(No Model.)

R. D. A. PARROTT.

APPARATUS FOR GATHERING MINERAL WOOL.

No. 396,050. Patented Jan. 8, 1889.

Fig. 1

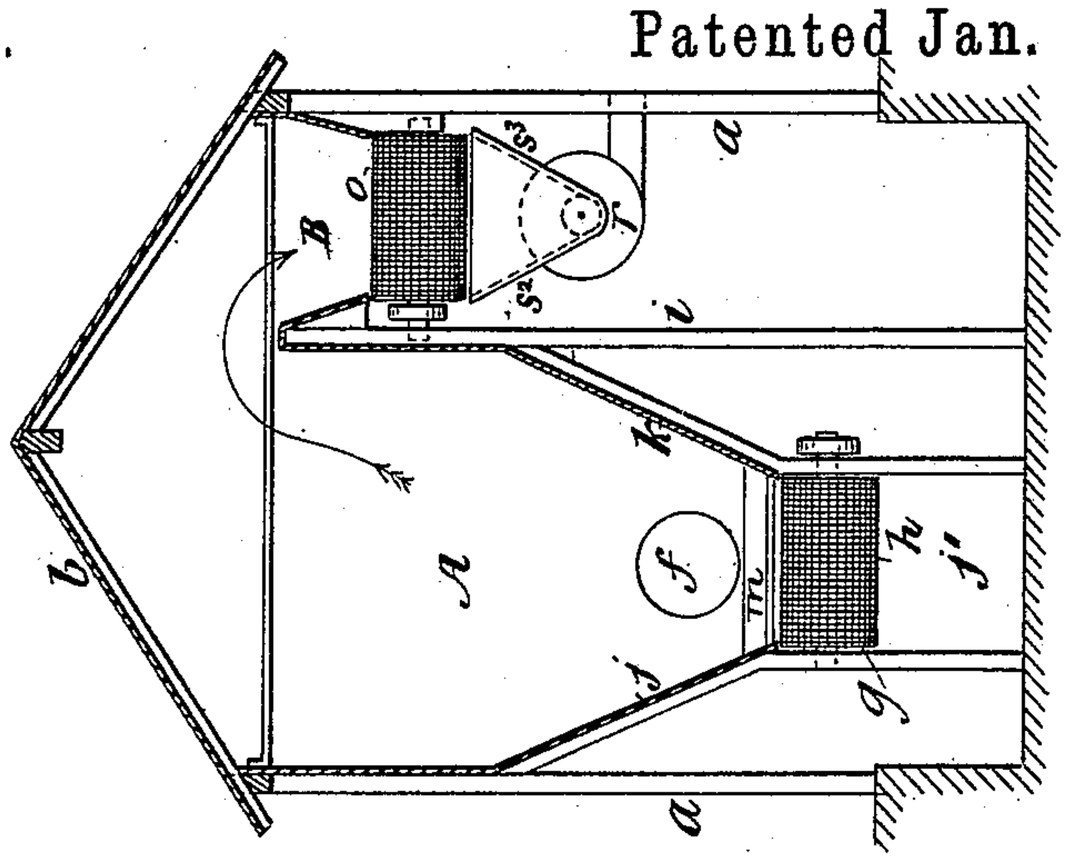


Fig. 3.

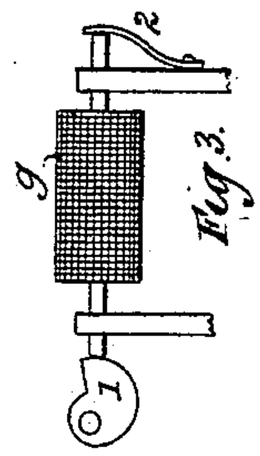
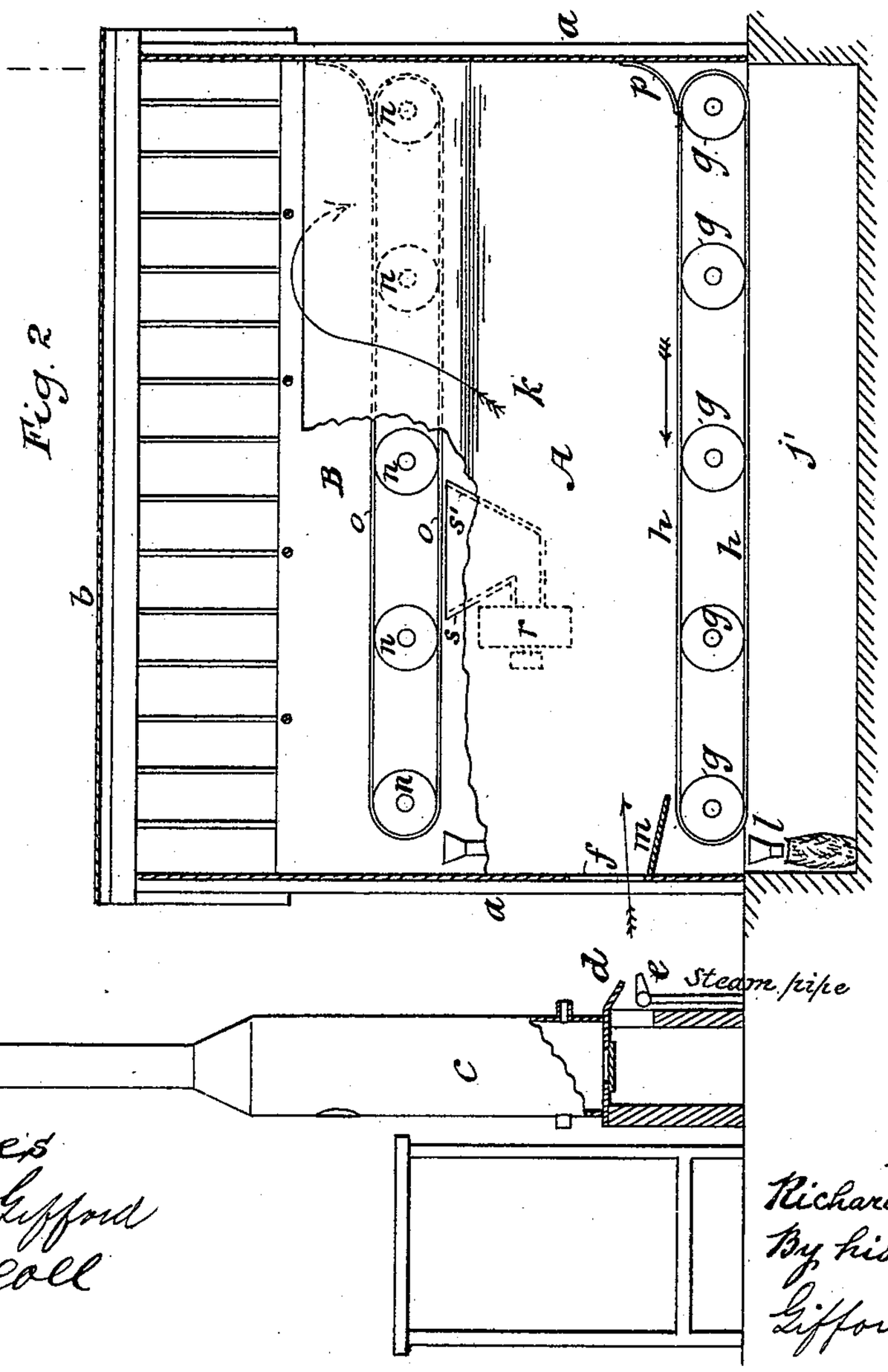


Fig. 2



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR GATHERING MINERAL WOOL.

SPECIFICATION forming part of Letters Patent No. 396,050, dated January 8, 1889.

Application filed February 14, 1888. Serial No. 263,990. (No model.)

To all whom it may concern:

Be it known that I, RICHARD D. A. PARROTT, of Arden, Orange county, State of New York, have invented a certain new and useful Improvement in Apparatus for Gathering Mineral Wool, of which the following is a specification.

The usual method of gathering the fibers which, when massed together, constitute mineral wool or silicate cotton is to blow them through an aperture or flue into a large room known as a "blowing-chamber." A current of compressed air or steam may be used for this purpose. Escape for the compressed air and vapors created by the jet or jets is provided for by ventilators so constructed and arranged as to catch the fibers which are light enough to float about on the currents. Wire screening has been used for covering the ventilator-openings of the blowing-chamber, so that as the currents pass through the meshes the fibers of the mineral wool will be caught on the surface of the wire screening. The settling of the fibers in large numbers soon forms a mat over the meshes, which clogs and prevents the escape of the confined currents until the obstructing fibers are removed either by their own gravity or by jarring the screening. Where the supply of fluid cinder from the blast-furnaces was intermittent the practice was to remove the accumulated fibers from the wire screening by jarring or otherwise at frequent intervals during the cessation of the supply of fluid cinder. Since, however, the introduction of the methods employing a continuous flow of cinder, the frequent removal of the accumulated fibers from the wire screening has necessitated the use of a plurality of blowing-chambers to be used alternately, so that while the supply of fluid cinder was directed into one the accumulated fiber could be removed from the wire screening of the other.

In the production of mineral wool, particles, spherules, or shot are detached from the molten stream and projected into the blowing-chamber. The flight of these shot spins out the fiber of the mineral wool. With the methods heretofore in use there has been no efficient means in the operation of the process of separating the shot and the fibers. The result has been that the shot have been mixed with the product and have tended to increase its weight and injure its quality. For purposes of separation it has been found necessary to screen the product by various devices requiring the transfer of the mineral wool from the blowing-chamber to other contrivances by hand after the blowing process has ceased. After the operation of blowing, it has been customary to collect the product in bags, which necessitated that the attendant should enter the blowing-chamber and pack it by hand, consuming much time and breaking the fibers, so as to largely destroy the usefulness thereof for the production of felts or wadding and the like.

The apparatus which I have invented is designed to provide means whereby the operation of gathering the mineral wool may be improved as to efficiency, economy of time and labor, and as to the quality of the product. The apparatus which I am about to describe is what I at present consider to be the best form for the embodiment of my invention; but I do not wish to limit myself to the form described, since I am well aware that it may be changed in arrangement, construction, and number of parts to a very large extent without departing from the principle of my invention.

In the drawings, Figure 1 is a cross-section of the blowing-chamber. Fig. 2 is a central longitudinal section of the same, showing a portion of one of the partitions removed. In this figure, at the left of the blowing-chamber, is represented a cupola in which the rock is melted and from which the stream is directed into the blowing-chamber. Fig. 3 shows an appliance for shaking the apron.

a and *b* are respectively the walls and roof of an ordinary building which is to contain the blowing-chamber. Wherever the molten rock is likely to come in contact with the walls of this building it should be of course lined with a suitable substance to prevent ignition. At one end of this building is arranged the cupola *c* of a suitable well-known construction for melting the rock.

d is a gutter, down which the stream of molten cinder flows, so as to fall over the outlet of the steam or compressed-air supply-

pipe *e*. The escaping steam or compressed air from this pipe will blow the stream of molten cinder into the blowing-chamber through an aperture, *f*. Of course in practice there may be any number of jets of steam or compressed air, blowing the stream into the blowing-chamber arranged side by side.

g g, &c., are rollers arranged at the bottom of the blowing-chamber to support and move an endless apron, *h*, of wire screening. Any one or more of these rollers may be driven by any suitable means, so as to move this endless apron in the direction of the arrow, Fig. 2, though, if desired, the apron may be moved in the opposite direction or transversely, according to the requirements of the case and the position of the supporting-rollers. This apron may travel in a horizontal plane or on a slightly-inclined plane, if preferred.

i is a partition extending longitudinally through the building and reaching within a short distance of the roof, so as to divide the chamber within the building into two longitudinal compartments having communication with each other over the top of the partition *i*.

j and *k* are partitions extending, respectively, from the side *a* of the building and the partition *i* in a converging direction downwardly to the endless apron *h*, making the bottom of the blowing-chamber hopper-shaped, so as to direct the contents thereof onto the surface of the endless apron *h*.

l is a hopper arranged at the delivery end of the apron *h*, so as to collect the product delivered from the apron for the purpose of packing. In lieu of this hopper, some conveyer may be substituted in case it is desired to convey the product to a distance before packing.

m is simply a projecting partition, which is designed to prevent anything falling into the hopper *l* excepting what is delivered from the surface of the apron *h*.

n n, &c., are rollers located on the opposite side of the partition *i* from the rollers *g*, and preferably in a more elevated position. These rollers support an endless apron of wire screening, *o*, which is moved by the rollers in either direction, depending upon the end at which it is desired to deliver the product deposited thereon.

I have lettered the compartment of the blowing-chamber containing the apron *h*, A, and the compartment containing the apron *o*, B.

p is simply a protection against the escape of the product between the endless apron *h* and the end wall, *a*, of the building. The endless aprons *h* and *o* are of wire screening or perforated sheet metal, which may be of about one-fourth inch mesh. The compartment A of the blowing-chamber should be of sufficient length to enable the shot to cool somewhat before they strike and to spin out a sufficient quantity of the fiber. A length which I should advise would be in the vicinity of twenty-four feet.

The operation of the apparatus is as follows: A jet of compressed air or steam from the pipe *e* blows a stream of molten cinder into the compartment A through the opening *f*. This draft of steam or compressed air entering the compartment A must find its exit therefrom, and I provide two courses through which it may escape. One course is down through the meshes of the endless apron *h* and out into the open air through any suitable openings arranged beneath that apron. The other course is over the top of the partition *i* and down through the meshes of the apron *o* into the compartment B, from which it escapes through any suitable openings communicating with the outer air. Accompanying the draft of air or steam entering the opening *f* are the shot and fibers. These shot are projected toward the opposite end of the compartment A, where they either fall upon the surface of the apron *h* or strike against some of the walls of the compartment and drop down upon the apron. The apron being practically free from any accumulation of fiber at that part of the compartment A, no obstruction is opposed to the sifting of the shot down through the meshes of the apron into the shot-pit *j'* beneath, from which it may be removed in any convenient manner. In order to facilitate the sifting of the shot through the apron, a lateral or vertical motion or vibration may be given to the apron *h* by any suitable contrivance. A useful contrivance for this purpose is shown in Fig. 3. *g* is the roller, which may have short pins projecting from its surface, as shown, to enter the meshes of the apron and prevent any slip. The journals of this roller are elongated and its bearings are arranged far enough apart to provide for considerable endwise play. 1 is a cam arranged to bear against the end of one journal. 2 is a spring to bear against the end of the opposite journal. The conjoint operation of the cam and the spring will keep up a lateral vibration. Of course other appliances may be used for producing vibration in this or other directions. Having thus gotten rid of the shot, it remains to collect the fiber. The coarser and heavier portion of the fiber will naturally occupy and fall to the lowermost portion of the compartment A, and be deposited upon the surface of the apron *h*. The descent of the air or steam draft through the meshes of this apron will hasten the deposit and fix or mat the fibers upon the surface of the apron. The lighter particles of the fibers will more generally occupy a higher position in the compartment A, and, being caught by the upward currents, will be carried over the top of the partition *i* and caught upon the surface of the endless apron *o*, through which these currents pass. Thus upon the apron *h* will be obtained one grade of the mineral wool, and upon the apron *o* another grade.

By multiplying the number of aprons and taking the draft of air for each at various elevations from the compartment A a still greater separation of the fibers may be accomplished. As the fibers are collected and matted upon the apron *h*, they will be continually moved by the travel of that apron toward the delivery-point at the hopper *l*. Here they can be removed and packed into bags, or, if it is desired to preserve them in the form of a bat or fleece for the purpose of the manufacture of felts or wadding or other similar uses, they may be taken off of the apron *h* in that form and carefully guarded against the breaking of the fibers until they are conveyed to other machinery, by which the process of manufacture is continued. Likewise the fibers deposited upon the apron *o* will be constantly delivered at the delivery end thereof and treated as required.

By the apparatus above described it will be observed that a single blowing-chamber will be sufficient to receive a continuous stream of molten cinder, the products of the chamber being continuously removed therefrom, so that the operation may proceed without intermission and without requiring the blowing-chamber to be opened or entered for any purpose. At the same time the shot will be delivered separate from the fibers into the shot-pit, and the various grades of fibers will be delivered separate from each other, and, if need be, in such form that they may be utilized without crushing or breaking the fiber. Thus it is obvious that the quality of the product will be better, and all subsequent operations for separating the shot from the fibers may be dispensed with, the time of the operation is reduced to a minimum, and the labor and personal inconvenience and risk of the laborers are also reduced.

Sometimes it may be desirable to employ a suction or exhaust draft through one or both of the endless aprons for a greater or less portion of its length. This may be useful to hasten the precipitation of the fibers on the apron or aprons, and also to uniformly distribute them upon the same. I have shown such an appliance in connection with the upper apron, *o*.

r is an ordinary exhaust-fan.

s s′ s² s³ are the diverging sides of an air-passage connected at the bottom with the exhaust of the fan and at the top including any desired section of the apron—as, for instance, the portion of the apron lying between two of the rollers, as shown. This exhaust will direct the draft through that section of the apron, and while hastening the precipitation of the fibers on it will tend to equalize their accumulation. In lieu of the blower, of course any other contrivance may be employed to produce an exhaust-current.

I claim—

1. In an apparatus for gathering mineral wool, the combination, with a blowing-chamber, of a traveling meshed screen obstructing the passage to the outer air, whereby the fibers are arrested from the currents and delivered from the blowing-chamber, substantially as described.

2. In an apparatus for gathering mineral wool, the combination, with the blowing-chamber, of a meshed traveling screen arranged at the bottom thereof, through which the shot are sifted, substantially as described.

3. In an apparatus for gathering mineral wool, the combination, with the blowing-chamber, of a meshed apron traveling in the opposite direction to that at which the currents enter the chamber, whereby the shot falling at the further extremity of the chamber fall upon the bare surface of the apron, and are sifted therethrough, and the fibers are accumulated upon the nearer surface of the apron and delivered thereby, substantially as described.

4. In an apparatus for gathering mineral wool, the combination, with the blowing-chamber, of a meshed traveling screen arranged at the bottom thereof and provided with means whereby it is shaken to sift the shot, substantially as described.

5. In an apparatus for gathering mineral wool, the blowing-chamber divided into compartments A and B, each of said compartments being provided with a traveling meshed apron and said compartments communicating with each other by an elevated passage, whereby the coarser fibers will be separated from the lighter fibers, substantially as described.

6. In an apparatus for gathering mineral wool, the combination, with a blowing-chamber, of a traveling meshed screen obstructing the passage to the outer air, whereby the fibers are arrested from the currents and delivered from the blowing-chamber, and an air-exhaust arranged to induce a forced current through the screen, substantially as described.

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