

(No Model.)

A. C. SMITH & M. K. BISHOP.  
COAL SEPARATOR AND CLEANER.

No. 454,148.

Patented June 16, 1891.

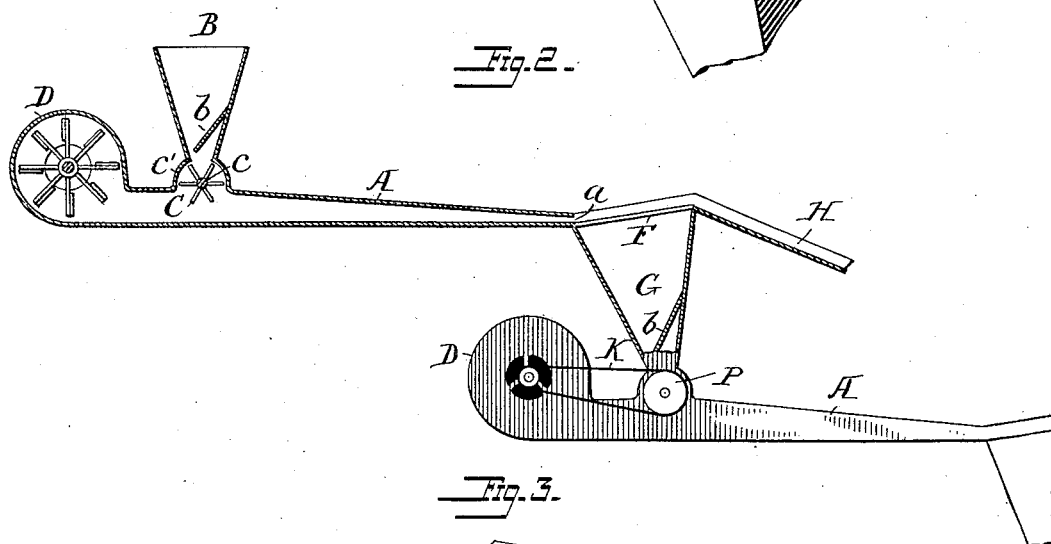
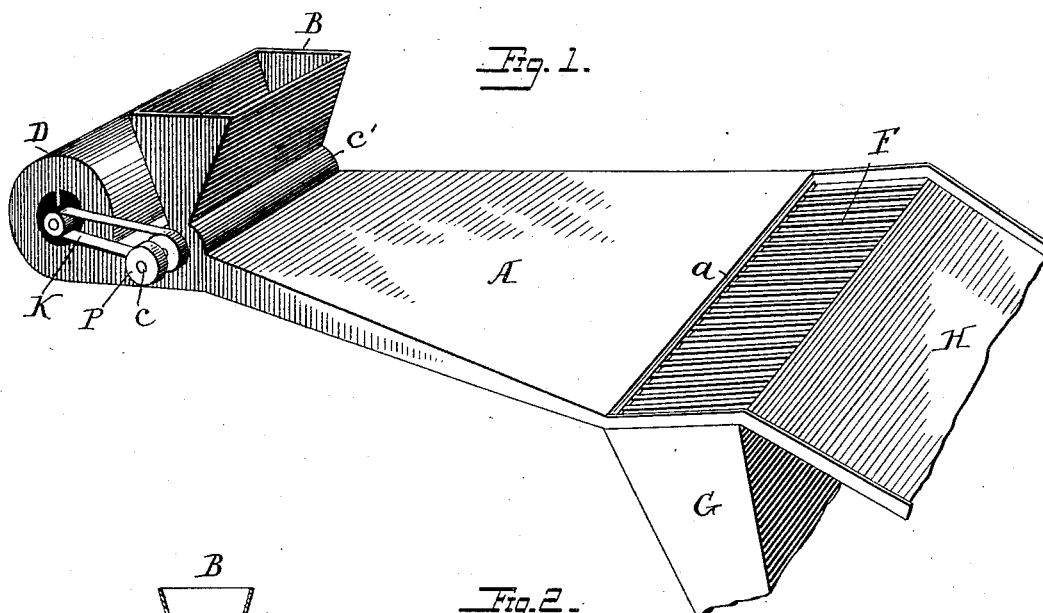
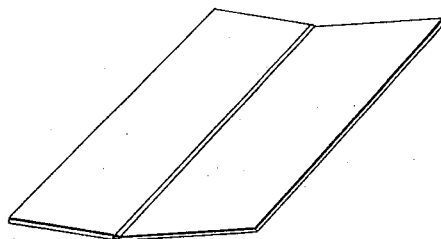


Fig. 3.



WITNESSES

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# UNITED STATES PATENT OFFICE.

ANDREW C. SMITH AND MARCUS K. BISHOP, OF SCRANTON, PENNSYLVANIA.

## COAL SEPARATOR AND CLEANER.

SPECIFICATION forming part of Letters Patent No. 454,148, dated June 16, 1891.

Application filed December 17, 1890. Serial No. 375,012. (No model.)

*To all whom it may concern:*

Be it known that we, ANDREW C. SMITH and MARCUS K. BISHOP, citizens of the United States, residing at Scranton, in the county of Lackawanna and State of Pennsylvania, have invented certain new and useful Improvements in Coal Separators and Cleaners, of which the following is so full, clear, and exact a description as will enable others skilled in the art to which our invention appertains to make and use the same, reference being had to the accompanying drawings.

Our invention relates to screening and separating machines, and more particularly to a machine for separating the smaller sizes of coal from each other and from the fine dust which usually accompanies such coals.

The object of our invention is to produce a convenient, effective, and economical machine which will rapidly handle the coal or other similar material fed to it, and at one and the same operation dry the coal, if moist, and clean and separate it.

We will now proceed to describe our invention, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view of a single machine. Fig. 2 is a longitudinal central sectional view of two machines arranged in series, and Fig. 3 is a view of a removable cover which may be placed over the screen.

We shall first describe a single machine and afterward point out how two or more such machines may be connected together or used in series to obtain results which are sometimes desirable.

In the drawings, A indicates a casing or trunk through which the material to be separated is forced by a blast of air from a blower D. The trunk is relatively narrow and deep at one end and wide and shallow at the other, the latter being the outlet end *a*. Above the trunk at its narrow end is a hopper B, having converging sides, and at the bottom of the hopper is a feed-wheel C. Near the bottom of the hopper is an apron or deflecting plate *b*, extending from one side across and downward within a short distance of the other side, thus forming a contracted discharge-opening at one side of the hopper.

The feeder C is composed of several radial paddles upon a shaft *c*, forming a feed-wheel.

This feed-wheel is arranged within partial cylindrical casings *c'*, which fit sufficiently close to the paddles to prevent upward currents of air through the hopper.

The blower may be of any design suitable for generating a blast of air; but we prefer a fan, as shown, arranged within a casing, which communicates directly with the trunk A, the blast passing under the feed-wheel.

The bottom of the trunk may be horizontal, but is preferably inclined slightly downward toward its discharge-opening *a* to facilitate the passage of the material to be separated. At this discharge-opening a screen F, located in the path of the blast, extends outward and upward, making a considerable angle with the axis of the trunk, the bars of the screen preferably running in the general direction of the axis of the trunk. Below the screen is a chute G, into which all the dust and fine grades of material which pass the screen may enter. This chute may lead the dust away to a dirt-pile, or, if it contains particles large enough to be of value, the chute may communicate with a second separating-machine having a screen of finer mesh, and this second machine may communicate with a third, and so on, carrying the division as far as desirable. In Fig. 2 of the drawings two machines thus connected together are shown in section.

From the upper edge of the screen F a chute H leads the coal or other large particles of material which pass over the screen away by gravity to a suitable receptacle or deposit place.

The trunk A is made relatively narrow and deep at the hopper and wide and shallow at its mouth *a*, so that the material which is fed from the hopper will be spread in a thin sheet by reason of the shape of the trunk and the blast of air, and is thus projected evenly over the entire width of the screen. In order to get the best effects, it is necessary to construct the mouth of the hopper very wide and shallow—say, for instance, ten feet wide and but two inches deep—and in order to prevent lumps of coal or other substance which are too large to pass the mouth *a* from entering the trunk, the apron *b* is arranged to contract the lower opening of the hopper until it is of no greater width than the mouth *a* of the

trunk. This also prevents the entrance of lumps of material which are too large and heavy to be readily moved by the blast.

5 The cover shown in Fig. 3 may be arranged on the trunk so as to cover the screen, if desired; but we find that it is not necessary to the successful operation of the machine.

The blower and feed-wheels may be operated by any suitable belting or gearing. As shown, the feed-wheel shaft *c* is operated from a suitable source of power by means of a pulley *P*, and the blower is connected to the shaft *c* by a belt *K*; but we do not confine ourselves to any particular form of driving mechanism.

15 The operation of our improved separator is as follows: The material to be separated—fine coal and dust, for instance—is placed in the hopper *B* and discharged therefrom continuously into the trunk by means of the feeder. The blast of air generated by the blower drives the material through the trunk and delivers it onto the screen in a thin layer with considerable force. As the screen lies directly in the path of the blast, the air and with it the dust and fine particles of coal pass into the chute *G*, while all of the particles of coal which are too large to pass the screen are shot over it onto the chute *H*. Should the material be damp, the current of air passing through the particles will dry them and the impact upon the screen will shake off the dust, thus at one and the same operation drying, cleaning, and separating the coal.

30 The essential features of our machine are a trunk, a blower for blowing a blast of air through the trunk, a feeder, and a screen arranged at the mouth of the trunk and at an angle with the bottom of the trunk.

40 It will be evident that various changes in the details of the mechanism may be made without departing from the spirit of our invention, and therefore we do not limit our-

selves to the precise construction and arrangement of parts shown.

What we claim is—

1. The combination of the trunk, the feeder and blower at one end thereof and the screen at the other end, said screen being in the path of the blast and inclined at an angle to the axis of the trunk, substantially as described.

2. The combination, with the trunk relatively narrow and deep at one end and wide and shallow at the other, of the feeder and blower at the former end and the screen at the latter end, said screen being in the path of the blast and inclined at an angle to the axis of the trunk, substantially as described.

3. The combination, with the trunk, of the feeder and blower at one end, the screen inclined upwardly from the bottom of the trunk at the other end, the dirt-chute beneath the screen, and the coal-chute at the upper end of the screen, substantially as described.

4. The combination, with the trunk relatively narrow and deep at one end and wide and shallow at the other, of the hopper at the narrow end of the trunk, said trunk and hopper having discharge-openings substantially the same in least dimension, and the blower and screen, substantially as described.

5. The combination of several screening and separating machines arranged as set forth, and each comprising a trunk, feeder, blower, a screen inclined to the axis of the trunk, and chutes for conveying the smaller and larger coals from the screens separately, substantially as described.

In testimony whereof we affix our signatures in the presence of two witnesses.

ANDREW C. SMITH.  
MARCUS K. BISHOP.

Witnesses:

JAS. H. TORREY,  
ARTHUR C. LOGAN.