June 8, 1943. J. M. RANGE 2,321,243

SHALE SHAKER

Filed Feb. 19, 1940 3 Sheets-Sheet 1

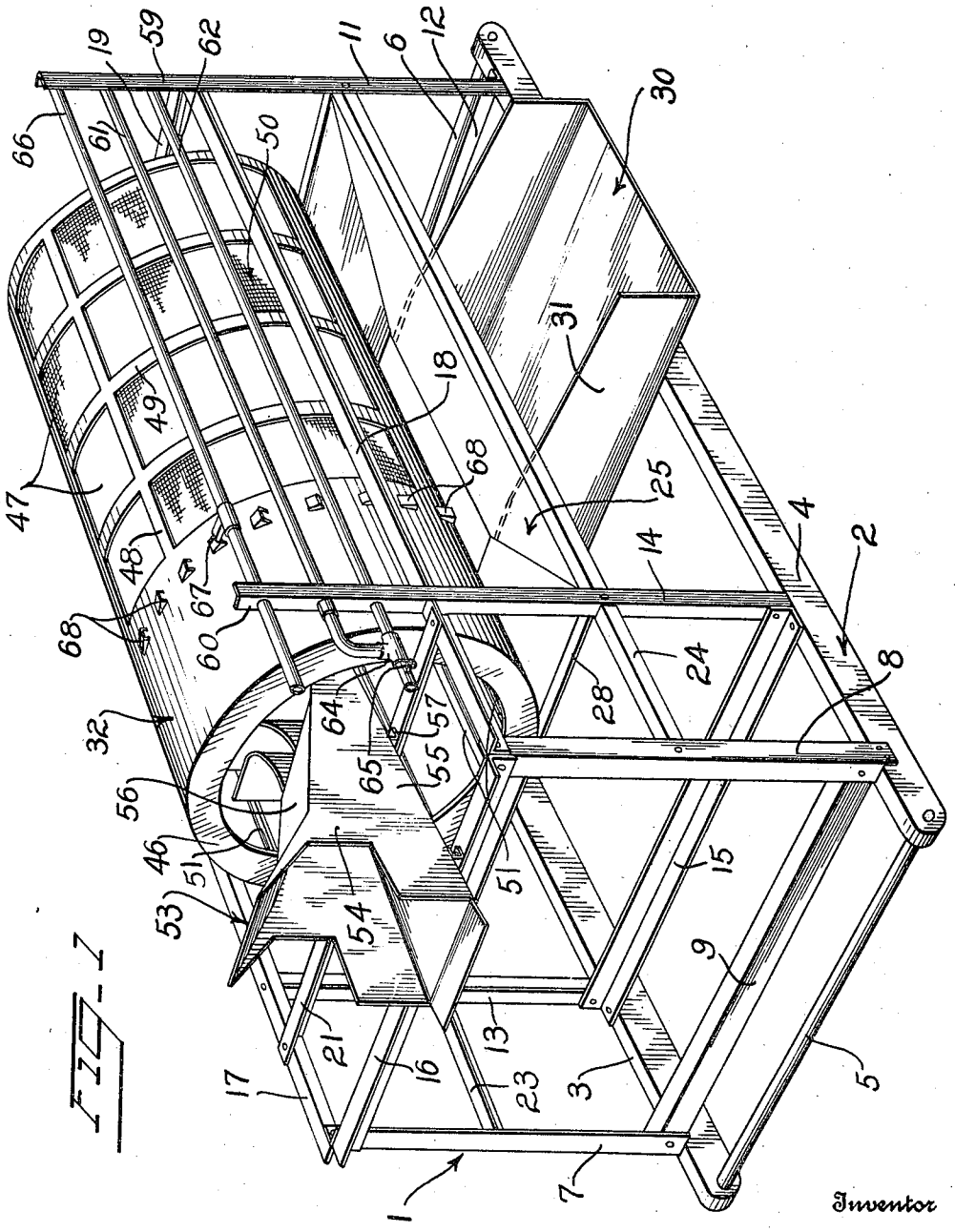


FIG. 1

Inventor

J. M. Range.

By Lacey & Lacey, Attorneys

June 8, 1943. J. M. RANGE 2,321,243

SHALE SHAKER

Filed Feb. 19, 1940 3 Sheets-Sheet 2

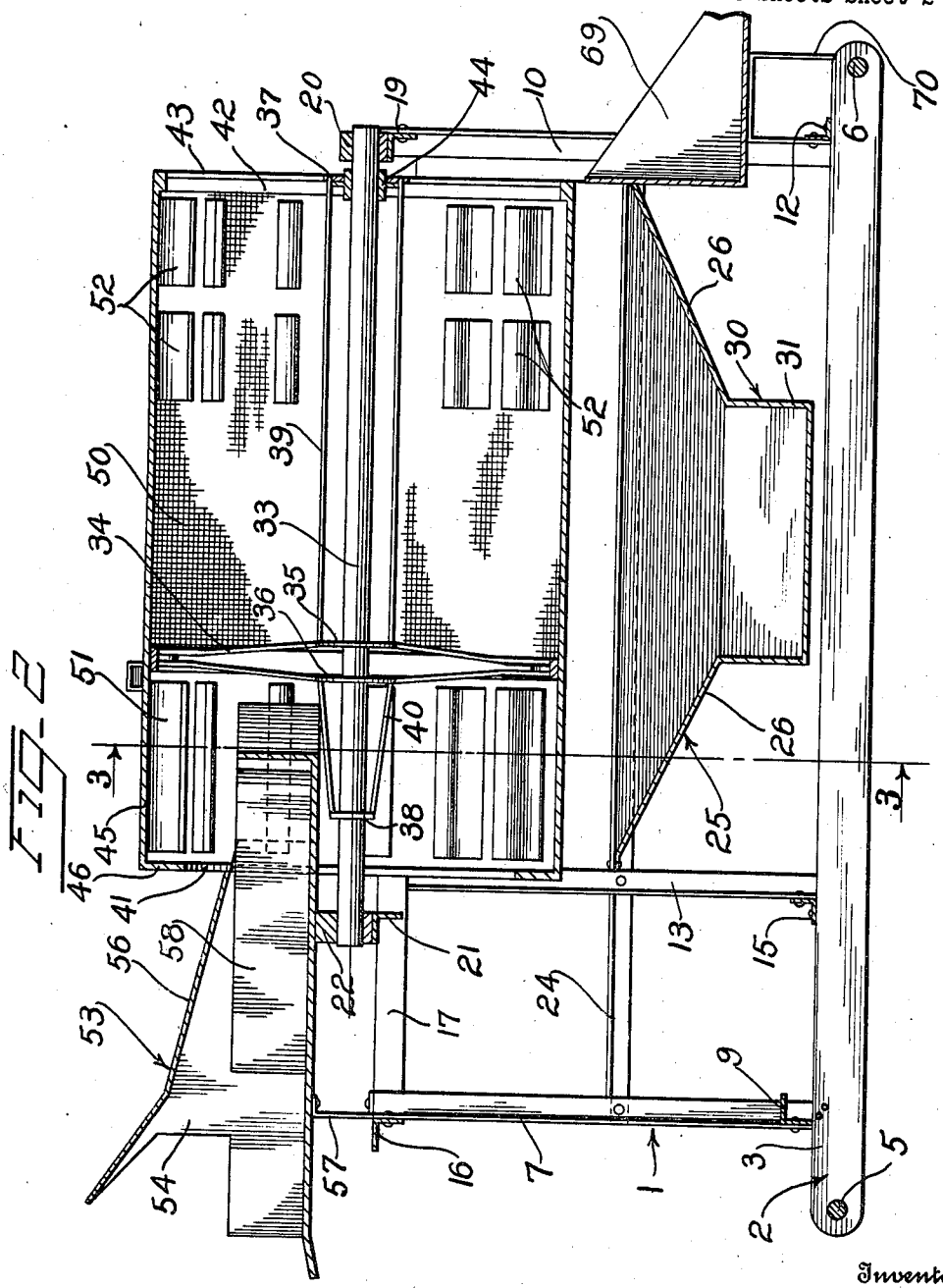


FIG. 2

Inventor

J. M. Range.

By Lacey & Lacey, Attorneys

June 8, 1943. J. M. RANGE 2,321,243

SHALE SHAKER

Filed Feb. 19, 1940 3 Sheets-Sheet 3

FIG. 4

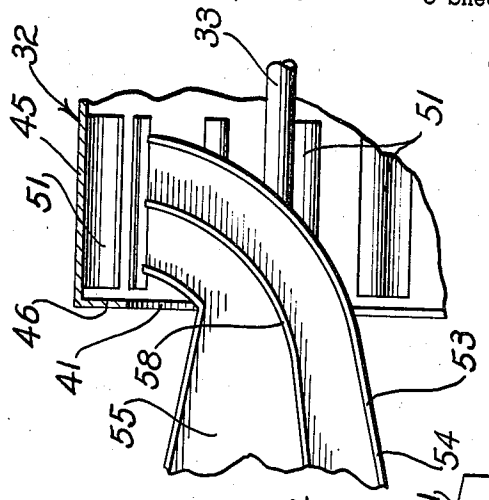
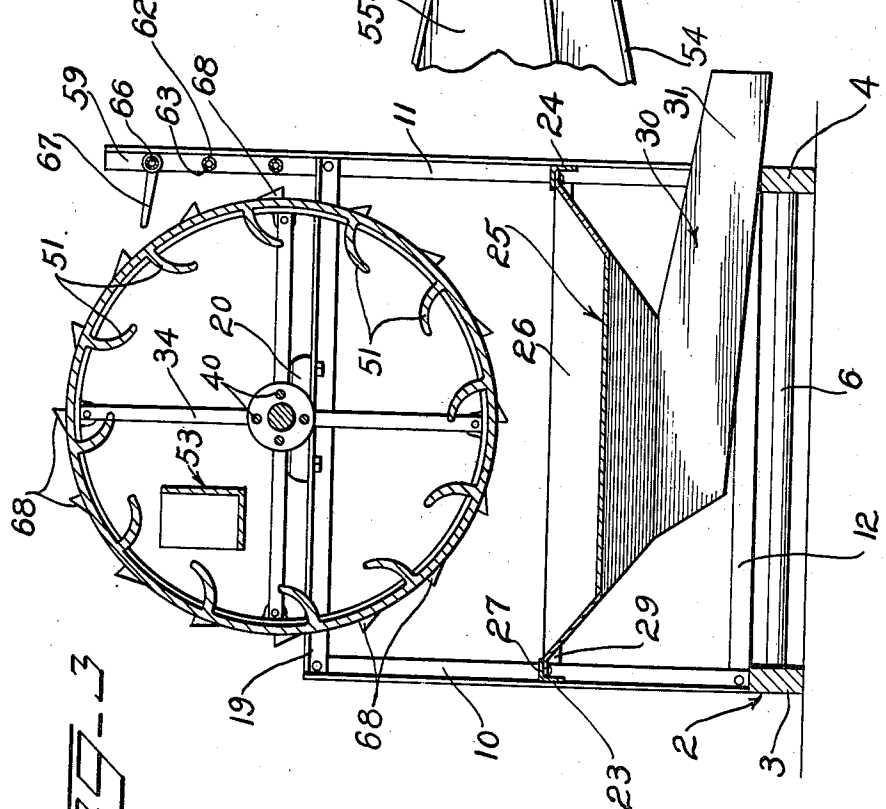


FIG. 3



Inventor

J. M. Range.

By Lacey & Lacey, Attorneys

Patented June 8, 1943

2,321,243

UNITED STATES PATENT OFFICE

2,321,243

SHALE SHAKER

John M. Range, Beeville, Tex.

Application February 19, 1940, Serial No. 319,773

1 Claim. (Cl. 209—284)

This invention relates to an improved shale shaker and is an improvement over the structure shown, described and claimed in my Patent No. 2,174,836 (Serial No. 218,657, filed July 11, 1938).

One object of my invention is to provide a shale shaker employing an improved mud pan which will effectively eliminate splashing of mud dropping from the cylindrical screen employed.

Another object of the invention is to provide a shale shaker wherein the axle supporting the cylindrical screen is reinforced so that vibration will be largely eliminated and danger of the axle breaking obviated.

As a still further object, the invention seeks to provide a machine of this character employing a frame which will partially enclose said machine and offer protection therefor.

Further objects of the invention, not mentioned hereinbefore, will become apparent during the course of the following description.

In the drawings:

Figure 1 is a perspective view of my improved shale shaker,

Figure 2 is a longitudinal sectional view of the machine,

Figure 3 is a vertical sectional view on the line 3—3 of Figure 2 looking in the direction of the arrows, and

Figure 4 is an enlarged detail top plan view showing the inner end of the intake trough employed.

Referring now more particularly to the drawings, wherein similar reference numerals designate similar parts throughout the views, the numeral 1 indicates in general the frame of my improved shale shaker. The frame 1 includes a base 2 which is formed of spaced beams 3 and 4, said beams being mounted endwise and being located in parallel spaced relation throughout their lengths. At their opposite corresponding ends, the beams are connected by rods 5 and 6 which prevent spreading of the base.

The frame 1 includes standards 7 and 8, which rise from the beams 3 and 4 near their corresponding forward ends, which is to say, near the ends of said beams which are connected by the rod 5. The ends of the beams connected by the rod 6 will be located at the rear end of the frame. The standards 7 and 8 are connected at their corresponding lower ends by an angle beam 9 which serves to brace the lower ends of the standards and also to provide additional bracing means for the base. Standards 10 and 11 are carried at the rear end of the base and rise from the beams 3 and 4. Said standards 10 and 11 are connected by an angle bar 12. Near the standards 7 and 8 are located standards 13 and 14. These last-mentioned standards extend upwardly in parallel spaced relation to the standards 7 and 8. Near the forward end of the base an angle bar 15, like the bar 9, connects the corresponding lower ends of the standards 13 and 14 and thus provide a bracing means for said standards and additional bracing means for the base. A horizontal front bar 16, of inverted L-shape cross section, connects the corresponding upper ends of the standards 7 and 8 at corresponding sides thereof. As will be seen by referring to Figure 1, all of the standards are, like the bar 16, of L-shape contour. Side bars 17 and 18 are connected with the standards 7 and 8 and with the standards 13 and 14. The side bars extend throughout the major portion of the length of the base and are connected with the standards 10 and 11. As will be seen by referring to Figure 3, the side bar 17 is connected with the upper end of the standard 10. The side bar 18 is connected with the standard 11 at a point substantially two-thirds along its height. In other words, the standard 11 is projected upwardly past the horizontal plane in which lies the upper end of the standard 10. The reason for this will be explained hereinafter. A rear bar 19 connects the upper end of the standard 10 at the point along the height of the standard 11 at which the side bar 18 is connected. Mounted on the top surface of the rear bar 19 medially of its length is a bearing 20.

The side bars 17 are connected near their corresponding forward ends by an intermediate bar 21 which is of angle shape cross section and which is located in parallel spaced relation to the front bars 16. The intermediate bar 21 is located near the forward end of the frame. To be more specific, the intermediate bar 21 is located substantially one-fifth the length of the frame away from the front bar 16. Like the bar 19, the intermediate bar carries a bearing 22 which is of similar construction to the bearing 20.

Extending longitudinally of the frame and disposed medially between the bars 3 and 4 of the base and the side bars 17 and 18 are supporting bars 23 and 24. The supporting bars are of inverted L shape cross section and serve to support the upper rearward portion of a mud pan, which is indicated generally by the numeral 25. The mud pan 25 includes a flared substantially rectangular upper portion 26 which terminates in a laterally extending mounting flange 27 which flange is riveted or otherwise secured to the laterally extending arms of the supporting bars 23

and 24. A transverse supporting bar 28 connects the standards 13 and 14 and provides support for the end portion of the flange 27. A suitable supporting bar 29 extends between the standards 10 and 11 and supports the opposite end of the flared portion 26.

The flared portion 26 of the mud pan 25 is tapered downwardly and communicates with the upper and inner end of a discharge chute 30, said discharge chute extending laterally to discharge from the side of the frame. The discharge chute 30, as may be clearly seen by referring to Figure 1 of the drawings, includes side flanges 31 which effectively prevent splashing of mud dropping from the cylindrical screen which is mounted in the frame and will be described hereinafter. Mounted in the frame 1 between the intermediate bar 21 and the rear bar 19, to rotate in said frame, is a cylindrical screen 32. The screen 32 is of sufficient diameter to extend throughout the major portion of the area of the frame between the side bars 17 and 18 and the bars 19 and 21, and yet be freely rotatable therein. The screen includes an axially mounted supporting shaft 33 which extends throughout the length of the screen and is journaled by the bearings 20 and 22. The screen is braced initially by means of radially extending braces 34, said braces extending from the inner surface of the screen, near one end thereof, to hubs 35, 36, 37 and 38 which surround the shaft, the hub 38 being relatively small. Brace rods extend between the hubs 35 and 37, said brace rods being shown at 39 and being located at spaced points throughout the circumference of the hubs. Four of the rods 39 are shown. It should be understood that, if desired, more of them may be employed. Brace rods 40 extend between the hub 36 and the hub 38, and as will be seen, the rods 40 are tapered toward the shaft. This is due to the fact that the hub 38 is relatively small. It is a particularly noteworthy feature of the invention that the hubs 35, 36, 37 and 38, and the rods 39 and 40 cooperate to provide reinforcement for the axle 33 so that vibration will be eliminated and danger of breaking the axle largely removed.

As clearly seen in Figures 1 and 2 of the drawings, the cylindrical screen 32 is provided with an open forward end 41 and an open rear end 42, the rear end, of course, being provided with suitable braces 43 for enclosing the axle with respect to the screen itself. A hub 44 is carried by the braces and effectively mounts the rear end of the screen on the shaft 33.

The screen 32, as clearly seen in Figures 1 and 2, is formed with a solid portion 45 which extends substantially one-fourth the length of the screen. The solid portion 45 terminates at its forward end in an inwardly disposed flange 46. At its opposite end, the screen is formed with cutouts 47, which are defined by longitudinally and circumferentially extending strips 48 and 49, respectively. The strips, as will be seen, define substantially square shape for the cutouts 47. A cylindrical screen member 50 extends throughout the circumferential area of the cylindrical screen from the inner boundary of the solid portion 45 to the rear end of said screen. It will be seen that said screen extends through the areas of all of the cutouts 47.

Mounted on the inner surface of the solid portion 45 of the screen 32 are substantially U-shaped driving paddles or buckets 51, the driving paddles 51 each extending longitudinally of the portion 45 and said paddles being arranged in a circumferential series. Relatively short agitating paddles 52 are carried adjacent the screen member 50 and in longitudinally and circumferentially spaced relation. The purpose of these paddles will be made known presently.

In order to introduce shale into the machine, I provide an inlet chute, which is indicated generally at 53. The inlet chute 53 includes a substantially rectangular relatively wide mouth 54 which is defined by a bottom wall 55 and an upwardly tapered top wall 56. The bottom wall 55 is mounted on the front bar 16 and intermediate bar 21, medially of their lengths, by clips 57. As will be seen, the wall 55 is spaced above the bars 16 and 21 by said clips. The inner end portion of the inlet chute 52 is turned laterally and is formed with a dividing partition 58. As will be seen clearly in Figure 4, the open inner end of the chute 53 is presented to confront the series of driving paddles or buckets 51 so that, when a flow of shale is passing through the inlet chute, said flow will impinge on the paddles and will cause the cylindrical screen 32 to rotate.

The upper third of the standard 11, for the sake of convenience is indicated by the numeral 59. The standard 14 is also provided with an upwardly projecting third which will be designated at 60. The portions 59 and 60 are, of course, arranged in the same longitudinal plane and in a plane parallel to the axis of the shaft 33. The portions 59 and 60 support water pipes 61 and 62 which are provided with water outlet openings 63. The pipe 61 is connected with the pipe 62 at a point adjacent the portion 60 of the standard 14 by means of a T joint 64. A control valve 65 is operated for regulating flow of water into the pipes 61 and 62. A steam pipe is indicated by the numeral 66 and is supported in parallel spaced relation above the pipe 61 by the portions 59 and 60 of the standards 11 and 14, respectively. The steam pipe is connectable to any suitable source of steam pressure and is provided with a nozzle 67 which extends laterally and inwardly toward the surface of the cylindrical screen 32. Steam passing from the nozzle 67 will engage in circumferentially spaced vane members 68 which are mounted on the inner end portion of the solid portion 45. It will be understood that steam flowing from the nozzle 67 and engaging in the members 68 will provide a booster for the cylindrical screen for speeding up rotation where necessary.

As shown in Figure 2, a shale discharge pan 69 is mounted on a bracket 70 at the rear end of the machine. The shale discharge pan 69 is located with its upper bottom adjacent the rear end rim of the screen 32.

It is believed that the operation of my improved shale shaker will be clear from the foregoing description. However, a brief statement on the subject of the operation of the invention is not thought to be out of place.

Shale is fed to the trough 53 and, as it passes from the inner end of said trough, it will fall into the paddles or buckets 51. The weight of the continuous flow of shale will cause the screen 32 to rotate within the frame. The shale will, of course, move rearwardly in the screen and the screen element 50 will cause screening of the shale for removing desired materials therefrom. The shale will pass along through the screen and will pass into the discharge pan 69. The buckets or paddles 52 will be effective for scattering the shale within the area of the screen element so that effective screening will

be assured. The desired material, such as mud containing gold or other metal particles, will pass from the screen into the mud pan **25**, to discharge through the chute **30**. The screening operation will be aided by flow of water from the perforations **63** in the pipes **62**. A jet of steam through the nozzle **67** will provide boosting means for the screen **32** so that said screen will be given additional rotative impetus.

It is thought that the construction and operation of my improved shale shaker will now be thoroughly understood.

Having thus described the invention, what is claimed as new is:

A shale shaker including a frame having a base, standards rising from the base, side bars connected with the standards, front, intermediate and rear bars connected with the standards at their corresponding upper ends, supporting bars carried by the frame between the side bars and the base, a mud pan carried by the supporting bars and extending laterally throughout the area of the central portion of the frame, said mud pan having a flared portion terminating in a reduced U-shaped laterally extending discharge chute, said discharge chute projecting from one side of the frame, and a cylindrical screen rotatably mounted on the frame for screening desired material from shale, said desired material passing into the mud pan and discharging from the chute, said cylindrical screen being rotatably mounted between the intermediate and rear bars and being entirely surrounded by the frame.

JOHN M. RANGE.