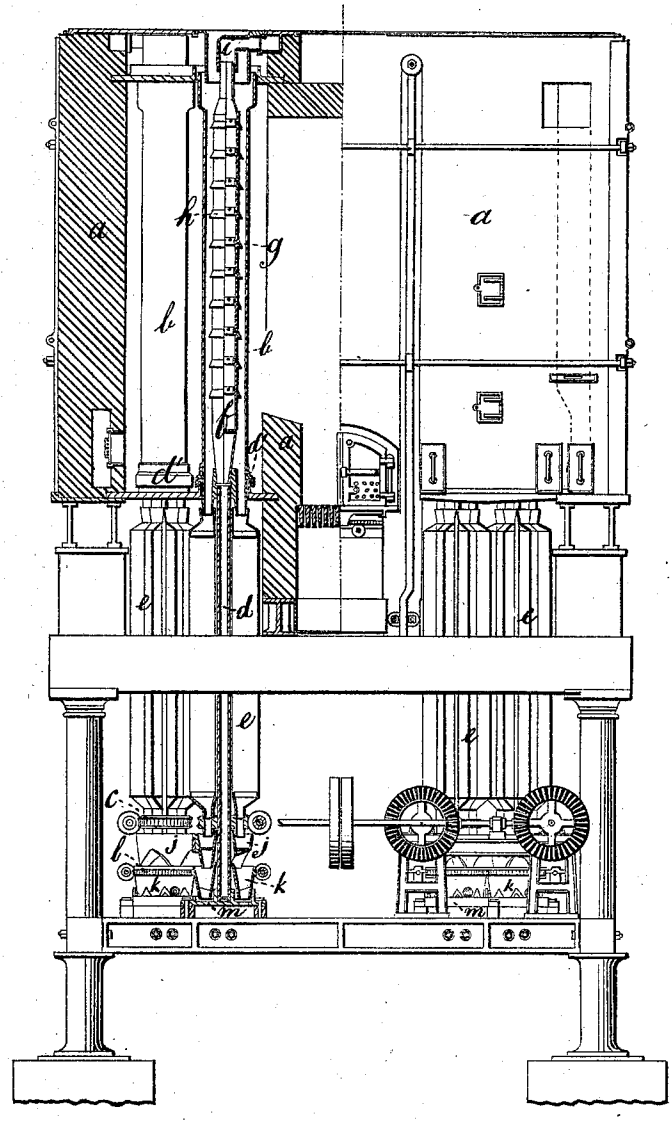
2 Sheets--Sheet 1.

J. BUCHANAN & S. VICKESS.

Treating Animal-Charcoal or Bone-Black.

No. 150,821. Patented May 12, 1874.

Fig 1



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2 Sheets--Sheet 2.

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Treating Animal-Charcoal or Bone-Black.

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Fig 3

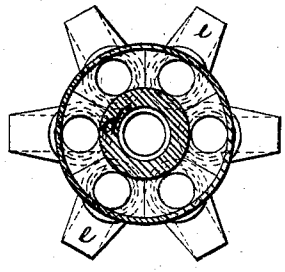
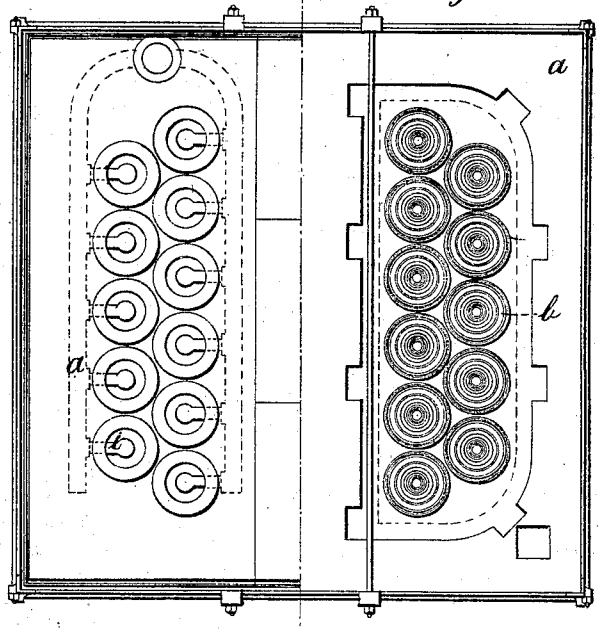


Fig 2



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UNITED STATES PATENT OFFICE

JAMES BUCHANAN AND SAMUEL VICKESS, OF LIVERPOOL, ENGLAND.

IMPROVEMENT IN TREATING ANIMAL CHARCOAL OR BONE-BLACK.

Specification forming part of Letters Patent No. **150,821**, dated May 12, 1874; application filed March 24, 1874.

To all whom it may concern:

Be it known that we, JAMES BUCHANAN, of Liverpool, in the county of Lancaster, England, engineer, and SAMUEL VICKESS, of the same place, sugar-refiner, have invented an Improved Apparatus for Reburning, Cooling, and Measuring Animal Charcoal, of which the following is a specification:

Our invention relates to that class of kiln apparatus in which vertical or nearly vertical retorts are used, and consists, first, as means for insuring that vertical or nearly vertical retorts fitted in kilns are equally heated, and prevented from warping or bending, in giving to each of the said retorts a motion of rotation on its longitudinal axis. The said motion may be continuous, which we prefer, or it may be intermittent in one direction, or alternately in opposite direction. Second, as means for conveying away the gases and vapors immediately they are generated, and for securing equal reburning of animal charcoal, in constructing such retorts, each, with an internal perforated tube, open at the top, preferably into a chimney or flue. By so constructing retorts, the charcoal being reburned occupies an annular space, and can be allowed to pass downward at a comparatively high rate of speed. Third, as means for keeping the perforations in the internal tube free, so as to allow egress for gases or vapors, and for turning the charcoal during its descent in the annular retort-space, in forming the perforations in an upward direction, and casting or constructing immediately over the external openings of the perforations flange-like hoods. Fourth, as means for uniformly lowering the temperature of the reburnt charcoal the required degree, in giving to the coolers, whether of circular or other section, a motion of rotation on or around a vertical axis, which motion may be the same as that imparted to the retorts, (first head,) to which they (the said coolers) may be connected. Fifth, as means for delivering, at a uniform speed and in regular quantities, reburnt and cool charcoal, we fit under the coolers a stationary measuring-box, preferably having half the number of openings that the coolers have. Beneath the said measuring-box is a receiver, rotating at about one-fifth of the speed of the coolers, and provided with a similar number of openings, each opening being in a separate compartment. Finally, beneath the said receiver is a stationary diaphragm, provided with openings the same in number as those of the stationary measurer, but not placed opposite thereto. The reburnt, cooled, and measured charcoal is delivered through the diaphragm into any convenient receptacle.

The several five features of novelty above described may be used separately in kilns, with the exception of the third, which must, in all cases, be used with the second; or they may be used together.

That others may be enabled to make apparatus under our invention and carry the same into practice, we have appended hereunto two sheets of explanatory drawings, on which our various novel motions and devices are delineated in position in a kiln. We would have it understood, however, that we do not claim the kiln-walls, partitions, fire-places, flues, dampers, and like parts as of our invention.

Figure 1, Sheet I, is a side elevation, partly in section, and Fig. 2, Sheet II, a plan, partly in section, both of a kiln fitted with our novel appliances and devices. *a* are flues, walls, fire-places, and dampers. These, as mentioned, we do not claim as in any wise part of our invention, as any preferred mode of heating may be used.

Under the first head, *b* is a retort, the motion of which, intended to be continuous, is shown as being imparted from the wheel *c*, through the spindle *d* and socket or head *d'*. The top of the retort is covered with charcoal in the ordinary way. Under the second head, *f* is the pipe for carrying away the waste gas s and vapors. The bottom of the said pipe is secured into the socket or head *d'*, and the top enters the elbow-tube *i*, led to a flue. Instead of entering the elbow-tube, the pipe *f* might be carried up and left open. Under the third head, *g* are the perforations, opening upward, formed taper, and arranged in rings round the pipe *f*. To prevent the said perforations from being stopped up by charcoal, each ring of perforations is protected by a hood, *h*, which also serves to turn the charcoal in its descent through the annular space. Under the fourth head, *e* are the coolers, six in num-

ber, (shown on an enlarged scale in Fig. 3, Sheet II.) They are grouped around *d*, fit around nozzle-openings in the head *d'*, and are supported and caused to revolve by the wheel *c*, which drives the retorts. The coolers might be driven separately from the retort—they might be stationary or their number varied. Under the fifth head, *j* is the stationary measuring-box, formed with three openings. *k* is the receiver, divided into six compartments, each compartment having an opening, and caused to rotate in the opposite direction to the coolers by the wheel *l*. *m* is the stationary diaphragm, provided with three openings, which are placed so as not to be beneath the three openings in the stationary measurer *j*.

A kiln constructed as we prefer consists of twenty-two retorts arranged in two rows on each side of the furnace, as shown and delineated in the plan view, Fig. 2, Sheet II. The driving-gear and supports are of any ordinary kind, and may be varied to suit circumstances.

Having now fully and clearly described the nature of our said invention, we claim—

1. The vertical or nearly vertical retort, acpable of rotary motion on its longitudinal axis, as and for the purpose set forth.

2. The retort provided with an internal perforated tube, substantially as and for the purpose set forth.

3. In combination with the internal perforated tube, the flange-hoods, for the purposes set forth.

4. The vertical or nearly vertical coolers, capable of rotary motion, substantially as and for the purpose specified.

5. The measuring appliances, consisting of the stationary measuring-box, the divided receiver rotating in a direction opposite to that of the coolers, and the perforated stationary diaphragm, combined substantially as and for the purpose set forth.

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JAMES BUCHANAN.

Witnesses:
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J. JOHNSON.