March 22, 1932. T. W. BENNETT 1,850,824

LOCOMOTIVE STOKER

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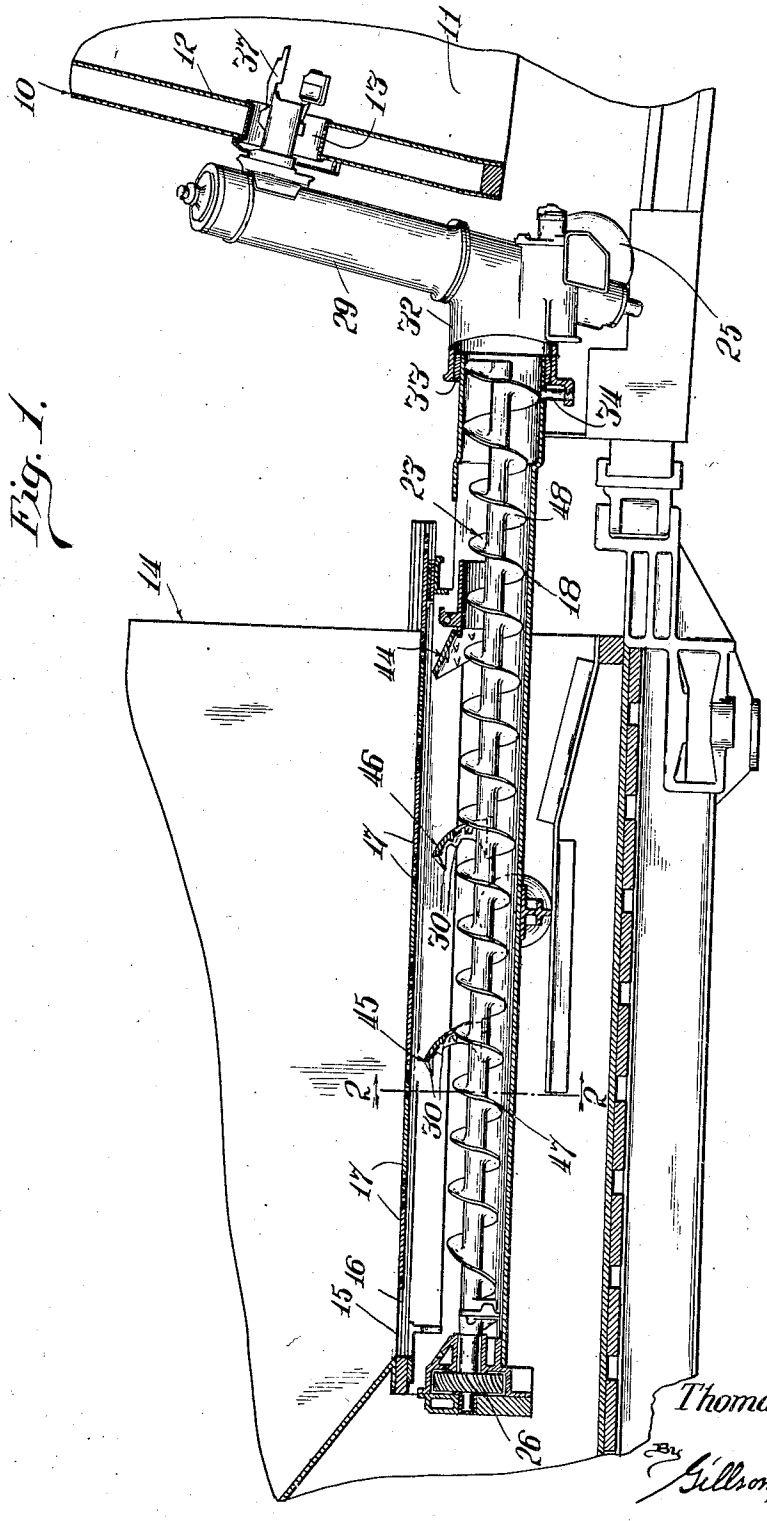


Fig. 1.

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Fig. 2.

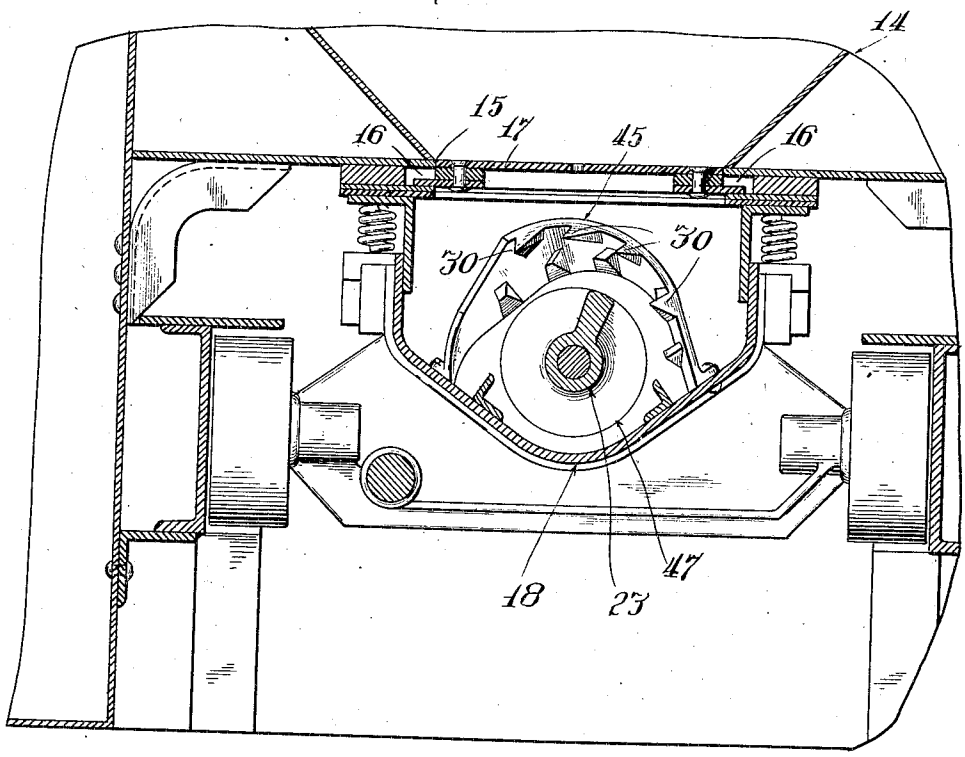
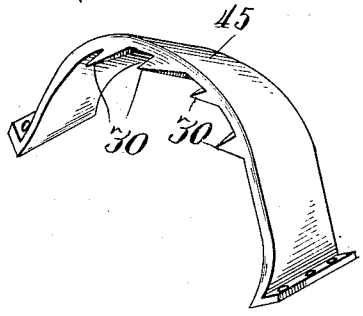


Fig. 3.



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UNITED STATES PATENT OFFICE

THOMAS W. BENNETT, OF PITTSBURGH, PENNSYLVANIA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE STANDARD STOKER COMPANY INC., OF NEW YORK, N. Y., A CORPORATION OF DELAWARE

LOCOMOTIVE STOKER

Application filed September 21, 1926. Serial No. 136,804.

This invention relates to stoker mechanism, and more particularly to stoker mechanism for railway locomotives.

One of the objects of the invention is the provision of new and improved mechanism and arrangement thereof for reducing the fuel to proper size and delivering the same to the firebox of the locomotive.

Another object of the invention is the provision of a new and improved fuel crusher mechanism for stokers that is cheap to manufacture, simple and rugged in construction, efficient in operation, readily assembled and that requires a minimum of power for operating the same.

Other and further objects and advantages of the invention will appear from the following description taken in connection with the accompanying drawings, in which

Fig. 1 is a longitudinal vertical section of a portion of a locomotive and its tender showing the invention in position thereon, with parts broken away;

Fig. 2 is a section on line 2—2 of Fig. 1;

Fig. 3 is a perspective view of one of the auxiliary crushers.

On the drawings the reference character 10 designates a locomotive provided with the firebox 11 having the back wall 12 thereof provided with one or more openings 13 through which fuel is delivered to the firebox of the locomotive. The tender for the locomotive is shown at 14 and is of the usual or any well known construction. The bottom wall of the tender is provided with an elongated opening 15, each side edge of which is provided with a groove 16 in which is slidably mounted the slide plates 17. The plates 17 are adapted to be slid forwardly progressively one or more at a time in order to adjust the position of the opening whereby the fuel may flow by gravity from the tender, in the usual manner.

A conveyor member or casing 18 having its rear end in the form of a trough located beneath said opening is employed for conveying the fuel from the tender to the locomotive.

The conveyor support 20 is located adjacent to the center of gravity of the conveyor whereby the tender will support the weight of the conveyor, thus relieving the locomotive of this additional weight.

The conveyor casing 18 is provided with a suitable means, as the conveyor screw 23, for conveying the fuel along said casing. The screw is operated from the engine 25 through the gears 26 by a suitable shaft in the usual manner.

Suitable means are provided for elevating the fuel and delivering the same to the firebox of the locomotive. This means comprises one or more elevator casings 29, depending on the type of elevator mechanism employed, that shown being of the type in which two elevator casings are employed. The lower portion of the casing of the elevator mechanism is provided with a rearward extension or conduit 32 in which the forward end of the conveyor casing 18 is pivotally mounted, the end of the conveyor being provided with a ring 33 convex on its outer surface and forming a ball or universal joint with said extension. The parts are held in assembled relation by a pin 34. The parts thus described are of the usual construction, well understood in the art, and need not be further described.

The casings 29 extend upwardly and forwardly and are each provided with a distributor member 37 extending through the corresponding opening 13 in the back wall of the firebox. The fuel is elevated through the casings 29 onto the distributor member from whence it is distributed over the grates by blasts of steam in the usual manner.

Suitable means are provided for reducing the lumps of fuel to the proper size for introduction into the firebox. In the conventional type of mechanism for conveying fuel from

the tender to the locomotive, a single crusher 44 is employed and it is located adjacent to the forward end of the tender. This arrangement is sufficient so long as the fuel is delivered into the fuel trough of the conveyor at a point adjacent to the crusher. When the fuel in the forward end of the tender has been used and the plates 17 have been moved forwardly to shift the opening 15, through which the fuel is supplied, rearwardly, considerably force is necessary to move the lumps of fuel forwardly beneath said plates, due to the jamming of the same against the plates. It has been proposed to employ a plurality of retarder bars extending over the trough but they are objectionable because they check the flow of fuel to a material extent, causing the same to accumulate in front of the bars, to boil up and to become jammed against the underside of the plates, thus seriously hindering the flow of fuel along said trough.

It has been found by experiment that if crusher means be provided for crushing the fuel immediately after it falls into the trough the same is reduced to such sizes that it does not jam but is moved easily and smoothly along said conveyor. In other words, by the use of means for crushing the fuel immediately after it falls into the conveyor, the power expended in operating the stoker mechanism remains substantially constant even when the fuel is supplied to the conveyor at the rear end thereof.

In order to take advantage of this principle, a plurality of crushers are employed for crushing the fuel. This is considered an important feature of this invention. As shown, two auxiliary crushers 45 and 46 are used in addition to the conventional type of crusher 44. Each of the crushers 45 and 46 is curved to form an arch over the conveyor screw and has its ends rigidly secured to the sides of the trough, see Figs. 2 and 3. The crusher is flared or conical and the rear edge is arranged at an angle to the axis of the conveyor as shown in Fig. 3. The rear edges and inner surfaces of the crushers are provided with teeth 30 for cooperating with the flights of the screw for reducing the fuel.

The fuel is progressively reduced as it is moved along the conveyor trough. Preferably, though not necessarily, this is accomplished by having the crushers all of the same size and employing a conveyor screw having its rear portion 47 of less diameter than the forward portion 48. As shown, the rear portion 47 of the screw terminates slightly in advance of the intermediate crusher 46 whereby when the opening 15 is located at the rear of the tender, as it is when the tender is nearly empty, and as shown in Fig. 1, the fuel is partially reduced by the crusher 45 and reduced still further by the crusher 46. When the opening 15 is at the front of the tender the fuel is reduced to proper size by the crusher 44 in the usual manner. When the parts are in the position shown in Fig. 1, the crusher 44 merely acts as a sizer to reduce the fuel that has passed through the other crusher or crushers to a more nearly uniform size.

The widths of the plates 17 are such that the edges of those immediately above the crushers are located adjacent to the plane of what for convenience will be termed the forward or advance edge of the crusher, whereby when the plate in advance of any particular crusher is opened the fuel will be free to fall in front of the adjacent crusher and be carried through the same by the conveyor screw. Should the fuel for any reason become jammed and boil up in front of the crusher the opening will permit it to rise into the tender. Furthermore, by this arrangement the uncrushed fuel will have a minimum distance to travel in the conveyor trough before encountering one of the crushers. The desired arrangement is to provide a plurality of crushers so that the fuel will be crushed immediately after it reaches the conveyor trough, in order to avoid clogging of the oversize lumps in the trough or the jamming of the same against the plates.

In the operation of the device, the boards or plates 17 are adjusted to permit the fuel to flow by gravity into the trough. The fuel is carried forwardly, reduced to the proper size by one or more of the crushers depending on the position of the opening 15, and forced upwardly through the elevator casings onto the distributor member from whence it is projected into the firebox by steam blasts in the usual manner.

It is thought from the foregoing taken in connection with the accompanying drawings that the construction and operation of my device will be apparent to those skilled in the art, and that various changes in size, shape, proportion and details of construction may be made without departing from the spirit and scope of the appended claims.

I claim as my invention:

1. In a locomotive stoker mechanism, a conveyor conduit, a conveyor screw of greater diameter at its forward than at its rearward end within said conduit, and a plurality of crusher members forming arches over said screw said members being duplicates and each being provided with crusher teeth.

2. In a stoker, a conveyor member, a conveyor screw in said member, said screw comprising sections of progressively increasing capacities toward the direction of the flow of fuel through said conveyor member, each section being of uniform capacity throughout its length, and a fuel crusher for each of said sections, said crushers being disposed substantially the same distance from the axis of said screw and so arranged that the space between

each crusher and its respective screw section will progressively diminish toward the forward end of said conveyor member, whereby fuel advanced by said screw will be progressively reduced.

3. In a stoker, a conveyor member, a conveyor screw in said member, said screw comprising sections of progressively increasing diameters toward the direction of the flow of fuel through said conveyor member, each section being of uniform diameter throughout its length, and a fuel crusher for each of said sections for progressively reducing said fuel, said crushers being substantial duplicates.

In testimony whereof I affix my signature.

THOMAS W. BENNETT.