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CONTINUOUS COAL OR OIL-SHALE MINING PULVERIZING AND SIMULTANEOUS BURNING APPARATUS

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Fig. 1.

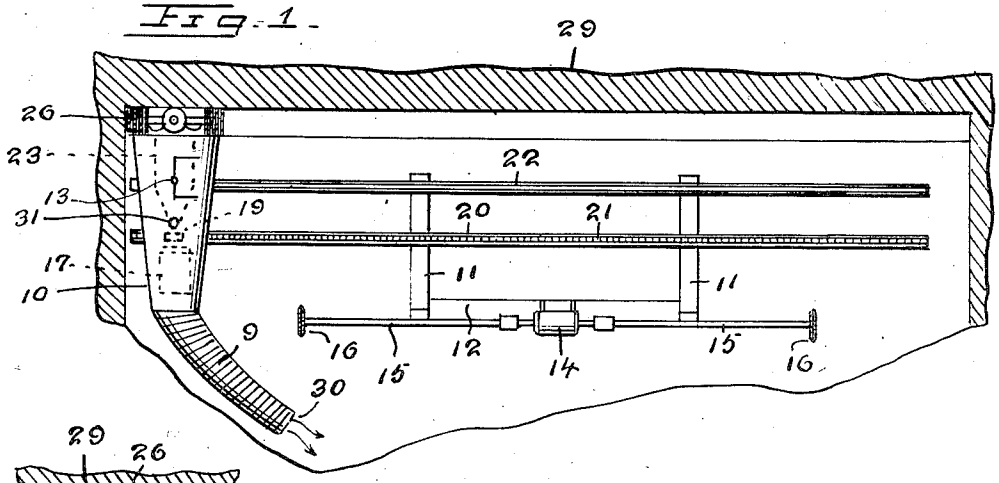


Fig. 2.

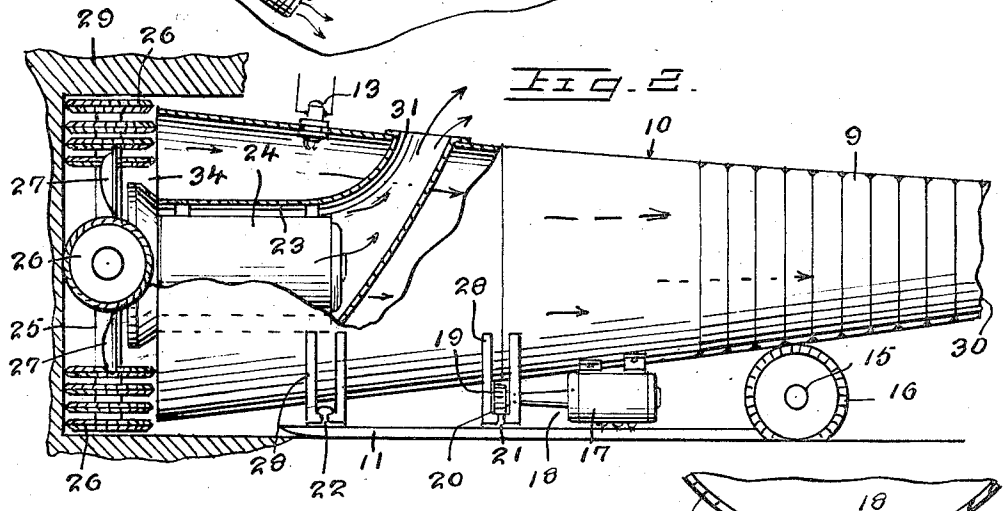


Fig. 3.

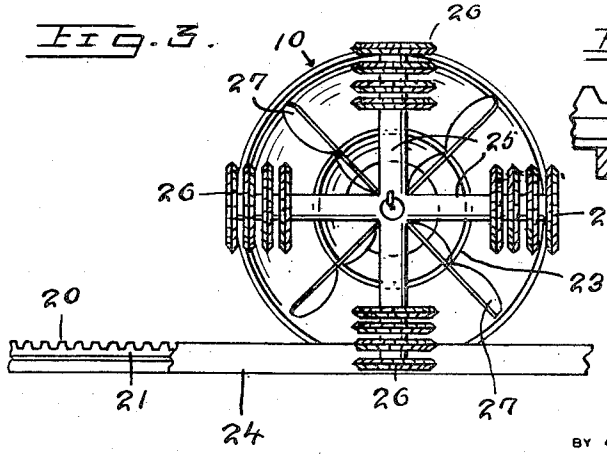
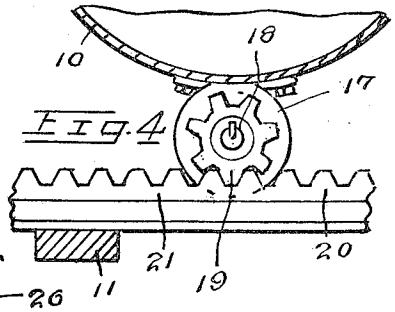


Fig. 4.



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CONTINUOUS COAL OR OIL-SHALE MINING PULVERIZING AND SIMULTANEOUS BURNING APPARATUS

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5 Claims. (Cl. 262—26)

This invention relates to a continuous coal mining, pulverizing and simultaneous burning machine or apparatus.

The object of the invention is to provide an automatic machine which will simultaneously mine, pulverize, and burn coal or oil shale, and the like and will permit the economic recovery of low grades of uranium, germanium, and other products, the like of which may be contained in the various ash, tars, gases of the coals or oil-shales.

Another object of the invention is to provide a mining machine which includes a mechanism for causing the device to move to the desired location, and whereby the machine can be used underground to facilitate the recovery of precious minerals or materials as desired.

A further object of the invention is to provide a mining and burning machine which is extremely simple and inexpensive to manufacture.

Other objects and advantages will be apparent during the course of the following description.

In the accompanying drawings, forming a part of this application, and in which like numerals are used to designate like parts throughout the same:

Figure 1 is a plan view illustrating the mining and burning machine of the present invention, and showing part of the mine broken away and in section.

Figure 2 is an elevational view of the machine of the present invention, with parts broken away and in section.

Figure 3 is a view taken at right angles to the view shown in Figure 2.

Figure 4 is a fragmentary sectional view showing part of the gear which meshes with the teeth on the rail.

Referring in detail to the drawings, the numeral **10** designates a hollow housing which may include a flexible rear portion **9**, and the numeral **11** designates a pair of spaced parallel skids **11**. Extending between the skids **11** and secured thereto, is a beam **12** which supports a motor **14**, and the motor **14** may be connected to a suitable source of electrical energy. A burner or igniter **13** is provided whereby the material may be simultaneously burned if desired. Shafts **15** extend from the motor **14** and are driven by the motor, and wheels **16** are mounted on the shafts **15**, whereby when the motor **14** is actuated, the wheels **16** will be rotated so that the device can be moved forward or reverse.

There is further provided a second reversible motor **17** which drives a shaft **18** that has a pinion gear **19** thereon, and the gear **19** has its teeth arranged in meshing engagement with teeth **20** that are arranged on the upper surface of a rail **21**. A second rail **22** is arranged in spaced parallel relation with respect to the rail **21**, and the rail **22** may be secured to the skids **11**.

Mounted in the burner housing **10** is a hollow casing **23** which has a motor **24** positioned therein. The motor **24** drives a yoke **25** which includes a plurality of arms and each has connected thereto cutting wheels **26**. Fan blades **27** are also driven by the motor **24**, and the fan blades **27** furnish an air stream for burning the powdered coal in the housing **10**, (burner chamber **34**), and fan

blades **27** also serve to circulate cooling air through the casing **23** so as to help cool the motor **24**.

A gas or electric igniter **13** is shown in Figure 2. Brackets **28** may be secured to the housing **10**, and the brackets **28** may slidably engage the rails **21** and **22**. The numeral **29** may designate a mine being worked by the machine of the present invention.

From the foregoing, it is apparent that there has been provided a mining and burning machine and in use, the various motors such as the motors **14**, **17** and **24** can be driven by any suitable source of energy such as a suitable source of electrical energy. With the motor **14** actuated, the wheels **16** will rotate to thereby cause movement of the mining and burning machine in one direction, since the wheels **16** engage the floor of the mine. With the motor **17** actuated, the gear **19** will rotate to thereby cause movement of the housing **10** along the rails **21** and **22** so that a further adjustment of the apparatus is permitted or provided. The motor **24** is used to drive the cutting wheels **26** and also to drive the fan blades **27**. Thus, the wheels **26** or cutting members **26** will dig into the surface of the coal or shale whereby this material will pass back through the housing **10** in the form of fine powder and ignited and burned, this material being discharged out through housing end **30** to any suitable mechanism.

An air stream can be blown back through the housing **10** (burner tube **34**) and also another air stream can be blown on the motor **24** by means of the fan blades **27** so as to cool the motor. These air streams can then pass out through the openings **30** and **31**. Suitable control means may be provided for controlling the actuation of the various motors. The skids **11** permit the device to be readily moved from place to place and the pair of motors **17** and **14** permit the device to be moved in two directions so that it can be properly located.

As the motor **24** rotates, the cutting members **26** and fan **27** will rotate so that the powdered coal or shale, mixed with the air stream from the fan **27** will pass back into the burner housing **10** to be ignited, then out the end **30**. Instead of operating the motors by electricity, diesel motors, gas, gasoline or steam can be used to drive the various motors. If a gas motor or turbine is used, it may be directly operated with the gases or pulverized fuel produced by the operation. The various motors may be reversible. The cutting members **26** are held against the face of the coal by motor **24**, and can be made to travel back and forth across the face of the coal by motor **17**. With the present invention, low grades of uranium, germanium and the like can be recovered whenever such materials are contained in various shales and coals. Such recovery can be made from the flue dust and fly ash and the like. Also, the burner can bs used to produce nitrates simultaneously by use of a peddle bed or to produce producer's gas by steam injection, and also fly ash for cements, and other chemicals and by-products can be produced. The present invention may be used for simultaneously mining, pulverizing, and burning the solid fuels to produce many intermediate and final products continuously and automatically. The cutting mechanism moves back and forth and sideways during the mining of the coal or shale.

It will thus be seen that there has been provided an automatic machine which will not only mine solid fuels very economically but also pulverize the fuel, burn it and produce minerals all in one operation, simultaneously and under ground. Thus, there is provided a method of gasifying coal under ground at a low enough cost to compete with natural or synthetic gases. The method is continuous and entirely automatic so that labor, upkeep, interest on capital investments, as well as taxes are at a minimum.

I claim:

1. In a continuous coal or oil shale mining, pulverizing and simultaneous burning machine, a pair of spaced parallel skids, beam extending between said skids and secured thereto, a first motor mounted on said beam and adapted to be connected to a source of electrical energy, a shaft means extending from said first motor and driven by said motor, gear members mounted on said shaft means, a pair of spaced parallel rails extending transversely across the tops of said skids and secured thereto, one of said rails being provided with a plurality of teeth thereon, a housing having brackets slidably engaging said rails, a second motor depending from said housing, a gear member driven by said second motor and meshing with the teeth on said rail, a casing positioned in said housing, a third motor positioned in said casing, a rotary yoke driven by said third motor, and a plurality of cutting members mounted on said yoke.

2. In a continuous coal or oil-shale mining, pulverizing, and simultaneous burning machine, a pair of spaced parallel skids, a beam extending between said skids and secured thereto, a first motor mounted on said beam and adapted to be connected to a source of electrical energy, a shaft means extending from said first motor and driven by said motor, gear members mounted on said shaft means, a pair of spaced parallel rails extending transversely across the tops of said skids and secured thereto, one of said rails being provided with a plurality of teeth thereon, a housing having brackets slidably engaging said rails, a second motor depending from said housing, a gear member driven by said second motor and meshing with the teeth on said rail, a casing positioned in said housing, a third motor positioned in said casing, a rotary yoke

driven by said third motor, a plurality of cutting members mounted on said yoke, and fan blades driven by said third motor for circulating air through said casing to cool said third motor.

3. The structure as defined in claim 2 wherein said fan blades serve to supply air for burning the powdered coal and ejecting the exhaust, ash and the like.

4. The structure as defined in claim 2 and further including an igniter for igniting the mixed air and powdered coal continuously.

5. In a continuous coal or oil shale mining, pulverizing and simultaneous burning machine, skids, a beam extending between said skids and secured thereto, a first motor mounted on said beam and adapted to be connected to a source of electrical energy, a shaft means extending from said first motor and driven by said motor, gear members mounted on said shaft means, rails extending across the tops of said skids and secured thereto, one of said rails being provided with a plurality of teeth thereon, a housing having means slidably engaging said rails, a second motor depending from said housing, a gear member driven by said second motor and meshing with the teeth on said rail, a casing positioned in said housing, a third motor positioned in said casing, a rotary yoke driven by said third motor, and cutting members mounted on said yoke.

References Cited in the file of this patent

UNITED STATES PATENTS

Re. 24,004	Howard	May 17, 1955
2,495,840	Findlater	Jan. 31, 1950