March 23, 1948. S. ROGOW 2,438,375

APPARATUS FOR FEEDING FUEL CABLES TO FURNACES

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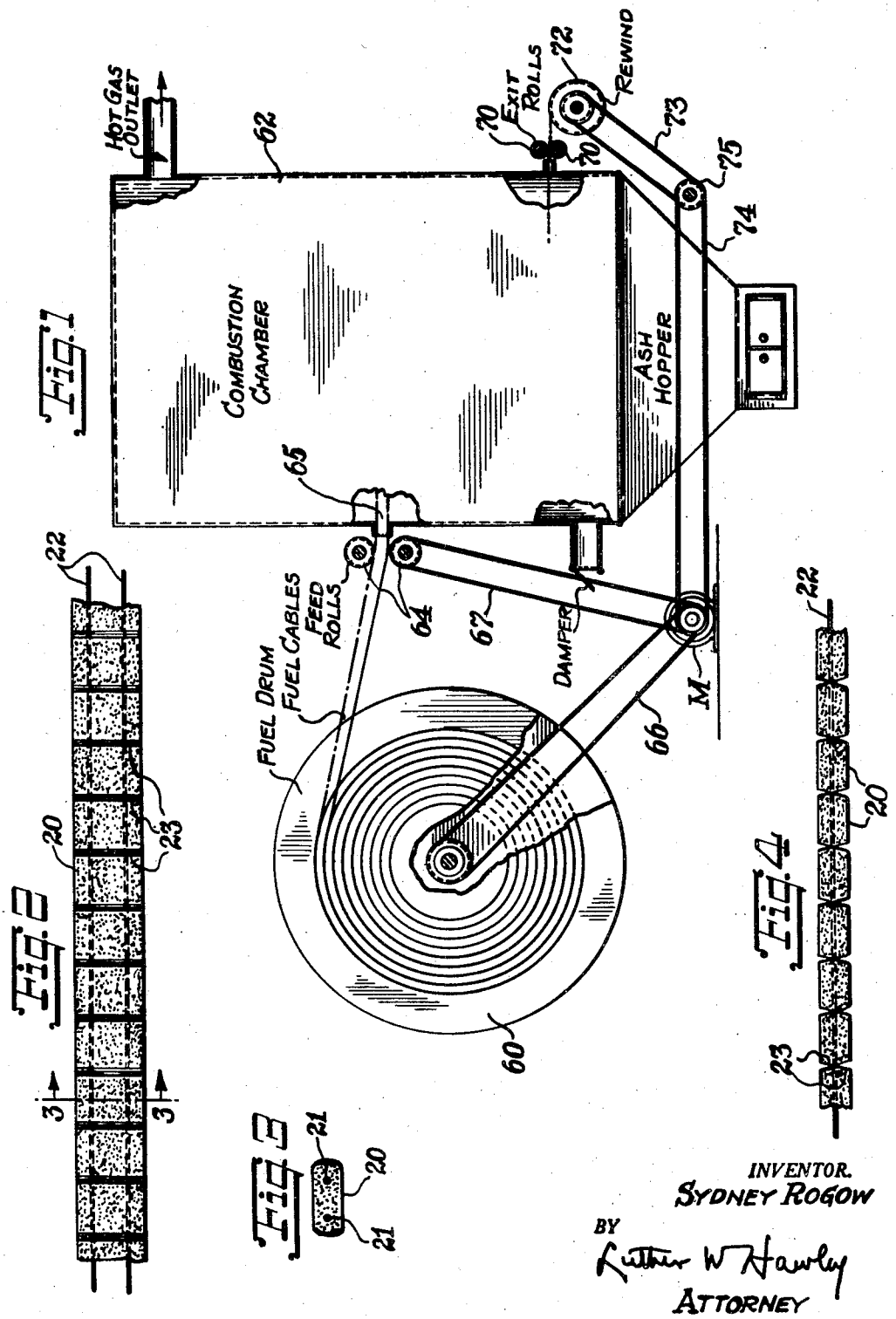


Fig. 1

Fig. 2

Fig. 3

Fig. 4

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Fig. 5

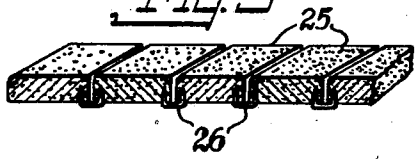


Fig. 6

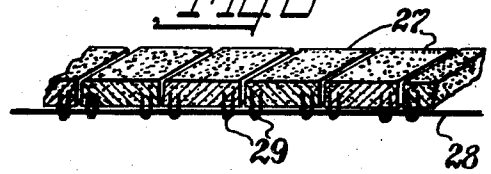


Fig. 7

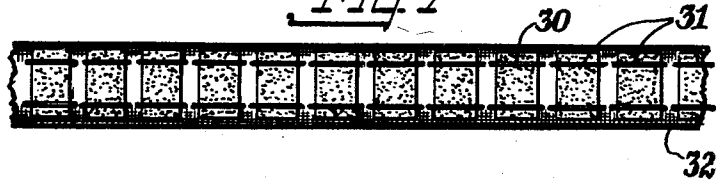


Fig. 8

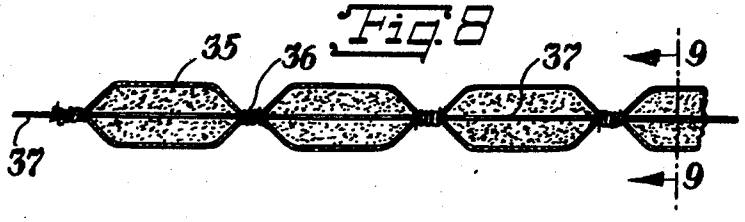


Fig. 9



Fig. 10

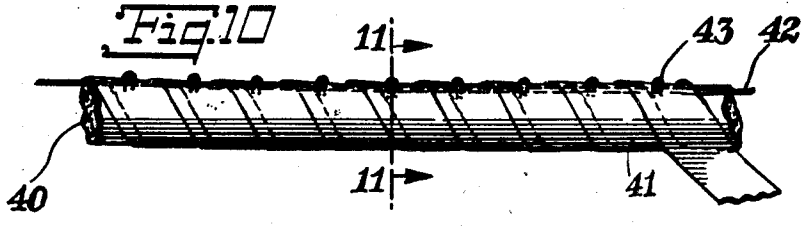


Fig. 11

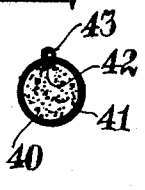


Fig. 12

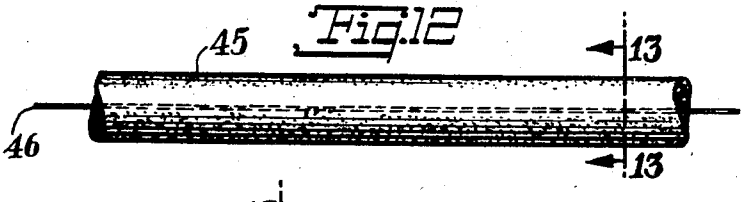
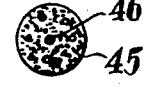


Fig. 13



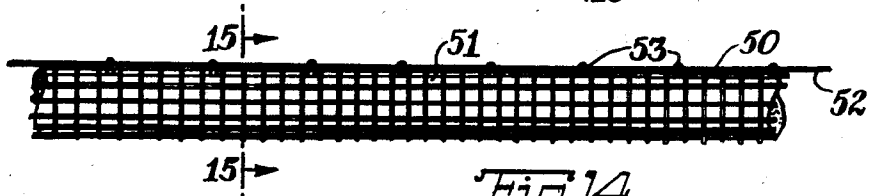


Fig. 14

Fig. 15



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APPARATUS FOR FEEDING FUEL CABLES TO FURNACES

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Application March 29, 1945, Serial No. 585,517

1 Claim. (Cl. 110—101)

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This invention relates to fuel and particularly to fuel in the form of a fuel cable.

At the present time a large amount of low grade fuel, such as coal dust or fines, is left at the mines and wasted since its fuel value does not warrant the expense of handling and transportation.

This invention has for its salient object to convert such fuel into a form in which it can be easily and economically handled, transported and used.

Another object of the invention is to provide fuel in such form that the consumer will obtain maximum efficiency therefrom.

Another object of the invention is to provide fuel in such form that it can be economically fed to the combustion chamber in which it is to be burned or consumed.

Another object of the invention is to provide fuel in such form that it can be easily and economically handled, transported, delivered to the consumer, and used by the consumer.

Another object of the invention is to provide a cheap and efficient fuel so constituted as to facilitate its use in automatic stoking and reduce to a minimum the mechanism required for such use.

Another object of the invention is to provide a simple, practical and economical method of forming and using the fuel cable.

Further objects of the invention will appear from the following specification taken in connection with the drawings which form a part of this application, and in which

Fig. 1 is an elevational view, somewhat diagrammatic and partly in section, showing a fuel cable constructed in accordance with the invention and also one form of apparatus adapted for storing and feeding such a cable;

Fig. 2 is a plan view illustrating one form of fuel cable embodying the invention;

Fig. 3 is a transverse sectional elevation of the cable shown in Fig. 2 and taken substantially on line 3—3, looking in the direction of the arrows;

Fig. 4 is an edge or side elevation of the cable shown in Fig. 2;

Fig. 5 is a perspective elevation illustrating another form of fuel cable embodying the invention;

Fig. 6 is a view similar to Fig. 5 but illustrating a further embodiment of the invention;

Fig. 7 is a plan view illustrating another embodiment of the invention;

Fig. 8 is a longitudinal sectional elevation

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illustrating a still further form of the invention;

Fig. 9 is a transverse sectional elevation taken substantially on line 9—9 of Fig. 8, looking in the direction of the arrows;

Fig. 10 is an elevational view illustrating a further embodiment of the invention;

Fig. 11 is a transverse sectional elevation taken substantially on line 11—11 of Fig. 10, looking in the direction of the arrows;

Fig. 12 is an elevational view illustrating another embodiment of the invention;

Fig. 13 is a transverse sectional elevation taken substantially on line 13—13 of Fig. 12, looking in the direction of the arrows;

Fig. 14 is an elevational view illustrating another embodiment of the invention; and

Fig. 15 is a transverse sectional elevation taken substantially on line 15—15 of Fig. 14, looking in the direction of the arrows.

As illustrated, the fuel cable can be manufactured in a number of different ways. The fuel is first crushed or pulverized and thereafter in most embodiments of the invention a binder, such as asphalt, coal tar, or any other suitable combustible binder material, is mixed with the fuel particles and the fuel is compressed at a reasonably high temperature in the presence of steam to enable the natural oils present in the fuel to act as binding agents, thus reducing to a minimum the quantity of the additional binder required.

As a result of this processing the mixture of fuel particles and binder may be formed into briquettes of the desired shape, which can be perforated and flexibly connected together by stringing the briquettes on a cord or cable which may be formed of wire or non-combustible material or of combustible material, such as rope or cord.

In the form of the invention illustrated in Figs. 2, 3 and 4 there are shown briquettes 20 which are perforated, as shown at 21, and are strung in end to end relation on cables 22 which, as above stated, may be wire, rope or any other desired material. The briquettes are oppositely beveled at the ends, as shown at 23, in order to facilitate the winding of the cable on the drum and to promote the flexibility of the fuel cable. This form of the invention could be formed by molding or forming the fuel cable on the flexible reinforcing members 22 and then dividing the fuel into sections as shown.

In Fig. 5 the briquettes 25 are flexibly connected by staples 26 and in Fig. 6 the briquettes

27 are connected to a wire or cord 28 by means of staples 29.

In Fig. 7 the briquettes 30 are secured by staples 31 to a flexible band 32 which may be formed of fabric or, if desired, of wire mesh.

The cable may also be formed by enclosing the fuel particles in envelopes or casings 35, as shown in Fig. 8, and the envelopes may be formed of any suitable material, such as paper, Cellophane or like material. These casings or envelopes may have incorporated therein fibrous material to give added tensile strength and the envelopes are connected together, as shown at 36, and are strung on a core which may be formed of cord or wire 37.

Another embodiment of the invention is shown in Fig. 10 in which the combustible material 40 is encased in a spiral winding or sheath 41 formed of suitable material, such as paper. A cord or wire 42 is enclosed in the sheath and the spiral windings are secured to the cord or wire 42 by means of staples 43.

Instead of first forming briquettes and then flexibly connecting the briquettes together or of encasing the fuel particles in envelopes or in a spiral sheath, the fuel cable may be formed by passing the mixture of fuel particles and binder through rolls or suitable presses or by means of an extrusion process, forming a flexible fuel cable from the mixture. This embodiment of the invention is illustrated particularly in Figs. 12 and 13. In Fig. 12 the cable is shown at 45 and as illustrated a core wire or cord 46 extends through the fuel cable 45 and provides the necessary tensile strength.

Still a further form of the invention is illustrated in Figs. 14 and 15 in which a wire mesh tubing 50 is shown, this tubing enclosing the fuel material in the form of lumps 51. A cord or wire 52 is connected to the tubing 50 by staples 53. With the form of the invention illustrated particularly in Figs. 10 to 13 inclusive the outer surface of the fuel cable may be coated with a rapid drying material, such as tar, asphalt, varnish, shellac, or other suitable material, to provide a wear-resistant skin. The surface may also be treated, if desired, with oil or calcium chloride to reduce to a minimum the formation of dust.

After manufacture the fuel cable is preferably wound on a drum, such as the drum 60 shown in Fig. 1, and the drums will be shipped to the retail dealer or industrial plant, as the case may be. The dealer will deliver the fuel by unreeling from the drum and reeling on a smaller reel or drum of the consumer the desired length of cable, in a manner similar to the delivery of oil to the fuel tank of the consumer.

The fuel cable constructed in the manner above described greatly simplifies the automatic feeding of fuel to a furnace since very simple mechanism for this purpose is required. In Fig. 1 there is illustrated somewhat diagrammatically one form of apparatus that may be utilized. In this figure the fuel drum 61 is mounted adjacent the furnace or heater 62 and the fuel rope or cable is led from the drum through feed rolls 64 and through an opening 65 into the combustion chamber of the furnace or heater. The fuel drum is driven by a belt 66 from a motor M and the lower feed roll 62 is also driven from this motor by a belt 67.

If the fuel cable has a cord or rope of combustible material, as the tensile cable, the entire fuel cable will be consumed in the furnace. However, if a wire cord is used and this cord is formed of suitable heat resistant material, the wire is led from the furnace between guide rolls 70 and 71 and is wound on a reel 72 which is connected by suitable belts 73 and 74 and idler pulleys 75 through the motor M.

If the combustible material, such as shown in Figs. 8 to 11 and consisting of fuel particles with very little or no binder is enclosed in the casing or sheath, the casing or sheath will burn upon entrance to the combustion chamber of the furnace and release the fuel particles. If desired, the feed rolls which feed the fuel cable into the furnace may be so formed as to crush or break the envelope or sheath, thus releasing a stream of fuel upon its entry into the combustion chamber.

It will be evident that the use of fuel cables is not confined to furnaces or heaters but that the cables may be used in stoves or the cable may be broken or cut into convenient lengths and burned in fireplaces. Furthermore, fuel cables of coal or coke may be used as fuel for hot gas turbine engines.

From the foregoing specification it will be clear that by this invention fuel or combustible material is processed into such form that material which is now unusable because of the expense of handling and transporting can be utilized and, furthermore, the transportation, delivery and use are facilitated and simplified. Moreover, the problem of automatic stoking requires practically no change in the construction of the furnace or heater, the fuel cable being fed by feed rolls into the furnace.

Although certain specific embodiments of the invention have been particularly shown and described, it will be understood that the invention is capable of modification and that changes in the arrangement and in the constuction of the various cooperating parts may be made without departing from the spirit or scope of the invention, as expressed in the following claim.

What I claim is:

In fuel burning apparatus of the character described, a furnace structure having a combustion chamber, a drum carrying a fuel cable at one side of the furnace, said fuel cable being carried by a non-combustible strand, a rewind roll at the opposite side of the furnace to receive thereon the non-combustible strand, a set of guide rolls for directing the cable into the combustion chamber, a set of guide rolls for directing the strand onto the rewind roll with the fuel cable consumed during passage through the combustion chamber and a motor drive for the drum and rewind roll.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
242,741	Banks	June 14, 1881
660,863	Low	Oct. 30, 1900
1,193,070	Roberts	Aug. 1, 1916
1,194,333	Foreman	Aug. 8, 1916
1,510,045	Day	Sept. 30, 1924