C. A. BRAUCHLER.

APPARATUS FOR FEEDING PULVERIZED FUEL.

APPLICATION FILED SEPT. 15, 1913.

1,231,327.

Patented June 26, 1917.

2 SHEETS—SHEET 1.

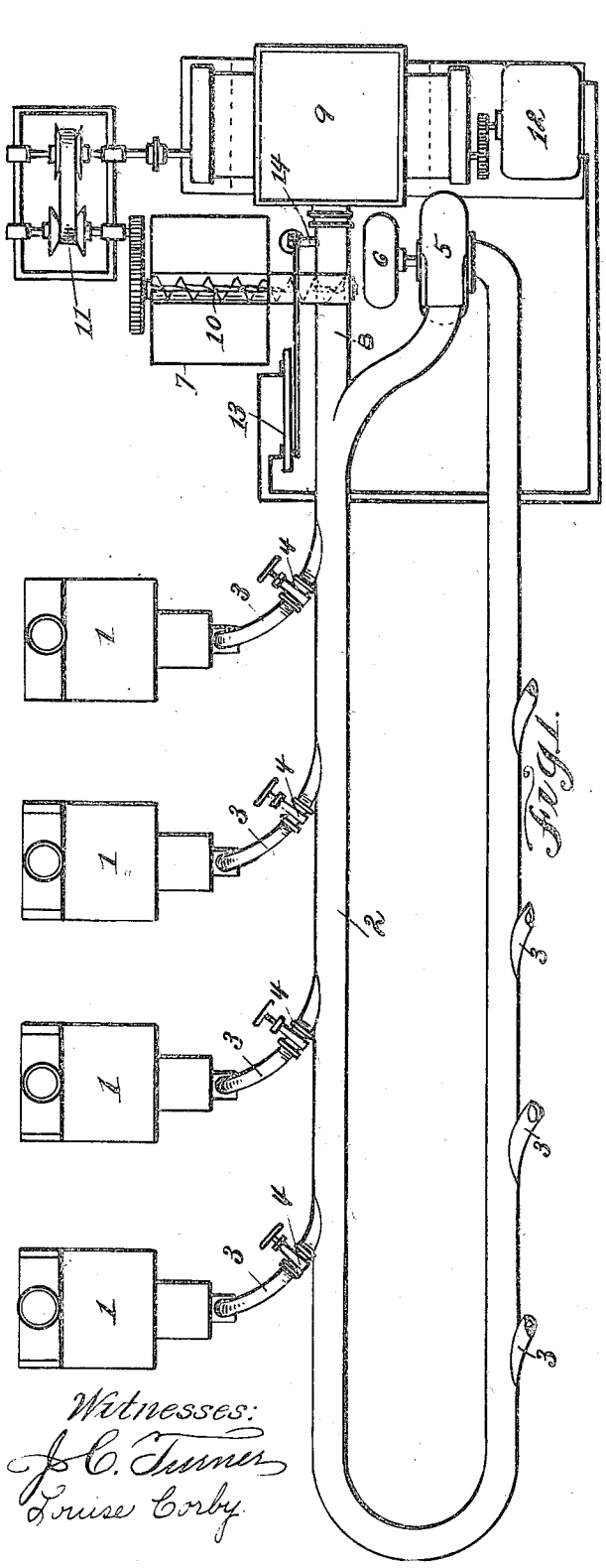


Fig. 1.

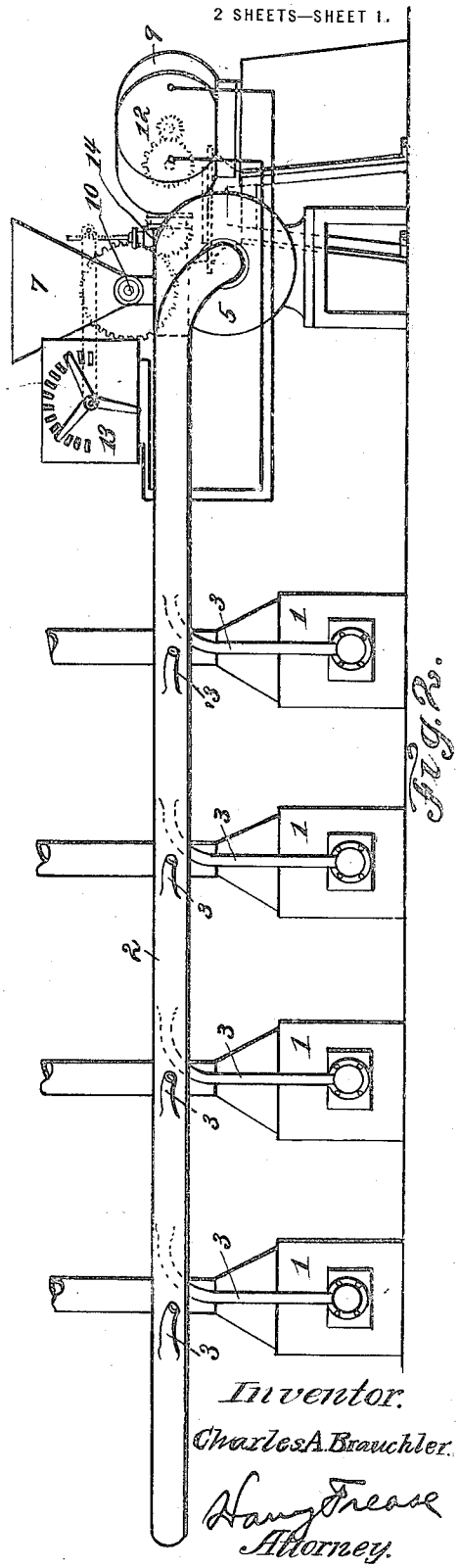


Fig. 2.

Witnesses:
J. C. Turner
Louise Corby.

Inventor.
Charles A. Brauchler.
Harry Grosse
Attorney.

C. A. BRAUCHLER.

APPARATUS FOR FEEDING PULVERIZED FUEL.

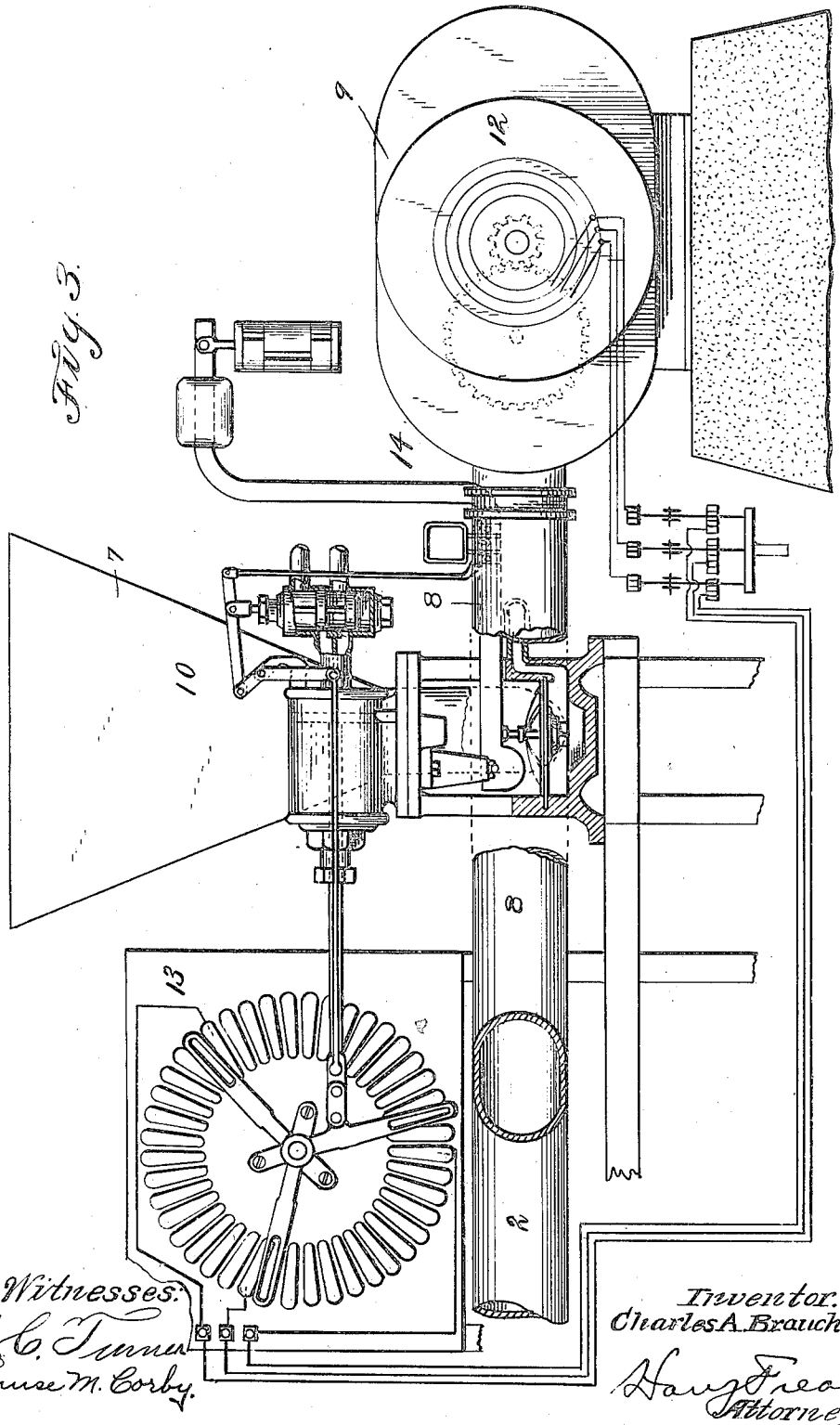
APPLICATION FILED SEPT. 15, 1913.

1,231,327.

Patented June 26, 1917.

2 SHEETS—SHEET 2.

Fig. 3.



Witnesses:
J. C. Turner
Louise M. Corby.

Inventor.
Charles A. Brauchler.
Howard Freas
Attorney.

UNITED STATES PATENT OFFICE.

CHARLES A. BRAUCHLER, OF CANTON, OHIO.

APPARATUS FOR FEEDING PULVERIZED FUEL.

1,231,327. Specification of Letters Patent. Patented June 26, 1917.

Application filed September 15, 1913. Serial No. 789,945.

To all whom it may concern:

Be it known that I, CHARLES A. BRAUCHLER, a citizen of the United States, residing at Canton, in the county of Stark and State of Ohio, have invented certain new and useful Improvements in Apparatus for Feeding Pulverized Fuel, of which the following is a specification.

The invention relates to an apparatus for feeding pulverized fuel to a plurality of furnaces, and the object of the improvement is to provide a main supply pipe in which a constant flow of fuel laden air will circulate at a uniform velocity to avoid the settlement of the fuel therein, and to provide automatic means for controlling the feed of fuel into the main supply pipe according to the particular number of furnaces receiving fuel therefrom.

The object of the invention thus set forth in general terms, and ancillary advantages, are attained by the preferred form of apparatus illustrated in the accompanying drawing, forming part hereof, in which—

Figure 1 is a plan view of the apparatus; Fig. 2, a side elevation thereof; and

Fig. 3, a side elevation of the feed blower and hopper showing fragmentary parts of the feed and supply pipes, and illustrating details of the pressure regulator conventionally shown in Figs. 1 and 2.

Similar numerals refer to similar parts throughout the drawings.

The series of furnaces 1 receive the pulverized fuel from the main supply pipe 2 through the branch pipes 3, each one of which is controlled by a valve 4. The main supply pipe 2 forms a continuous conduit having a circulating blower in closed circuit therewith, which blower may be in the form of the centrifugal fan 5, driven preferably by the electric motor 6. The circulating motor and fan are so proportioned as to power, capacity and efficiency, as to maintain the continuous circulation of fuel laden air in the main supply pipe at the rate of about 4000 feet per minute.

The cross area of the supply pipe 2 is at least as large as the cross area of all the branch pipes leading therefrom, and should be substantially uniform throughout its length to avoid any reduction of pressure or back pressure in its continuous circuit; and the supply pipe is preferably made somewhat larger in diameter than the aggregate area of the branch pipes, so as to constitute a reservoir from which fuel laden air may be discharged into the several furnaces.

The pulverized fuel is received from a suitable pulverizer, not shown, into the hopper 7, from which it is delivered into the feed pipe 8, leading from the feed blower 9 into the supply pipe 2, by means of the screw conveyer 10, which is operatively connected with the blower 9 by the variable speed gearing 11. The feed blower 9, which is preferably a positive blower as shown, and the conveyer 10 are preferably driven by the electric motor 12. The speed of the motor 12 is controlled by means of the electric switch 13 automatically operated by the pressure regulator 14; which regulator may be of the type shown in Letters Patent No. 1,075,733, and may communicate with the supply pipe or the feed pipe, but preferably as shown, communicates with the feed pipe at a point between the blower 9 and the conveyer 10, to be free of the pulverized fuel.

These parts are so organized, connected and arranged, that the blast of the feed blower 9 is sufficient to drive through the feed pipe against the pressure of the supply pipe, the amount of pulverized fuel delivered into the feed pipe by the conveyer 10, which amount is preferably one pound of fuel for each one hundred (100) cubic feet of air; and that the speed of the motor 12 will be inversely varied as the pressure in the feed pipe 8 and the communicating supply pipe 2, which variation extends from a minimum speed at the pressure created by the feed blower in the feed and supply pipes, when the valves of all the branch pipes are closed, to a maximum speed at the pressure maintained by the feed blower in the feed and supply pipes when the valves of all the branch pipes are open.

It will be understood that by the use of a pressure regulator of the type shown in U. S. Patent No. 1,075,733, one form of which is shown in the drawings, the variation of pressure within the feed and supply pipes does not exceed from two to five per cent., within which limits a substantially uniform or working pressure is maintained in the system at all times; loss of pressure and escape of air through the feed inlet being prevented by the powdered fuel in the screw conveyer and in the feed hopper.

In the operation of the apparatus, the cir-

culating fan, and the feed blower and conveyer being rotated by the respective motors, and a sufficient quantity of pulverized fuel being received in the feed conveyer hopper, the gearing and speed of the feed mechanism is so adjusted that the fuel will be delivered into the feed pipe by the conveyer and driven therefrom into the supply pipe by the feed blower in a quantity corresponding to the amount which will be discharged through the branch pipes, by the opening of the valves therein, into the particular number of furnaces desired to be supplied; the speed of the feed motor being varied and controlled by the pressure regulator, to accomplish this purpose, according to the slight and temporary variation of pressure in the feed and supply pipes, dependent upon the particular number of branch pipe valves which are open.

During the operation of the apparatus, it is evident that the circulating fan will maintain a constant flow of fuel laden air throughout the whole extent of the supply pipe, irrespective of whether any or all of the branch pipe valves are open or closed, and irrespective of the corresponding speed at which the feed motor and conveyer may be operating, and that the feed blower will maintain a substantially uniform pressure throughout the system at all times; thereby maintaining in the supply pipe, as a reservoir, a constantly circulating supply of fuel laden air at a substantially uniform pressure, which may be discharged into any particular furnace or furnaces by merely opening the valves of the branch pipes leading thereto, and the fuel and air thus discharged will be replaced by the automatic operation of the feed mechanism herein described, which serves to maintain the necessary or desirable amount of powdered fuel in the supply pipe at all times.

At the same time the substantially uniform cross area of the supply pipe throughout its whole extent, avoids any material reduction of pressure therein, and permits the flow of air at a substantially uniform volume and velocity throughout its whole extent, thereby constantly maintaining the carrying power of the air throughout the reservoir formed by the feed pipe, and preventing the settlement of any fuel therein at any point.

I claim:

1. A pulverized-fuel feeding apparatus including a continuous supply pipe having a blower in circuit therewith and a plurality of valved branch pipes leading therefrom, and means for feeding fuel-laden air into the supply pipe and for maintaining substantially uniform pressure therein, the cross area of the supply pipe being substantially uniform throughout its extent.

2. A pulverized-fuel feeding apparatus including a continuous supply pipe having a blower in circuit therewith and a plurality of valved branch pipes leading therefrom, and means for feeding fuel-laden air into the supply pipe and for maintaining substantially uniform pressure therein, the cross area of the supply pipe being substantially uniform throughout its extent and greater than the aggregate cross areas of the branch pipe.

3. A pulverized-fuel feeding apparatus including a continuous supply pipe having a blower in circuit therewith and a plurality of valved branch pipes leading therefrom, a feed pipe communicating with the supply pipe, a conveyer to deliver fuel and a blower to discharge air into the feed pipe geared together, a motor connected with said conveyer and blower, and a pressure regulator communicating with the feed pipe to control the speed of the motor.

4. A pulverized-fuel feeding apparatus including a continuous supply pipe having circulating means in circuit therewith, one or more valved branch pipes leading from the supply pipe, and means controlled by the pressure in the circuit for feeding fuel and air into the supply pipe and maintaining a working pressure therein.

5. A pulverized-fuel feeding apparatus including a continuous supply pipe having circulating means in circuit therewith, one or more valved branch pipes leading from the supply pipe, and means controlled by the pressure in the circuit for feeding fuel and air into the supply pipe, said means feeding fuel in proportion to the volume of air.

6. A pulverized-fuel feeding apparatus including a continuous supply pipe having circulating means in closed circuit therewith, one or more valved branch pipes leading from the supply pipe, and means controlled by the pressure in the supply pipe for feeding fuel and air at working pressure into the supply pipe.

CHARLES A. BRAUCHLER.

Witnesses:
LOUISE M. CORBY,
ELFRIEDE SCHMIDT.