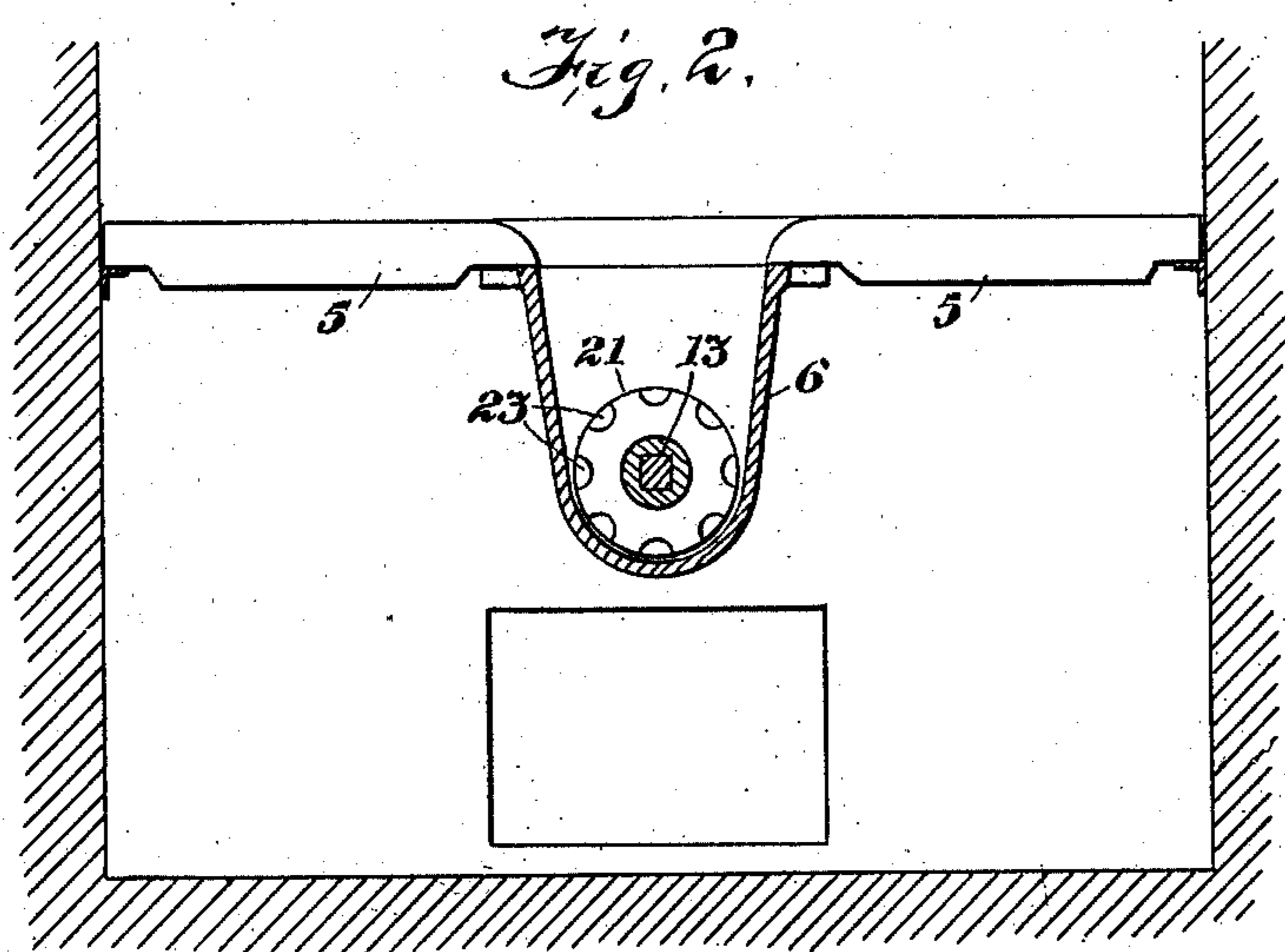
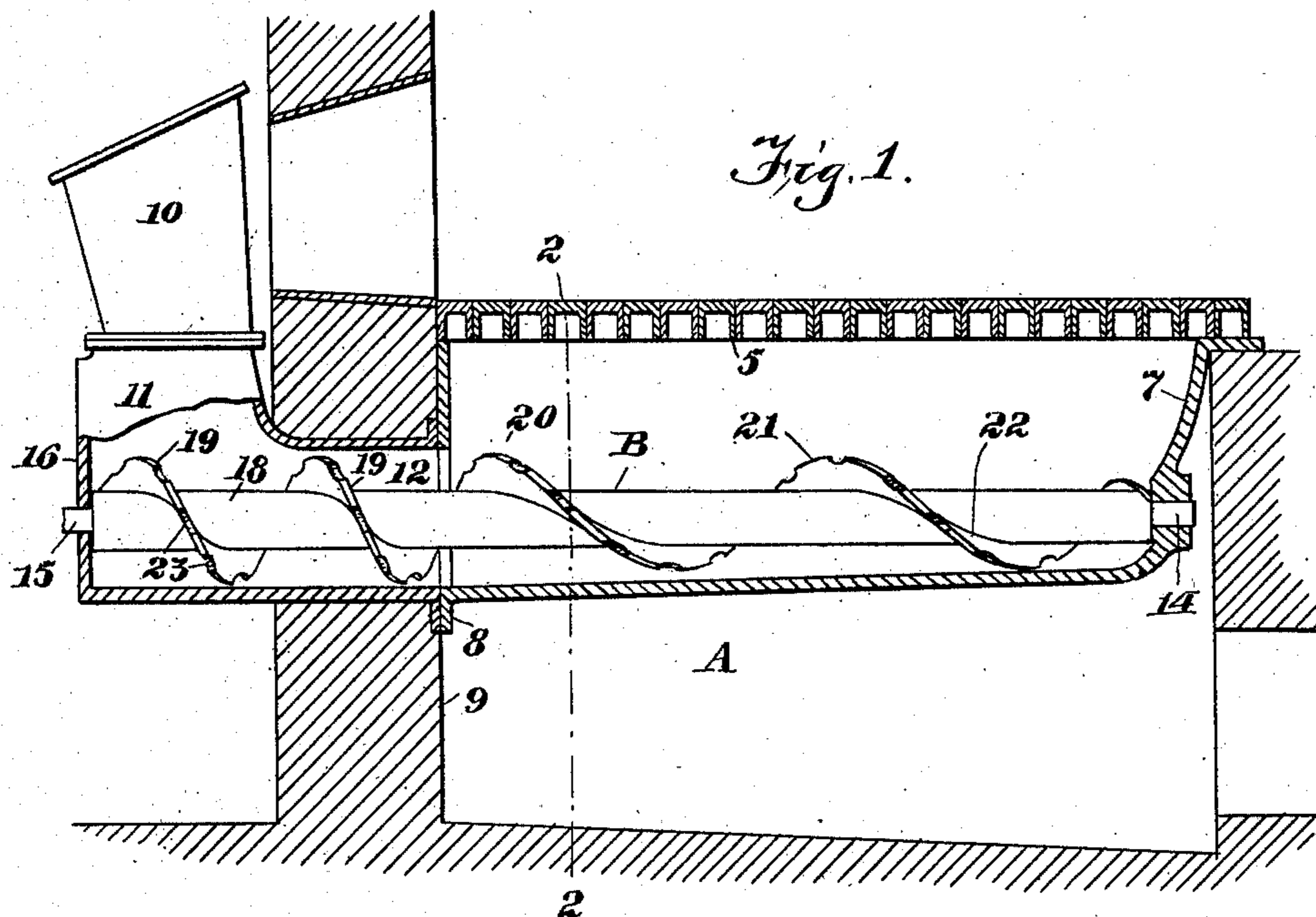


No. 826,792.

PATENTED JULY 24, 1906.

J. MACCORMACK.
DEVICE FOR FEEDING FUEL.
APPLICATION FILED JAN. 11, 1905.



WITNESSES:

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ENGINEER COMPANY, A CORPORATION OF NEW YORK.

DEVICE FOR FEEDING FUEL.

No. 826,792.

Specification of Letters Patent.

Patented July 24, 1906.

Application filed January 11, 1905. Serial No. 240,587.

To all whom it may concern:

Be it known that I, JOHN MACCORMACK, a citizen of the United States, residing at Bayonne, in the county of Hudson and State of New Jersey, have invented a new and useful Improvement in Devices for Feeding Fuel, of which the following is a specification.

This invention relates to improvements in an automatic device for feeding fuel into a furnace or for feeding masses of other material.

In carrying out the present invention I have particularly in view the provision of a mechanical stoker, whereby the fuel may be conveyed to the combustion-chamber of the furnace and forced or thrown onto the grate or grates in such manner that it will be evenly distributed over the body of the fire.

It is further my intention to provide a coal-conveying mechanism which may be used in connection with a grate arranged either longitudinally or transversely of the furnace.

My invention consists in the construction, combination, and arrangement of parts as set forth in the appended claims.

In the accompanying drawings, wherein I have shown one form of my invention, similar characters of reference indicate like parts in both the views.

Figure 1 is a view, partly in elevation and partly in section, showing the application of my improved stoker to a furnace. Fig. 2 is a transverse vertical sectional view taken upon the line 2 2 of Fig. 1.

Referring now to the accompanying drawings in detail, the letter A indicates any suitable furnace which is provided with any desired type of grate or grates, such as shown at 5. In the present instance I have shown extending longitudinally of the grate a stoking-magazine 6, which is in the nature of a relatively long trough U-shaped in cross-section, said trough being suspended between the grates in any suitable manner. In the accompanying drawings I have shown the rear closed end 7 of the magazine-trough supported from the bridge-wall, while the front 8 of such magazine abuts against the inner front wall 9 of the furnace. In connection with this magazine I employ any preferred form of hopper, and in the apparatus illustrated such hopper comprises a receiving portion 10, mounted upon the lower member

11, which latter extends horizontally through the front wall of the furnace, as is shown at 12. This tubular portion 12 is practically a continuation of the magazine and may be so considered.

The essential feature of my invention is the conveyer proper, which is in the nature of a spiral screw, (indicated as an entirety by the letter B.) This screw in the present instance is supported upon a square shaft 13, having its rear end 14 journaled in the end wall 7 of the magazine and its front end 15 similarly mounted in the front wall 16 of the lower hopper member 11.

One of the well-known difficulties attending the use of screw stoking devices is the difficulty of effecting the even feeding of the fuel throughout the entire length of the magazine. Referring to Fig. 1, it will be observed that in the hopper the flights form an angle with the axis of the screw which is greater than forty-five degrees and that in the trough or magazine the flights form an angle with the axis of the screw which is substantially forty-five degrees. The flights of the screw conveyer exert upon the fuel a force which may be resolved into two forces—one parallel with the axis, which we may call a "conveying" effort, and one at right angles to the axis, which we may call a "lifting" effort. It will be readily understood that if the angle of the flights be greater than substantially forty-five degrees the conveying effort exerted will exceed the lifting effort, while if the angle of the flights be substantially forty-five degrees the conveying and lifting efforts will be approximately equal, and if the angle of the flights be less than forty-five degrees the lifting effort will exceed the conveying effort. It is desirable that in the hopper and its extension through the furnace-walls the conveying effort shall exceed the lifting effort, and conveyer-screws have heretofore been made in this form throughout their length; but I have discovered that the difficulty heretofore experienced in obtaining a uniform feeding action throughout the length of the magazine is greatly diminished and may be substantially overcome by making the flights of the screw within the magazine of an angle which will afford a lifting effort at least equal to the conveying effort, or, in other words, by making these

flights of an angle of substantially forty-five degrees or less. This results, preferably, in a structure in which at the forward end of the screw the conveying effort exceeds the lifting effort and in which in the magazine the lifting effort equals or exceeds the conveying effort. In the screw shown in the drawings the initial conveying flights 19 19 are of the same pitch. They are followed by a flight of gradually-increasing pitch, while the lifting-flights 20 and 21 are of the same pitch of about forty-five degrees. In Fig. 1 I have also shown the diameter of the flights decreasing toward the rear end of the screw, and this I have found in general to be desirable, although not essential, with screws constructed as above described. Other difficulties heretofore experienced with screw conveyers used in feeding fuel to furnaces are the tendency to pack the fuel at the bottom of the magazine, the difficulty of conveying large lumps of fuel without clogging the apparatus, and the liability of hard substances—such as slate, nails, spikes, and the like—being caught between the edge of the flights and the walls of the magazine. These things not only impose abnormal strains on the mechanism as well as the motor and sometimes result in breaking the parts, but they render the action of the conveyer uncertain and unsatisfactory. I have discovered that these difficulties are to a great extent, if not entirely, overcome by providing the edge of the flights with indentations 23, the effect of which is to diminish the tendency to pack the fuel at the bottom of the magazine, to break or grind up large lumps of fuel to sizes which can be conveniently conveyed, and to act as liberating-spaces to permit the passage of such hard substances as cannot be readily broken, as nails and the like, and so prevent jamming. This constitutes an independent feature of improvement in the apparatus shown in the drawings.

The flights 19, 20, and 21 are shown in the drawings as mounted upon a sleeve 18, enveloping shaft 13, and such sleeve may be made of a plurality of sections or may be continuous, as desired.

While I have herein shown and described one embodiment of my invention, I desire it to be understood that the several features of my invention are not limited to the forms severally shown, but that various modifications and changes may be made without de-

parting from the spirit of my invention and without exceeding the scope of my claims.

Having thus described my invention, what I claim is—

1. The combination with a furnace of a hopper, a magazine and a screw conveyer, the screw-thread of which conveyer within the hopper forms an angle of substantially more than forty-five degrees with respect to the axis, and the screw-thread of which conveyer within the magazine forms an angle of substantially forty-five degrees or less with respect to the axis.

2. The combination with a furnace, of means for feeding fuel thereto, comprising a magazine, and a screw arranged therein having indented flights to diminish the strains imposed upon the fuel-feeding mechanism.

3. The combination with a furnace, of means for feeding fuel thereto, comprising a magazine, a screw therein having flights of relatively different pitch, the edges of said flights being indented.

4. The combination with a furnace, of means for feeding fuel thereto, comprising a magazine, a screw therein having flights of relatively different diameter, said flights being indented to diminish the strains imposed upon the fuel-feeding mechanism.

5. The combination with a furnace, of a stoking mechanism, comprising a conveying trough or magazine, having a hopper communicating therewith, and a conveying and feeding screw having a shaft rotatably mounted in the magazine-body, a sleeve enveloping said shaft, and a plurality of indented flights to diminish the strains imposed upon the fuel-feeding mechanism, said flights being of relatively different diameter and pitch, spirally arranged about said sleeve.

6. The combination with a furnace, of a stoking mechanism, comprising a magazine, a screw member therefor having certain flights at the front portion thereof, adapted to push or feed the material toward the rear of the magazine, and other flights adapted to exert a lifting influence upon the material coming from the first-mentioned flights to distribute the material uniformly over the furnace-grate, the edges of said flights having indentations formed therein.

JOHN MACCORMACK.

Witnesses:

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R. B. CAVANAGH.