Oct. 7, 1941. P. B. RICHARDSON 2,258,516

NONSEGREGATING DISTRIBUTOR

Filed June 24, 1941

FIG. 1.

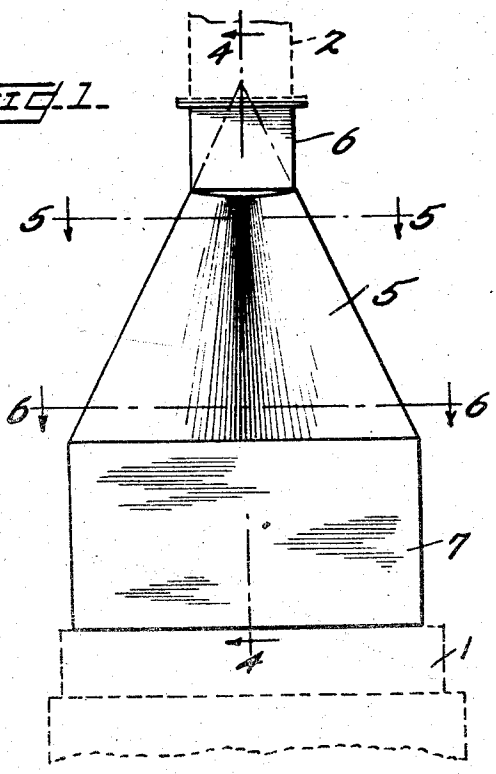


FIG. 2.

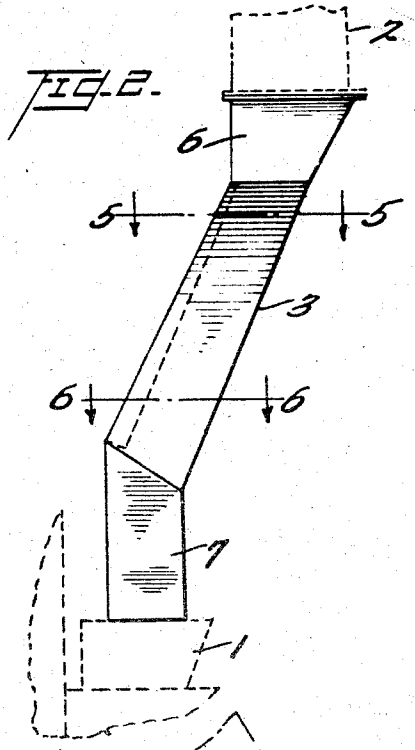


FIG. 3.

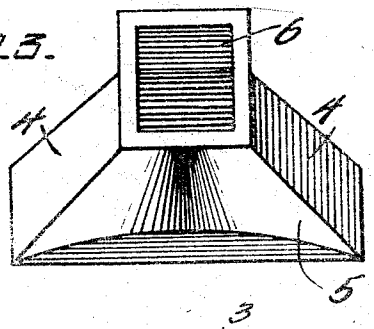


FIG. 4.

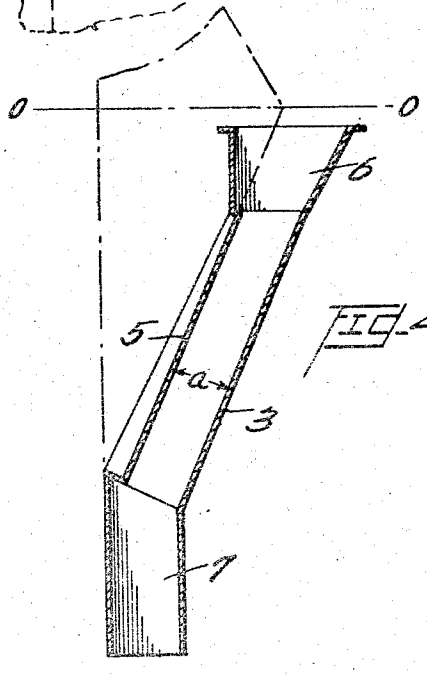


FIG. 5.

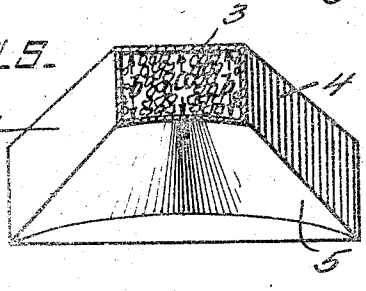
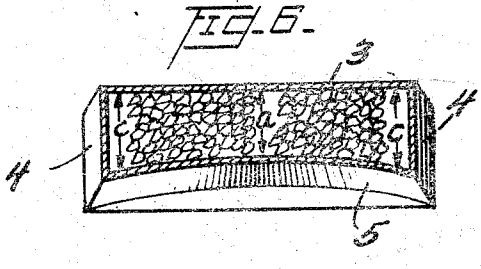


FIG. 6.



Inventor

Philip B. Richardson,

By Morris & Dateman

Attorneys

Patented Oct. 7, 1941 2,258,516

UNITED STATES PATENT OFFICE

2,258,516

NONSEGREGATING DISTRIBUTOR

Philip B. Richardson, Montclair, N. J., assignor to Richardson Scale Company, Clifton, N. J., a corporation of New Jersey

Application June 24, 1941, Serial No. 399,567

5 Claims. (Cl. 193—2)

The present invention relates to distributors for spreading fluent materials containing lumps or particles of different sizes in a mixed condition from a bin or other source of supply, over a relatively wide area without causing segregation of the larger and smaller sizes, and it relates more especially to distributors of this character for feeding coal across the width of a stoker of the travelling grate or belt type for steam boiler and other furnaces.

Heretofore, in the feeding of coal to stokers, the coal was supplied by gravity through a relatively narrow chute from a bunker or other source of supply to a distributor which was flared toward its lower end so as to spread the coal into a relatively wide stream approximating the width of the stoker belt, but the top and bottom walls of such previously used distributors have usually been flat and parallel, with the result that the coal descended more rapidly along the sides of the distributor than through its center, causing the larger lumps to roll into valleys formed along the sides of the distributor and thus separate from the finer particles descending through the central portion of the distributor. Such segregation and the resultant unequal distribution of the different sizes of coal across the width of the distributor and, consequently, across the width of the relatively wide stoker, causes the coal to burn unevenly and is otherwise objectionable in the operation of furnaces.

The primary object of the present invention is to provide an improved distributor of this type which is non-segregating and overcomes such objections, and which may be readily installed in place of distributors of this type as heretofore constructed, or the latter might economically be re-topped according to this invention to achieve non-segregation. The non-segregating distributor provided by the present invention is constructed with a flat bottom and downwardly and outwardly diverging sides as previously, but the side portions of the top wall of the distributor are arranged to diverge from the flat bottom to increase the volume of the flow of the material at the sides, the middle portion of the top wall being relatively depressed toward the flat bottom so as to cause the material to run more rapidly through the center than toward the sides of the distributor. By thus increasing the volume of flow toward the sides of the distributor while permitting the material to flow at a relatively higher speed at the center, the material is caused to descend through the distributor at a substantially uniform mean rate throughout its width, thereby avoiding the formation of valleys in which the larger lumps could roll and separate from the finer material at any portion of the width of the distributor. In feeding coal of mixed sizes through the improved distributor, the coal will therefore be fed to the stoker with the larger and smaller sizes remaining in a non-segregated condition across the width of the stoker grate or belt, thereby ensuring uniform and efficient combustion of the coal.

To these and other ends the invention consists in certain improvements and combinations and arrangements of parts all as will be hereinafter more fully described, the features of novelty being pointed out more particularly in the claims at the end of this specification.

In the accompanying drawing:

Fig. 1 is a front elevation of a distributor constructed in accordance with the present invention;

Fig. 2 is a side elevation of the distributor shown in Fig. 1 as viewed from the right hand side thereof;

Fig. 3 is a top plan view of the distributor shown in Figs. 1 and 2;

Fig. 4 represents a vertical section taken on the line 4—4 in Fig. 1; and

Figs. 5 and 6 are sections taken transversely through the distributor on the lines 5—5 and 6—6 respectively of Figs. 1 and 2.

Similar parts are designated by the same reference characters in the different figures.

The improved distributor according to the present invention is shown applied to the feeding of coal to a stoker of the travelling grate or belt type such as used for steam boiler and other furnaces, 1 representing the relatively wide hopper of the stoker and 2 representing a portion of a chute which may lead from a bunker or other source of supply.

The improved distributor according to the present invention comprises a bottom plate 3 which is flat and provides a plane surface for the flow of the coal thereover, this bottom plate being tapered from a narrow dimension at its upper edge to a relatively wide dimension at its lower edge, and a pair of side walls 4 which are welded, riveted or otherwise secured to the bottom wall along its lateral edges so that these side walls diverge outwardly toward the lower end of the distributor. The upper edges of the side walls 4 are connected by a top wall 5, by riveting, welding or other suitable means, this top wall in conjunction with the side and bottom walls forming a downwardly flaring chute through which the coal or other material is adapted to flow by gravity. The upper narrower end of the distributor may be provided with a hopper 6 for introducing the coal or other material from the chute 2 into the distributor, and vertical continuations of the bottom, side and top walls form an outlet 7 which is adapted to be mounted on the top of the stoker hopper 1. The outlet 7 is offset forwardly from the inlet hop-

per 6 so that the distributor occupies an inclined position between these parts so that the material received from the hopper 6 will fill the distributor and descend by gravity therethrough to the stoker hopper and will maintain a supply of coal in the stoker hopper as the coal is removed therefrom by the stoker in the usual and well known manner.

According to the present invention, the top plate 5 is of concave formation, its central portion being parallel or substantially so with respect to the bottom plate 3 but the portion of the top plate at each side of its center diverges from the bottom plate as the outlet of the distributor is approached. For example, as indicated diagrammatically in Fig. 4, the distance *a* between the bottom plate 3 and the central relatively depressed portion of the top plate 5 is substantially uniform from the inlet to the outlet of the distributor, but the distance between the bottom plate 3 and the portions of the top plate at each side of the central portion thereof widens from the inlet to the outlet of the distributor, such divergence increasing toward the sides of the distributor where *b* in Fig. 5 represents the spaces between the bottom wall and the lateral margins of the top plate near the inlet, and *c* in Fig. 6 represents the increased spaces between the bottom plate and lateral margins of the top plate near the outlet of the distributor. The particular formation of the top plate as described is obtained preferably by generating it as part of the surface of a cone the axis o—o of which is preferably disposed horizontally and located above the upper end of the distributor, as indicated in Fig. 4, and lies in the plane of the center of the distributor medially between the sides of the distributor, all portions of the surface of the top plate across its width converging toward this axis. Accordingly, the side walls 4 of the distributor widen as they approach the outlet 7 to join the lateral edges of the top plate 5 which diverge from the bottom plate 3, the central portion of the top plate however being relatively depressed so that it lies in substantial parallelism with the bottom plate 3.

In operation, the mixed coal or material as it flows from the bunker or other source of supply through the chute 2 and inlet hopper 6 fills the distributor and descends by gravity therethrough and through the outlet 7 into the stoker hopper 1, whence it is removed by the travelling stoker grate or belt. As the mixed material enters the upper narrower end of the distributor, it will tend to flow more rapidly through the medial center of the distributor, which, though it offers the most direct and shortest path of flow for the material, is nevertheless restricted in depth; and the material will tend to flow more rapidly along the sides of the distributor, which, though the path is not restricted in depth, is greater in length from inlet to outlet; but since the increased length of the path with its influence on the speed of the material is proportionately combined with the increased depth of the path with its influence on the speed of the material, a substantially uniform mean rate of flow of the coal or material will therefore be caused to take place through the distributor, and since the distributor is kept full of coal or material there will form no valleys or faster channels into which lumps or relatively larger bodies of coal or material may roll and thereby become separated from the finer coal or material; and likewise if the lumps and fines do not become separate, no segregation of lumps or fines can take place in this non-segregating distributor.

In employing the improved distributor for the feeding of coal to stokers of the travelling grate or belt type, the maintenance of a substantially uniform mean rate of flow throughout the width of the outlet of the distributor will ensure substantially uniform distribution of the larger and smaller sizes of coal throughout the width of the stoker, thereby enabling uniform and efficient combustion of the coal to be obtained.

Since the employment of baffles or similar means for the distribution of the material into a widening stream is avoided in the improved distributor, no obstruction to the flow of the coal or other material will be present to impede the gravity descent of the coal or material through the distributor.

I claim as my invention:

1. A distributor for fluent material flared to form a narrow inlet and a wide outlet, and having a bottom wall providing a plane surface, laterally divergent side walls, and a top wall providing a surface which is concave and the center of which is relatively depressed toward the bottom wall on an axis which lies in the plane of the center and medially between the sides of the distributor.

2. A distributor for fluent material flared longitudinally to form a narrow inlet and a wide outlet, and having a plane surface bottom wall, laterally divergent side walls, and a conical surface top wall the central portion of which is depressed relatively to its lateral portions in a direction toward the bottom wall on an axis which lies in the plane of the center and medially between the sides of the distributor.

3. An inclined distributor for fluent material having an inlet at its upper end and an outlet at its lower end, a bottom wall providing a plane surface which widens from the inlet to the outlet, side walls at the lateral edges of the bottom wall, and a top wall connecting the side walls and providing a surface the central portion of which is depressed relatively to its lateral portions and the lateral portions of which diverge from the bottom wall as they approach the outlet of the distributor.

4. An inclined distributor for fluent material having an inlet at its upper end and an outlet at its lower end, a bottom wall which widens as it approaches the outlet, side walls joined to the bottom wall and diverging laterally and increasing in depth as they approach the outlet, and a top wall the surface of which is conical and the central portion of which is relatively depressed toward the bottom wall on an axis which lies in the plane of the center and medially between the sides of the distributor and the lateral portions of which diverge from the bottom wall as they approach the outlet of the distributor.

5. A distributor for fluent material having an inlet at its upper end, an outlet at its lower end, a bottom wall providing a plane surface which widens from the inlet to the outlet, side walls which increase in depth and diverge laterally as they approach the outlet, and a top wall which provides a surface having a portion between the side walls which is depressed toward the bottom wall and lateral portions joined to said side walls which diverge from the bottom wall in a direction from the inlet to the outlet to a progressive degree from the center to the sides of the distributor.

PHILIP B. RICHARDSON.