

H. BRADFORD.

Improvement in Apparatus for Separating Slate from Coal.

No. 123,974.

Patented Feb. 27, 1872.

Fig. 1.

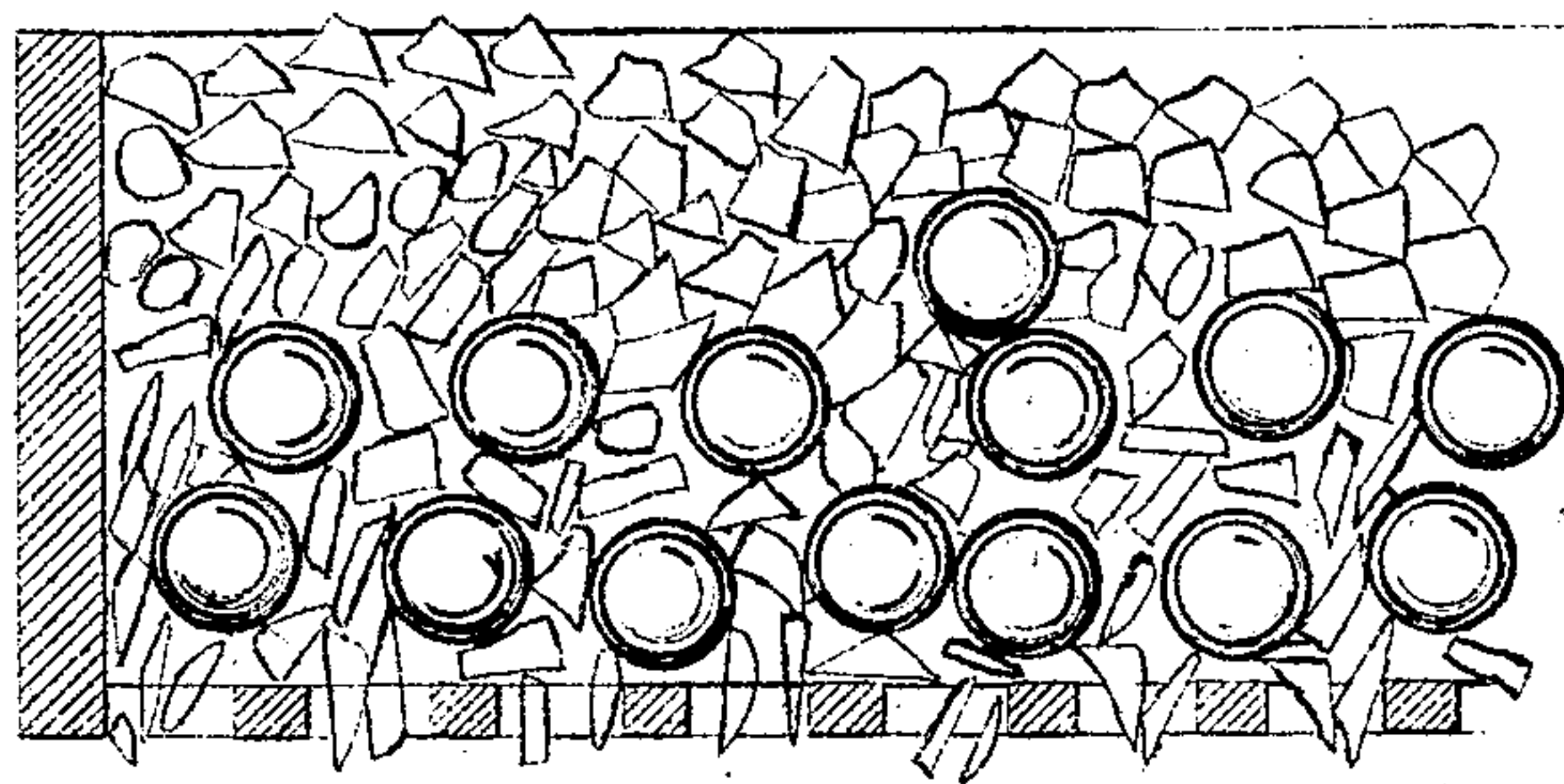
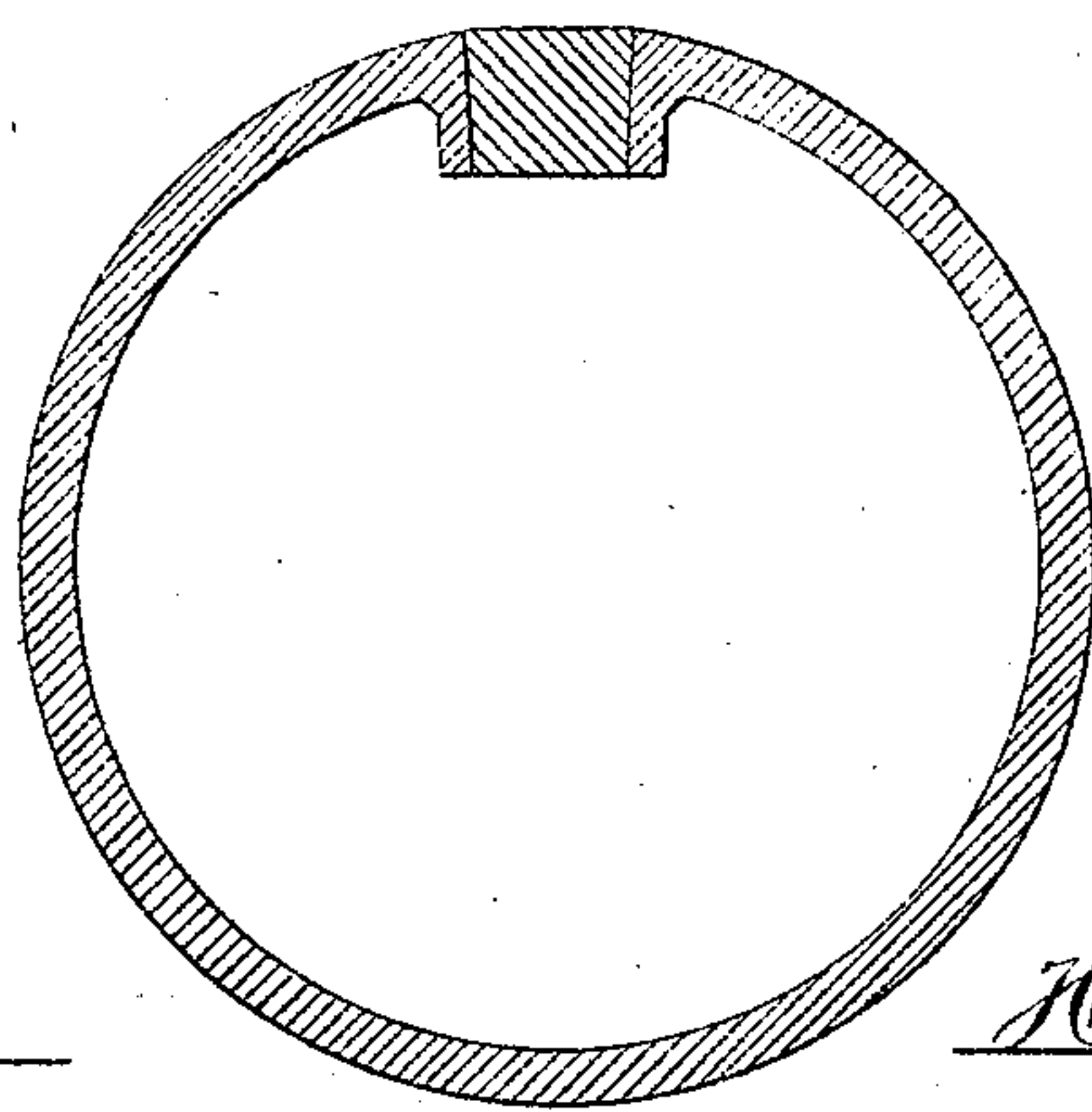


Fig. 2.



Witnesses

Chas. B. Smith

Geo. D. Maerz

H. Bradford

Lemuel W. Perrell

att'y.

UNITED STATES PATENT OFFICE.

HEZEKIAH BRADFORD, OF READING, PENNSYLVANIA.

IMPROVEMENT IN APPARATUS FOR SEPARATING SLATE FROM COAL.

Specification forming part of Letters Patent No. 123,974, dated February 27, 1872.

To all whom it may concern:

Be it known that I, HEZEKIAH BRADFORD, of Reading, in the county of Berks and State of Pennsylvania, have invented and made an Improvement in Apparatus for Separating Slate from Coal and other articles of different specific gravity; and the following is declared to be a correct description of the same.

In Letters Patent granted June 29, 1858, and numbered 20,756, an apparatus is shown for separating ores and other articles of different specific gravity, in which a receptacle or jig with a perforated bottom is immersed in water and receives a vibrating motion, and above the perforated bottom pieces of ore or similar materials are introduced, of a size larger than the perforations, and these serve as valves, and allow the escape of the ore that is separated and is of a size smaller than the perforations, and which passes through the same, while the lighter materials are separately delivered. My present invention is based upon the aforesaid patent; and the separation is effected in accordance with the specific gravity while in the water and subjected to a jiggling movement, the heavier matters usually mixed with the coal, such as slate, pyrites, &c., passing away through the perforations in the bottom of the receptacle or box, and the coal is retained by the valves that are of larger diameter than the openings, and such coal is separately delivered. In adapting my apparatus, patented as aforesaid, to the separation of coal, I made use of valves of slate; but with large-sized coal the slate valves wore out too rapidly, and required to be replaced. I then made use of stones; but these were of too great specific gravity, and did not operate well unless of an oblate, spheroidal, or flattened form, so that they might present a large surface to the action of the water when exposed to the jiggling movement; but if these turned up edgewise they would not present sufficient surface, and were not raised in the necessary manner. My present invention consists in the employment of artificial valves above the perforated bottom, such valves being of the necessary gravity, according to the material operated upon.

In the drawing I have represented, in Figure 1, a portion of the perforated bottom of

the box with the improved valves thereon; and in Fig. 2 a section is shown of one valve separately.

By extended experiment I have discovered that the gravity of the valve should generally be less than that of the heaviest material that is to pass the perforations, and greater than that of the material to be retained, so that, in the jiggling operation in the water, the valves will fall faster than the lighter material, and slower than the heavy material, so that the latter may pass through the perforations before they are closed by the valves. The gravity of these artificial valves, however, has to be regulated somewhat according to the material operated upon and the relative sizes, as the valves have to be larger than the pieces of coal, slate, ore, or other material to be separated. I prefer to make these valves of a spherical form, as they then cannot fall in an incorrect position; but they may be more or less flattened, or of other shapes; and these valves are to be sufficiently numerous to form one, two, or more layers upon the bottom of the jig-box. The surface of the valve is formed of metal or other material of sufficient hardness to withstand the wear to a reasonable extent; and the interior of the valve is of wood, or other light material, and may be hollow, and simply contain air. I prefer to make these balls of iron, cast in a chill, so as to be sufficiently hard, and the same are to be hollow; and the opening in such ball or valve may be filled with a wooden or other plug, or other suitable means. These valves, however, may be made of brass, copper, or other metal, and each valve may be cast upon a core without any opening through the shell, and thereby obtain the proper gravity; but when an opening is provided, if these valves are too light or become too light in consequence of wear, they may be made heavier from time to time by asphaltum or other adhesive material, poured into the inside, and either filling or partially filling the cavity, or only forming a layer around the walls of such cavity; and any desired material, such as resin, pitch, or tar, mixed with sand, ashes, sawdust, or other material, may be used as a filling for such balls; and where extra weight is required, shot or balls or pieces of metal may be introduced; or

the valve may be made of solid metal, when required. Where the water made use of will be liable to injure the valves, in consequence of the acidity, the material employed for the same should be such as to resist such action, and artificial valves of glass, scoria, or other sufficiently hard material may be employed, solid or hollow. Where glass, scoria, or other melted substances are used, and are not of sufficient specific gravity, metallic filings, chip-pings, or any other heavy substance can be mixed with the same in a melted or plastic state, and then be molded into the required shape. For separating some substances, valves of hard wood may be used to advantage, and the gravity increased, as desired, by driving into the same metallic or other substances.

In all cases the substances to be separated should be assorted into as many different sizes as can conveniently be done, for it is obvious that the more uniform in size the pieces to be separated are, the better the work will be performed.

I claim as my invention—

The artificial valves for the perforated bottom of a separator for coal and slate or other articles of different specific gravities, substantially as set forth.

Signed by me this 3d day of November, A. D. 1871.

HEZEKIAH BRADFORD.

Witnesses:

GEO. T. PINCKNEY,

CHAS. H. SMITH.