N. M. LOWER.

LOCOMOTIVE STOKER MECHANISM.

APPLICATION FILED NOV. 10, 1917.

1,312,858.

Patented Aug. 12, 1919.

2 SHEETS—SHEET 1.

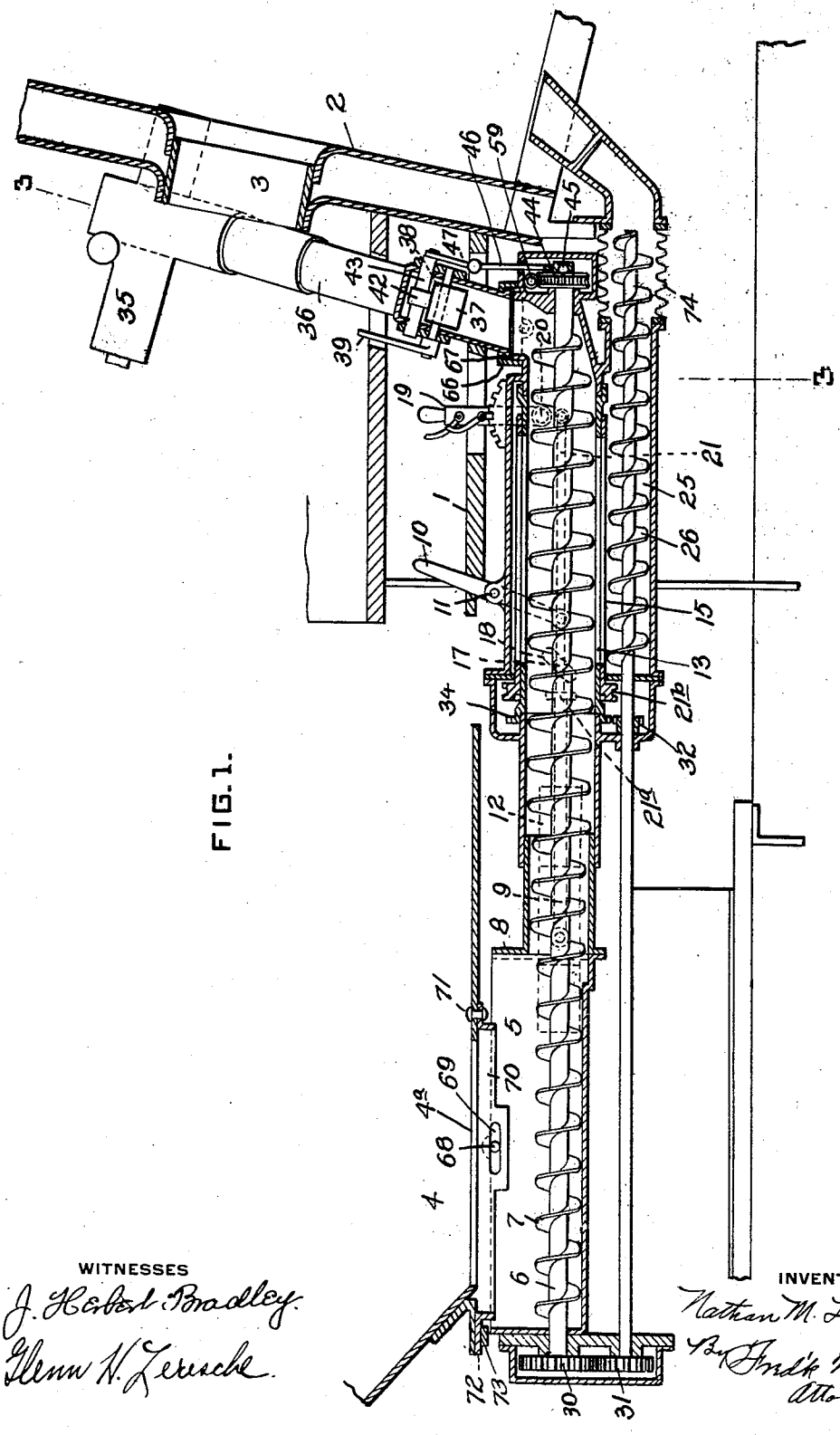

FIG. 1.

WITNESSES

J. Herbert Bradley.

Glenn N. Zerusche.

INVENTOR

Nathan M. Lower,

By Fred'k W. Mueller

Attorney

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2 SHEETS—SHEET 2.

FIG. 4.

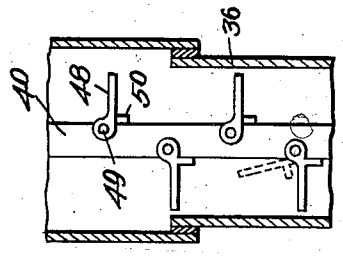


FIG. 3.

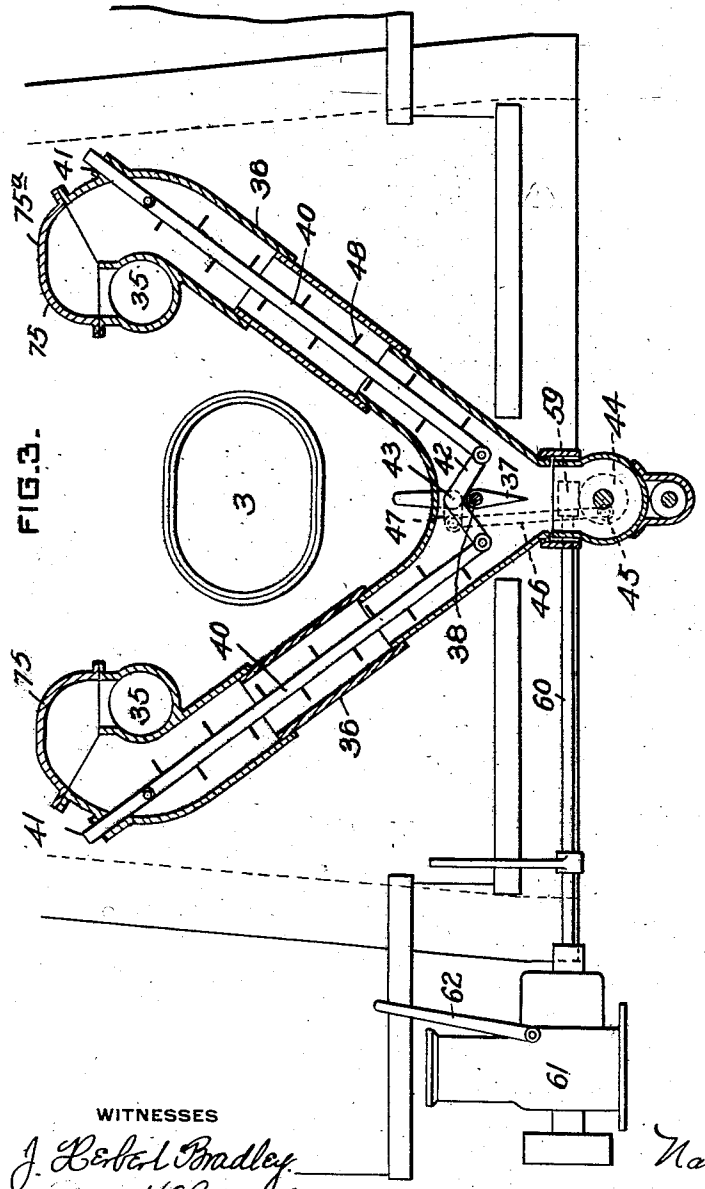
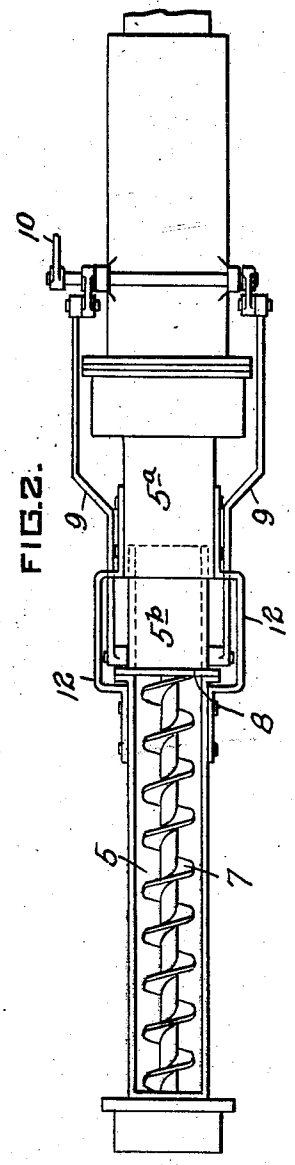


FIG. 2.



WITNESSES

J. Herbert Bradley

Glenn H. Lerasche.

INVENTOR

Nathan M. Lower

By Frank N. Hunter

Attorney

UNITED STATES PATENT OFFICE.

NATHAN M. LOWER, OF PITTSBURGH, PENNSYLVANIA, ASSIGNOR TO LOCOMOTIVE STOKER COMPANY, OF SCHENECTADY, NEW YORK, A CORPORATION OF PENNSYLVANIA.

LOCOMOTIVE STOKER MECHANISM.

1,312,858. Specification of Letters Patent. **Patented Aug. 12, 1919.**

Original application filed October 16, 1912, Serial No. 726,108. Divided and this application filed November 10, 1917. Serial No. 201,288.

To all whom it may concern:

Be it known that I, NATHAN M. LOWER, a resident of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Locomotive Stoker Mechanism, of which the following is a specification.

This invention relates to conveying mechanism, and more particularly to locomotive stoker mechanism for conveying the fuel from the tender to the fire-box and distributing the same therein.

This application is a division of my application Serial No. 726,108, filed October 16, 1912.

One object is to provide conveyer mechanism for such stokers having means for delivering or removing therefrom lumps of slate or other hard bodies, or coal too large to be conveyed therethrough.

A further object is to provide stoker conveyer mechanism which will not clog.

For the attainment of the foregoing and other objects the invention comprises the construction and combination of means hereinafter described and claimed.

In the accompanying drawings, Figure 1 shows a longitudinal section through a stoker conveying mechanism constructed according to the invention, the locomotive and tender to which the same is applied being shown conventionally; Fig. 2 is a plan view of a portion of the horizontal portion of the conveyer; Fig. 3 is a transverse section on the line 3—3, Fig. 1, showing the driving mechanism and the elevating mechanism for the fuel; and Fig. 4 is an enlarged detailed view of the improved flight of the elevating mechanism.

The improved stoker conveying mechanism is shown in Fig. 1 applied to the rear of a locomotive having a deck 1 and a fire-box 2, the latter being provided with the usual fire-door opening 3. Connected behind the locomotive is the usual tender having the fuel hopper 4, for carrying the fuel to be supplied to the fire-box, and which fuel may be either ordinary run-of-mine coal or fuel specially prepared before being supplied to the tender, but in any case it is generally composed of both fine and coarse particles.

The fuel in the tender passes by gravity through an opening 4^a in the bottom of the hopper 4, to a horizontal conduit 5 in which is located a rotatable shaft provided with spiral vanes which form a screw conveyer 7, which is power operated, as hereinafter described, and which conveys the fuel longitudinally in the conduit and carries it forward toward the fire-box.

Any large lumps or masses of fuel or foreign material which fall from the hopper 4 into the conduit 5 are forced by the screw conveyer against a shoulder or abutment 8 in the conduit, and under most circumstances are crushed under the action of the heavy screw conveyer. In case, however, that they are not crushed, they may be discharged from the conveyer by telescoping one section of the conduit into another section thereof, to thereby open the conduit and allow the mass of slate or other hard material to drop out.

To permit of this the conduit is made in three sections, 5 and 5^a, which are rigidly connected together by means of tie rods or plates 12, thus holding said sections in alinement and at fixed distances from each other, and an intermediate conduit section 5^b which is slidably mounted in the section 5^a, to telescope therein, and which has at its rear end the shoulder or abutment 8. The section 5^b is moved longitudinally in and out of the section 5^a by means of links 9 pivotally connected thereto and attached to a lever 10 fulcrumed at 11 and operable from the locomotive cab.

The conduit and screw conveyer therein, are provided with portions of increasing diameters forwardly. As shown the screw conveyer portion in the conduit portion 5^b is of larger diameter than that in conduit portion 5, and the conduit portion 5^a and the conveyer portion therein are of larger diameter than the preceding portions 5^b. This gives the conveyer an increasing feeding capacity forwardly, which prevents clogging of the conveyer which may occur if the rear or initial end of the conveyer has a feeding capacity equal to that of the forward or delivery end thereof, due to the increasing resistance toward the forward end of the conveyer.

The conveyer mechanism illustrated is provided with means for separating the fine from the coarse fuel, this being accomplished by means of a cylindrical screen

member 13 forming a part of the horizontal conveyer, and which is rotatably mounted at its ends on the fixed conduit members. This cylinder 13 is provided with a plurality of longitudinal slots or openings and is surrounded by a cylindrical sleeve 15 which also is provided with longitudinal slots or openings therein, similar to the openings in the cylinder 13. The sleeve 15 rotates with the screen member 13 and the slots therein normally register with the slots in the member 13, but said sleeve is rotatable relative to the member 13 so that the size of the opening from the interior to the exterior of the conduit may be varied. For this purpose the member 13 is provided with a cam roller 17 operating in a spiral or inclined cam slot 18 in the sleeve 15, so that by moving the sleeve longitudinally on the cylinder 13, the former rotates with reference to the cylinder and thereby varies the relative positions of the slots in the two members. The sleeve can be moved longitudinally to effect such variation in the size of the discharge openings by means of a lever 19 fulcrumed at 20 and pivotally connected to a rod or link 21 which in turn is connected to a member 21^a which engages an annular groove 21^b in one end of the sleeve 15.

The fine fuel discharged by this screen mechanism falls into a conduit 25 located beneath the screen and in which conduit is another screw conveyer 26, which is driven from the screw conveyer 7 in conduit 5 by means of intermeshing gears 30 and 31 connected respectively to the shafts of said conveyers, and which screw conveyer 26 pushes the fine fuel forward to mechanism which under-feeds it to the fire, but which need not be here described as it forms no part of the present invention. The screen is driven from the screw conveyer 26 by means of a sprocket wheel 32 on conveyer shaft 26, which is connected by a chain to a sprocket 34 forming a part of or attached to the cylinder 13 of the screen.

The coarse fuel which cannot pass through the slots in the screen is carried forward by the conveyer 7 to an elevating mechanism which elevates it at the rear of the fire-box to fuel injecting mechanism (shown generally at 35) so located as to inject the same into the fire-box, above the fire. This elevating mechanism is shown in Figs. 3 and 4. It comprises a pair of conduits 36 which communicate with and branch from the end of the horizontal conduit 5, each of said conduits leading to one of the fuel injecting mechanisms.

In order to distribute the fuel properly to opposite sides of the fire-box, there is mounted in the lower ends of the conduits 36, a central deflector 37, which is so arranged that it can be moved to direct more or less fuel into one or the other of said conduits. As shown, this deflector is pivotally mounted by means of a transverse rod or shaft 38 which is provided exteriorly of the conduit with a handle 39, by means of which the position of said deflector can be changed, so that more or less of the fuel may be deflected into one or the other of said conduits, as desired, and thus distribute the coal properly on the two sides of the fire-box.

The mechanism for elevating the fuel in the vertical or inclined conduits 36 comprises rods or bars 40 which at their upper ends are slidably guided in suitable bearings 41 in the conduit casings. These rods are pivotally connected at their lower ends to a double armed lever 42 fixed upon an oscillating shaft 43, which shaft is oscillated by the worm gear 44 which drives the conveyer shaft 6, said worm gear being provided with an eccentric crank pin 45 having a universal connection to a connecting rod 46 which is coupled to an arm or crank 47 on shaft 43.

The bars or rods 40 are each provided with a plurality of lifting vanes 48, of the type shown in Fig. 4, each of said vanes being pivotally connected to the bar at 49 and provided on its underside with a stop or projection 50 to engage the bar and thereby maintain the vane in horizontal position when the bar rises under the impulse of its reciprocating mechanism, but allowing said vanes to fold into the position shown in dotted lines in Fig. 4 when the bar is moved downwardly and thus slide idly downwardly through the fuel. By this means the fuel is fed upwardly through said conduit step by step and is held from falling or retreating by the pressure of the screw conveyer 7. The elevating mechanism described continually lifts the fuel and therefore prevents it from packing in the conduits, which often occurs with wet fuel fed upwardly by a screw conveyer. If desired, the fuel in the upstanding conduit may be moistened by supplying thereto a spray of steam or water, such as through pipe 64, Fig. 6.

The worm gear 44 on the end of the conveyer shaft 6 is driven by a worm 59 on the end of a transverse shaft 60 which is rotated by a suitable motor or engine 61, which may be of any type or design but preferably is such that its speed can be regulated at will by a lever or other controlling member 62, as fully described in my application above referred to, Serial No. 726,108, filed October 16, 1912, and which need not be here repeated.

Flexibility in the conveyer mechanisms between the locomotive and tender is secured by connecting the forward end of the horizontal conduit to the lower end of the

conduits 36 by a collar 66 secured to the horizontal conduit and having a portion embracing and resting upon a flange 67 on the bottom end of conduit 36. The collar 66 is of such dimensions as to permit a proper amount of up-and-down motion, as well as the swiveling motion of the horizontal conduit with respect to the conduits 36. The rear end of conduit 5 is provided with a pair of rollers 68 which move in horizontal slots 69 in a frame 70, pivoted at 71 to the bottom of the tender hopper 4, and having a circular projection or flange 72 at its rear end supported by and traveling on a way 73 on the tender frame.

Movement of the lower conduit 25 relative to the locomotive is provided for by a flexible conduit section 74, which is formed of heavy sheet metal corrugated circumferentially in such manner that it is durable and yet sufficiently flexible to permit of the movements of the locomotive relative to the tender.

The upper ends of the conduits 36 connect to the two injector mechanisms 35, one on each side of the central plane of the firebox. These conduits are bent or arched over the injectors at 75, and are preferably provided with removable covers or doors 75ª to permit fuel to be introduced by hand to the plungers, or permit access thereto for repairs. As these injectors form no part of the present invention, they are merely indicated in outline in Fig. 1. They may be of any type suitable for the purpose, such for instance as illustrated and described in my application Serial No. 726,108, filed October 16, 1912.

By means of the conveyer mechanism described, large or hard lumps of fuel, slate or other foreign objects, can be readily discharged from the conveyer mechanism so as not to clog the latter. The improved flight or elevating mechanism secures a constant step-by-step upward movement of the fuel, without danger of clogging, and the screw conveyer of increasing diameters forwardly provide the same advantage in the horizontal portion of the conveyer. The deflectors described provide a ready means for diverting more or less fuel into one or the other of the distributing conduits so as to properly distribute the fuel on the two sides of the fire.

What I claim is:—

1. In locomotive stoker mechanism, the combination with a firebox, of a conduit located underneath the deck of the locomotive for feeding fuel to the firebox, said conduit including a section arranged to be opened laterally to permit the discharge of obstructing masses therefrom, and means extending above the deck of the locomotive for moving said section to open and closed position.

2. In locomotive stoker mechanism, the combination with a fire box, of a conduit located underneath the deck of the locomotive for feeding fuel to the firebox, said conduit including a portion arranged to be moved to open the conduit laterally to permit the discharge of obstructing masses therefrom, and an actuating lever connected to said movable portion and projecting above the deck of the locomotive.

3. In stoker mechanism, a sectional fuel-feeding conduit, one of said sections being longitudinally movable, and means for longitudinally moving said section to open the conduit to permit obstructing masses to be discharged from said conduit.

4. In stoker mechanism, a sectional fuel-feeding conduit, said sections being telescopically related, and means for producing relative longitudinal movement between said sections to open the conduit laterally, and permit obstructing masses to be discharged therefrom.

5. In stoker mechanism, a sectional fuel-feeding conduit, a spiral conveyer therein, one of said sections being longitudinally movable, and means for moving said section longitudinally to open the conduit laterally and permit the discharge of obstructing masses therefrom.

6. In stoker mechanism, a fuel-feeding conduit including a reduced section sliding within an adjacent section and movable to a position to open the conduit and permit obstructing masses to be discharged therefrom.

In testimony whereof, I have hereunto set my hand.

NATHAN M. LOWER.

Witness:
F. W. WINTER.