H. E. TAYLOR.

ORE-WASHER.

No. 189,882. Patented April 24, 1877.

Fig. 2

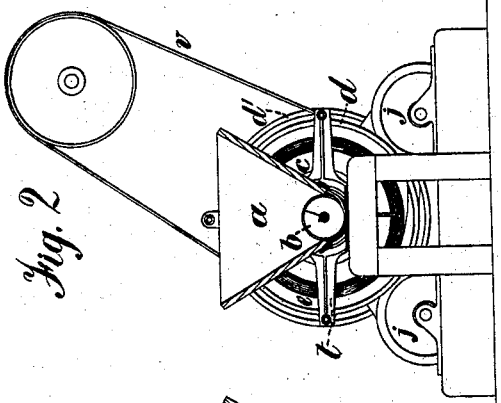
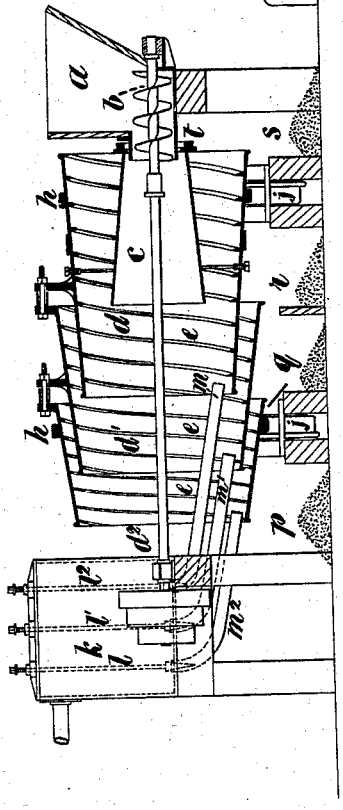


Fig. 1



Witnesses

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UNITED STATES PATENT OFFICE.

HENRY E. TAYLOR, OF CHESTER, ENGLAND.

IMPROVEMENT IN ORE-WASHERS.

Specification forming part of Letters Patent No. **189,882**, dated April 24, 1877; application filed February 5, 1877.

To all whom it may concern:

Be it known that I, HENRY ENFIELD TAYLOR, of the city of Chester, in the county of Chester, England, have invented a new and useful Improvement in Apparatus for Washing, Separating, and Sizing Mineral and other Substances, which improvement is fully set forth in the following specification, reference being had to the accompanying drawings, where—

Figure 1 is a longitudinal sectional elevation, and Fig. 2 an end elevation, of apparatus constructed under my invention.

This invention has for its object to provide apparatus which shall be capable of washing and separating or dressing substances of different specific gravities, and for sizing material which has been previously ground or otherwise reduced and prepared for treatment; and consists of a series of conical drums partly fitting into each other, and each provided internally with a screw thread or threads. A hopper and worm, or the like means, feeds the material to the first drum. A tube admits water or fluid to each of the drums, and the axis of the drums is adjustable.

a is a hopper, into which the materials are thrown. *b* is a worm, driven by the shaft and cone-pulley, as shown, for delivering a regular and definite supply into the machine. *c* is a cone, into which the worm first delivers the material to be treated. *d* d^1 d^2 are hollow drums. On the inner surface of each is formed a screw thread or threads, *e e e*, the number, pitch, and depth of which may be varied, so as to suit the quality of material to be operated upon. *j j* are rollers, supporting the drums *d* d^1 d^2, and upon which the drums revolve on the roller-paths *h h*. The drums are driven by a belt, *v*, or by other suitable means. *m* m^1 m^2 are three pipes, conveying water into the interior of the cones, the supply to each being derived from a cistern, *k*, and regulated by plugs *l* l^1 l^2, capable of being screwed up or down, so as to adjust the flow of water to the greatest delicacy, it being of importance that the quantity should be sufficient and yet not in excess for the work to be performed.

In using my improved apparatus, the material is first thrown into the hopper *a* by an elevator or by hand. It is thence fed into the cone *c* by the worm *b*, in the quantity found best by experience. When the material has reached the cone *c*, the rotary motion imparted to it from the separating-drums, along with which it is driven through the arm *t*, traverses it to a point a little beyond the middle of the length of the first drum *d*, into which it falls. There it meets with a stream of water issuing from the pipe *m*. The tendency of this stream is to wash down the material over the thread or threads of the screw to the larger or lower end at *s*. The drums are, however, made to revolve in such a direction that the tendency of the threads of the screw is to carry up the particles of material held in partial suspension by the water against the stream issuing from pipe *m* to the higher or smaller end. The heavy particles, gradually settling in the space between the threads of the screw, are carried up into the next drum d^1, and the lighter are washed down to *s*. After this partial separation in drum *d*, the heavy particles undergo still further treatment in d^1, but in a more seaching manner. The threads of the screw being of a finer pitch, and not so deep as in drum *d*, and the slope of the sides being steeper, the capacity of the spaces between the threads is not so great, and, owing to the diminution in the pitch of the screw, the material is left for a longer period exposed to the action of the water issuing from pipe m^1. The light particles separated in cone d^1 are washed down to *r*, and the heavy carried up by the screw-thread to d^2, there to undergo the same process.

The finished ore or heaviest particles of material are in this way deposited at *p*, and it is found that should the material under treatment contain three bodies of different specific gravities, as lead, zinc blende, and spar, the lightest, or spar, is washed away to *s*, a mixture of this and the blende is found at *r*, blende alone at *q*, and clean lead at *p*.

It will be seen that there is no limit to the number of drums through which the material may be made to pass, and since each drum effects a considerable separation, they may be employed singly, or in any number to suit the material under treatment.

When the machine is used for sizing, the smaller particles are washed out and deposited at *s*, the next at *r*, and so on.

By increasing or diminishing the distance between the rollers *j j*, either extremity of the apparatus can be elevated or depressed, so as to alter the speed of flow of the fluid over the material. The pitch of the screw-threads may be altered to produce the same effect.

I claim—

1. In apparatus for washing, separating, and sizing mineral and other substances, the combination of two or more conical drums having internal screw-threads of varying pitch and depth, one drum being arranged to deliver within the other, substantially as and for the purpose specified.

2. The combination of two or more conical drums having internal screw-threads of varying pitch and depth, one drum arranged to deliver within the other, and a device or devices, substantially as specified, for supplying a stream of water to each drum of the series, substantially as and for the purpose specified.

HENRY E. TAYLOR.

Witnesses:

F. LIPSHAM,

J. H. HARRISON.