at two points; said two points being located at each side of said partition wall respectively. 10

CHESTER I. LEVEKE. 15