R. G. MILLER.

MECHANICAL COAL FEEDER.

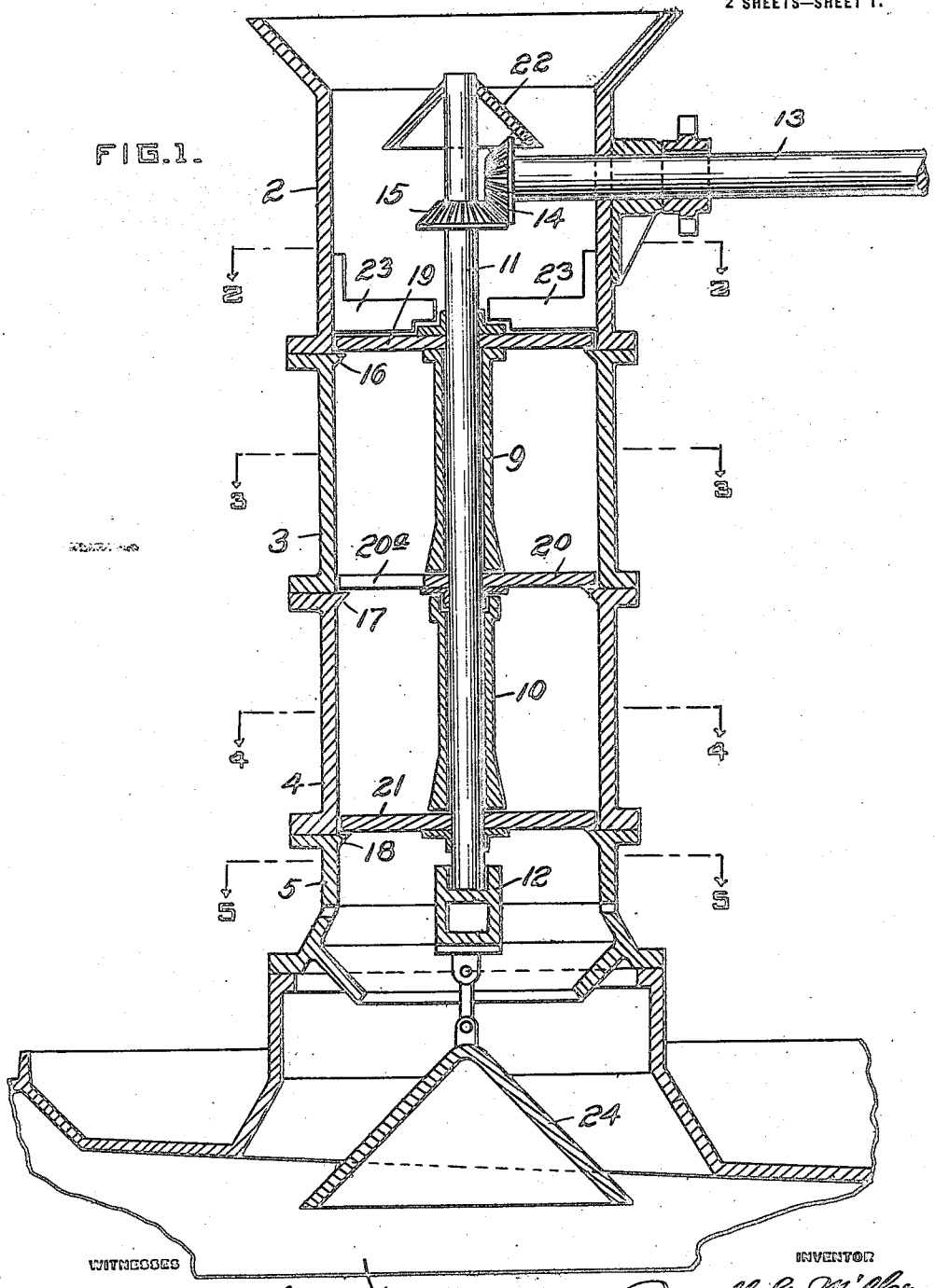
APPLICATION FILED DEC. 17, 1919.

1,372,765.

Patented Mar. 29, 1921.

2 SHEETS—SHEET 1.

FIG. 1.



WITNESSES

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2 SHEETS—SHEET 2.

FIG. 2.

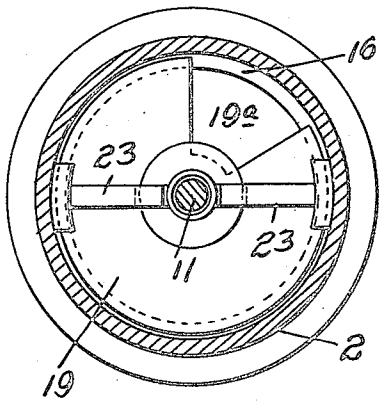


FIG. 3.

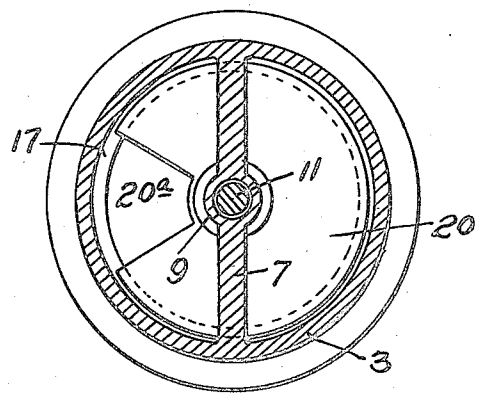


FIG. 4.

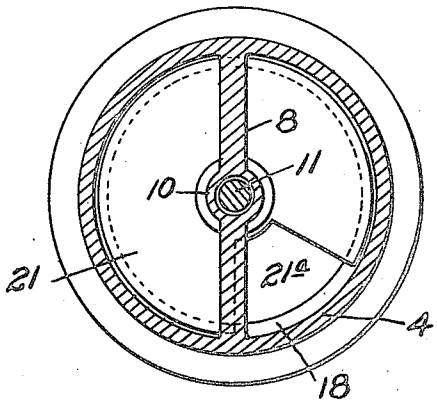
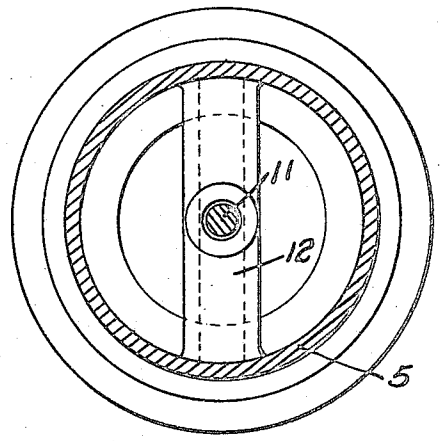


FIG. 5.



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UNITED STATES PATENT OFFICE.

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MECHANICAL COAL-FEEDER.

1,372,765. Specification of Letters Patent. Patented Mar. 29, 1921.

Application filed December 17, 1919. Serial No. 345,477.

To all whom it may concern:

Be it known that I, RUSSELL G. MILLER, a citizen of the United States, and a resident of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have made a new and useful Improvement in Mechanical Coal-Feeders, of which the following is a specification.

My invention consists in a mechanical coal feed device and the object of my invention is to supply coal to a gas producer, ore to a blast furnace, or similar material to an inclosed chamber of any kind without permitting a through passage between the exterior and interior of the structure to be supplied.

In the drawings I have illustrated my invention as adapted to feed by gravity to a gas producer and Figure 1 is a vertical section through my device and part of the top of the producer fed thereby; Figs. 2, 3, 4 and 5 are horizontal sections on lines 2—2, 3—3, 4—4 and 5—5 respectively of Fig. 1.

Briefly, my device consists in a vertical cylindrical chute intended to receive coal at its upper end and discharge same into the producer at its lower end. It is divided vertically into several chambers by rotating, horizontal disks and respective chambers are divided horizontally into non-connecting compartments by a vertical partition. The rotating disks are provided with openings whereby they are adapted to alternately connect and seal longitudinally adjacent compartments.

The chute is composed of cylindrical sections 2, 3, 4 and 5 mounted one above the other, section 5 being the lowest and opening into the top of producer 1. Each section is open at both ends and sections 3 and 4 have integral, vertical partitions 7 and 8 respectively which divide those sections into right hand and left hand semi-cylindrical compartments without any communicating opening. Partitions 7 and 8 have enlarged, central portions which form journal bearings 9 and 10 respectively for a central operating shaft 11. Section 5 is provided with a transverse support 12 for shaft 11. Shaft 11 is rotated by a horizontal driving shaft 13 through bevel gears 14 and 15.

The upper ends of sections 3, 4 and 5 are provided with inwardly extending ridges 16, 17 and 18 respectively which support door or shutter plates 19, 20 and 21 respectively. Each of these plates has a sectoral notch indicated by the suffix "a" and amounting, in this construction, to approximately one sixth of the area of the plate. The plates are fixedly mounted on shaft 11 and, when rotated therewith, the open sectors are presented alternately to the opposite semi-cylindrical compartments both above and below the plate.

The open sectors are disposed about the shaft's axis relatively to each other so that although there are always passages between any of the chute chambers and its adjacent chamber or chambers, there are never openings between all of the alined semi-cylindrical compartments at the same time.

Figs. 2, 3 and 4 illustrate a relative axial position of plates 19, 20 and 21 wherein they are timed with each other to insure the above result.

The upper end of shaft 11 is provided with a shield 22 to protect gears 14 and 15 from falling material. Section 2 has inwardly extending stationary blades 23 which insure relative movement of plate 19 and any material carried thereby and prevents the blocking of opening 19a. A deflector 24 is hung from section 5 and serves to spread the falling material about producer 1.

Operation: Coal is supplied continuously to the upper chamber in section 2. Shaft 11 is rotated steadily and slowly and plate 19 acts as a door or shutter to feed alternately to the opposite compartments in section 3 and to seal the compartment which is not receiving coal from chamber 2. Plate 20 acts similarly to supply alternately each of the compartments in section 4 and to alternately seal them from compartment above. Plate 21 feeds coal alternately from the opposite compartments of section 4 to the gas producer and seals the non-feeding compartment from the producer. In the temporary position indicated, coal is dropping through opening 19a into the right hand compartment in section 3 but is held therein by plate 20. The opening in the latter plate is admitting coal from the left hand compartment in section 3 into the left hand compartment of section 4. This coal is retained therein by plate 21, the opening 21a in which is permitting coal from the right hand compartment in section 4 to drop through section 5 onto the deflector 24 and into the producer.

It is obvious that gas cannot pass up-

wardly into the left hand compartment in section 4, nor can any gas entering the right hand compartment pass into the compartment above it in section 3.

As shaft 11 and the plates rotate, there will be two periods in each revolution of each plate when its opening will lead to each side of partition 7 or 8 as the case may be, but the openings are so spaced axially and relatively that at such times the openings in the other plates are not so located; consequently, at no time is there a through passage between the producer and the atmosphere to permit the escape of gas.

I do not consider it necessary to provide tighter seal joints between the circular plates and the walls of the chute but that may be done if desired. While deflector 24 serves a useful purpose when coöperating with the chute, its use is not essential to the functioning of the feeder and I contemplate its omission. While there is a relation between the number of door plates and the proportional size of the sectoral opening in each plate, neither the number of plates nor the proportional size is limited to what I have shown. Various other modifications in my device may be made without departing from its principle and I contemplate such modifications in its commercial development.

I claim:—

1. In a mechanical coal feeder, a chute, a longitudinal partition therein, transverse plates dividing said chute into transverse chambers and each provided with an opening, and means for moving said plates, said openings being positioned in their respective plates so that in moving said plates all of said openings are never on the same side of said partition at the same time.

2. In a mechanical coal feeder, a longitudinal chute, a plurality of spaced plates mounted in said chute so as to be rotated about the axis of said chute and adapted to form therewith successive chambers extending transversely of said chute and each provided with an opening, and means for rotating said plates, said openings being so positioned within their respective plates and about the axis of said chute so that upon each 120 degrees of axial rotation of said plates one of the openings will pass a given radius through said axis.

3. In a mechanical coal feeder, a longitudinal chute, a longitudinal partition therein, transverse plates dividing said chute into a plurality of chambers and each provided with an opening, and means for shifting said plates synchronously, said openings being spaced relative to said partitions so that all of them are never positioned on the same side of said longitudinal partition.

4. A mechanical coal feeder, comprising a vertical, cylindrical chute, a vertical partition in said chute, horizontal plates dividing said chute into horizontal chambers and each provided with a sectoral opening, and means for rotating said plates, said openings being spaced about the axis of said cylinder so that all of them are never positioned on the same side of said vertical partition.

5. A mechanical coal feeder, comprising a vertical chute divided into longitudinal compartments, a plurality of horizontal, rotatable, spaced plates each adapted to extend across all of said compartments in said chute and each provided with an opening disalined with the corresponding openings in the other plates, and means for rotating all of said plates and maintaining the relative position of said openings.

6. In a mechanical coal feeder, a vertical, cylindrical chute, projecting ridges on the inner surface of said chute spaced from each other, disks supported upon said ridges and dividing said chute into horizontal chambers, vertical partitions dividing said chambers, a shaft journaled in said partitions and adapted to rotate said disks, and an opening in each of said disks which is disalined with similar openings in the other disks.

7. In a mechanical coal feeder, a vertical, cylindrical chute, a vertical central shaft, three circular plates fixedly mounted on said shaft, spaced from each other so as to divide said chute horizontally into several chambers, a sectoral opening in each of said plates, said openings in the upper, middle and lower plates being so located about said shaft that they respectively pass a given radial line upon shaft rotation of 0, 120 and 240 degrees.

In testimony whereof, I have hereunto subscribed my name this 11th day of December, 1919.

RUSSELL G. MILLER.