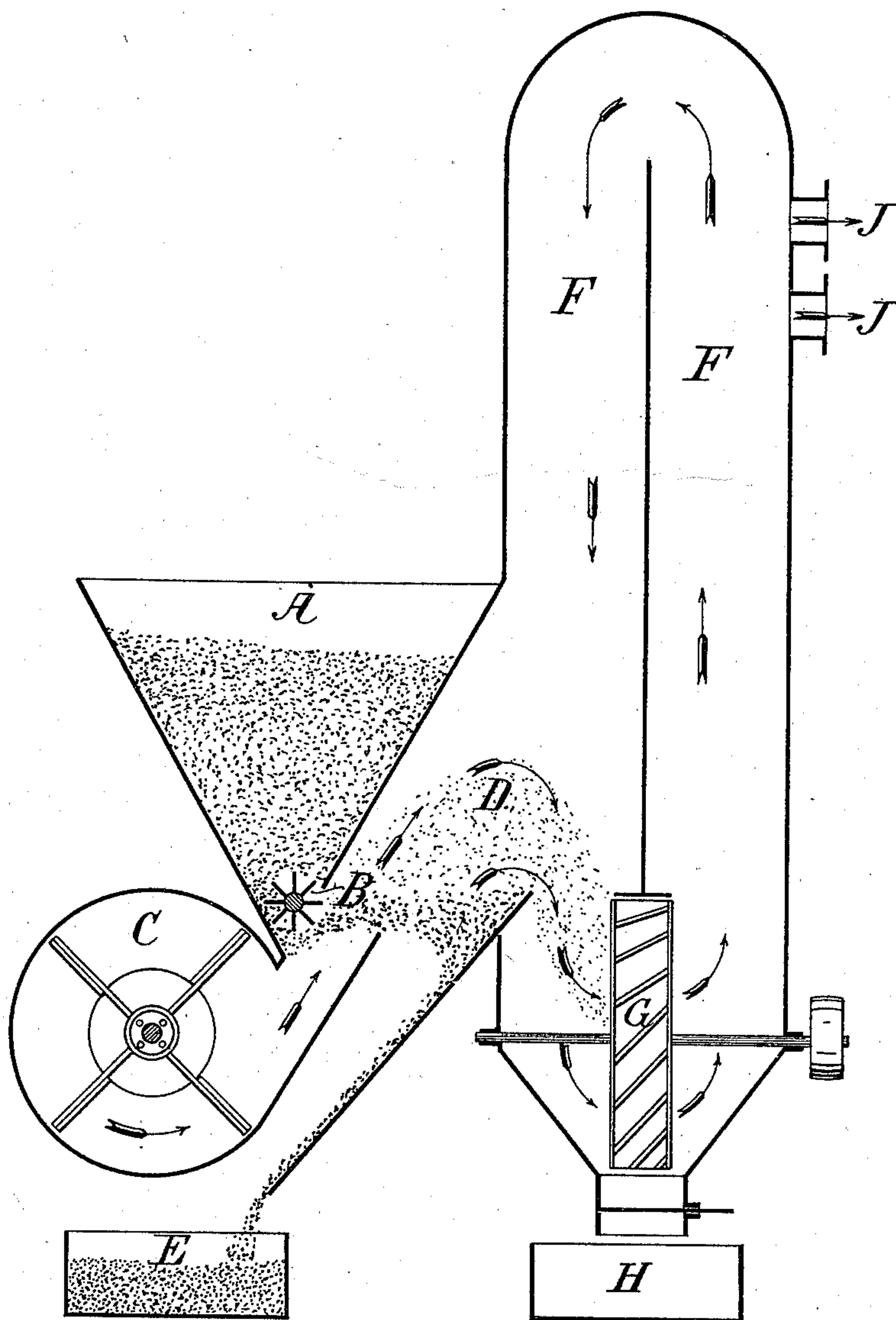


(No Model.)

C. SCHMITZ.  
METHOD OF AND APPARATUS FOR MIXING COAL DUST AND AIR  
FOR COMBUSTION.

No. 540,114.

Patented May 28, 1895.



WITNESSES.

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# UNITED STATES PATENT OFFICE.

CONSTANZ SCHMITZ, OF BERLIN, GERMANY.

METHOD OF AND APPARATUS FOR MIXING COAL-DUST AND AIR FOR COMBUSTION.

SPECIFICATION forming part of Letters Patent No. 540,114, dated May 28, 1895.

Application filed July 2, 1894. Serial No. 516,407. (No model.)

*To all whom it may concern:*

Be it known that I, CONSTANZ SCHMITZ, a subject of the King of Prussia, Emperor of Germany, residing at Berlin, in the Kingdom of Prussia, Germany, have invented a new and useful Method of and Apparatus for Mixing Coal-Dust and Air for Combustion, of which the following is a specification.

All the coal-dust firings hitherto used have the inconvenience, that the ground coal is introduced by means of any suitable mechanical device directly into the firing place. In consequence thereof an intimate mixture of coal and air is not obtained and a portion of the coal escapes unburned and falls down in the flues or it passes as smoke into the chimney. Moreover the quantity of the introduced coal cannot be rendered dependent upon the air quantity, so that with an increased air quantity a correspondingly greater quantity of coal is not introduced into the fire place; but the effect hereby produced is quite contrary to the intended purpose as the excess of cold air cools the firing place and prevents thus the ignition and good combustion of the coal; besides the feeding devices very often refuse the service, because any larger grain, the coal agglomerated by moistness, or a thread of the coal sacks hinders the feeding. By this the regularity of the working is put in question as it has been shown by practice. Finally it is impossible to force the firing with the hitherto known means. These inconveniences can be obviated by preparing an intimate mixture of coal dust and air, which always is composed in the manner necessary for obtaining the most advantageous combustion of the kind of coal to be taken into consideration. Such a mixture stored up and introduced into the furnace as required, will always afford a faultless and smokeless combustion. The right composition and the required uniformity of the mixture can be attained only without the fire place. A separation of the pure coal-dust from the impurities contained in the ground coal must precede the preparation of the mixture. To effect this separation directly the same air is used, which afterward is to be mixed with the coal-dust, and in such a manner, that the ground coal is introduced into an air current and carried along with it for some time. The impurities and larger pieces

then fall down, as the velocity of the air current may be so taken, that only the finest coal dust particles can be carried by the current. The air and the fine coal dust enter then together into a separate room, where they are stored up as a finished mixture and introduced as wanted, into the fire place. In this store-room the air is held in a continuous movement. The air, corresponding to the speed, with which it moves, will hold in suspension only a quite determined percentage of coal-dust. If therefore coal-dust is introduced in excess into the store-room, the air will be saturated only with the percentage of coal dust corresponding to the velocity with which it moves in the store-room. By altering the velocity of the air, the percentage of the composition of the mixture of air and coal dust may therefore also be altered corresponding to the burning value of the kind of coal employed. When from the store room a certain quantity of air is fed into the fire place, at the same time so large a quantity of coal dust will be taken along as under the conditions obtaining the air quantity will be capable to burn. A decrease or increase of air supply will cause at once a corresponding decrease or increase of the quantity of coal, as the percentage of the composition of the mixture is always the same. This percentage of the composition is altered only by the velocity of the air in the store-room independent of the quantity of air taken therefrom.

The accompanying drawing shows, by way of example, a device, which may advantageously be employed for carrying out the process.

From a funnel A the ground coal is led by means of a feeding roller or another suitable device B into an air current produced by a blowing engine or a windwheel C or by any other suitable means. The air current may also be produced, say by utilizing only the sucking effect of a second blowing engine G. This air current carries the coal through a channel D into the store-room F. In this way the air current corresponding to the velocity, with which it moves, allows all the parts heavier than the fine coal dust, to fall down. These parts, say coarser coal pieces, mineral admixtures and the like are collected in a vessel E. In the store-room F the air, maintaining in



suspension the coal dust arriving from the channel D is put in motion by means of a blowing engine or wind wheel G or by another suitable device or only by the effect of the first wind wheel E. The velocity of the air is so, that it maintains in suspension exactly so large a quantity of coal dust as, under the conditions obtaining, can be burned in the most advantageous manner. When a larger quantity of coal dust is introduced than the air in motion is capable to maintain in suspension, it falls down and is collected on the bottom of the store-room, whence from time to time it is discharged into a vessel H placed underneath the store-room F. From the store-room the mixture of coal dust and air is carried off through one or more conduit-pipes J and led by means of a blowing engine or by the natural draft into one or more fire places. The combustion takes place here in a known way, say on surfaces made of fire bricks, while for starting the plant the plane grate or another firing already in use may be employed.

It will be observed that the storage chamber is of increased cross sectional area relatively to its inlet and outlet, so that the air in said chamber instead of traveling in a straight line from the inlet to the outlet, will be subjected to an eddying agitation, to hold the coal dust in suspension, and this effect is further improved by producing a circuitous channel in the storage chamber, as shown and placing the blowing engine G in the said channel.

Having now fully described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. The herein described method of treating coal dust fuel, which consists in feeding the same into a chamber agitating the body of air contained in said chamber without directly expelling it therefrom, and feeding to the furnace as required, the mixture of air and suspended coal dust, substantially as described.

2. The herein described method of treating coal dust fuel, which consists in feeding the

same into a chamber, producing an eddying agitation of air in said chamber to hold the coal dust in suspension, and feeding to the furnace as required, the mixture of air and suspended coal dust, substantially as described.

3. An apparatus for mixing coal dust with air, consisting of a feed device for the coal, a storage chamber having an inlet connected to the feed device, and an outlet adapted for connection with a furnace, said storage chamber being of enlarged cross sectional area relatively to the inlet and the outlet, and a blowing engine for producing a current of air in the storage chamber, substantially as described.

4. An apparatus for mixing coal dust with air, consisting of a feed device for the coal, a storage chamber having an outlet adapted for connection with a furnace, a channel connecting the feed device with the storage chamber, and provided with an outlet for coarse particles, and the blowing engine for producing a current of air in the said channel and storage chamber, substantially as described.

5. An apparatus for mixing coal dust with air, consisting of a feed device for the coal, a storage chamber having an inlet connected to the feed device, an outlet adapted for connection with a furnace, and a circuitous channel and a blowing engine for producing a current of air in the storage chamber, substantially as described.

6. An apparatus for mixing coal dust with air, consisting of a feed device for the coal, a storage chamber having an inlet connected to the feed device, an outlet adapted for connection with a furnace, and a circuitous channel, and a blowing engine located in said channel to agitate the air in the storage chamber, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CONSTANZ SCHMITZ.

Witnesses:

EDUARD PEITZ,  
GUSTAV HÜLSMANN.