

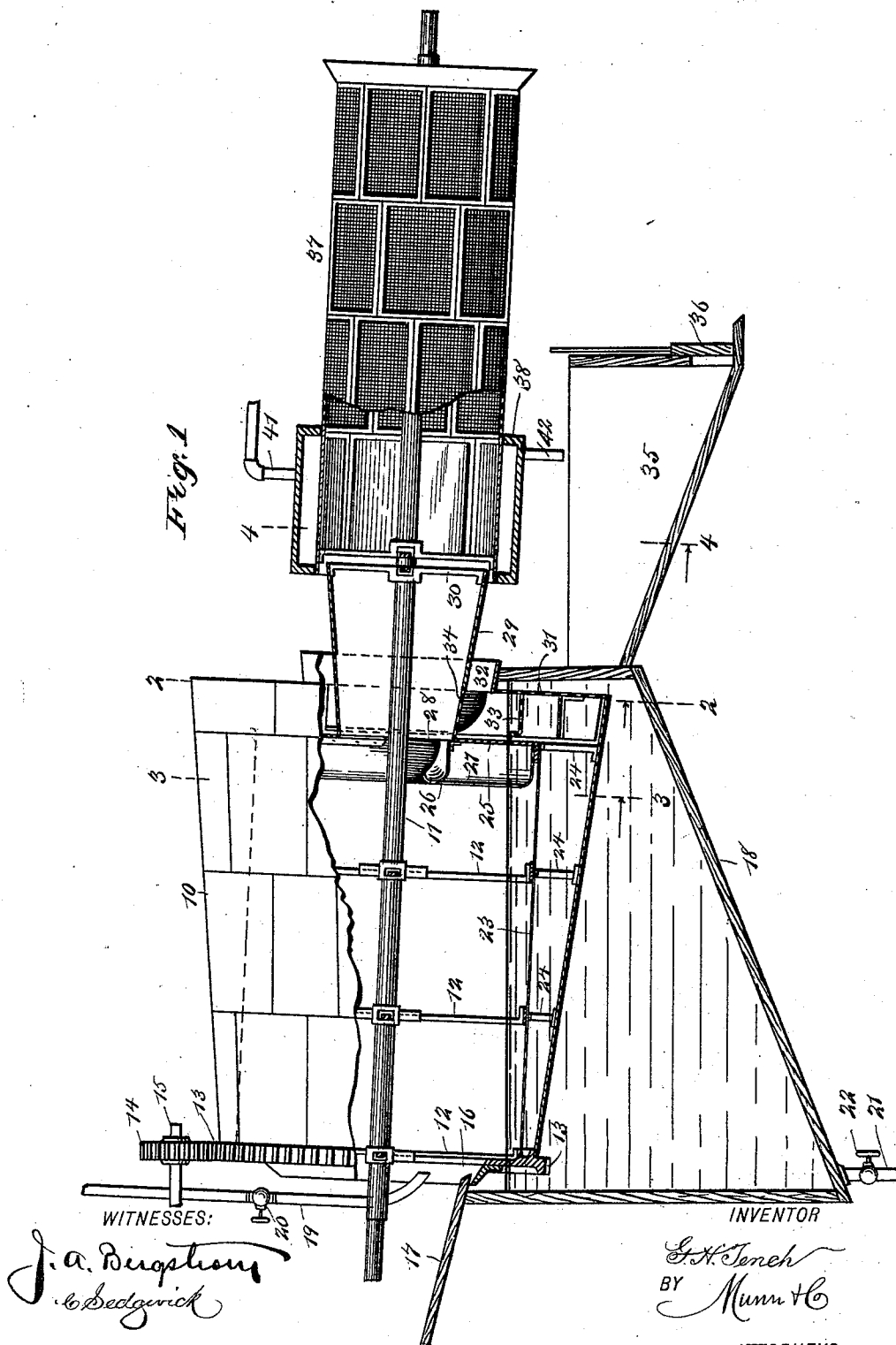
(No Model.)

2 Sheets—Sheet 1.

G. H. TENCH.
WASHER, DRIER, AND SEPARATOR.

No. 497,615.

Patented May 16, 1893.



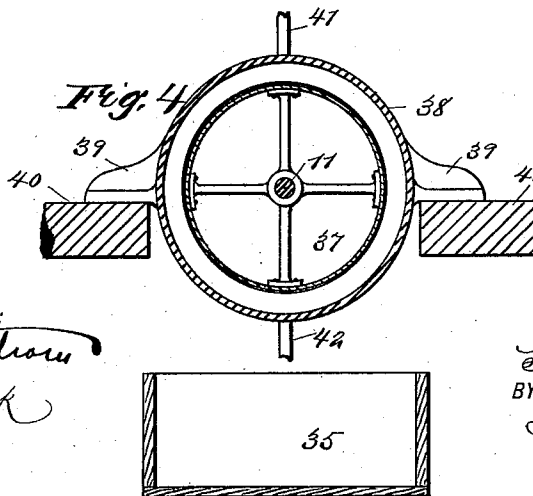
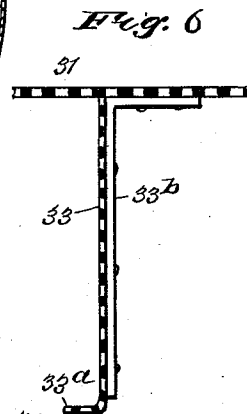
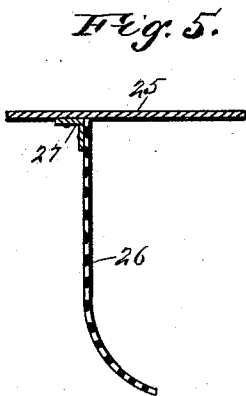
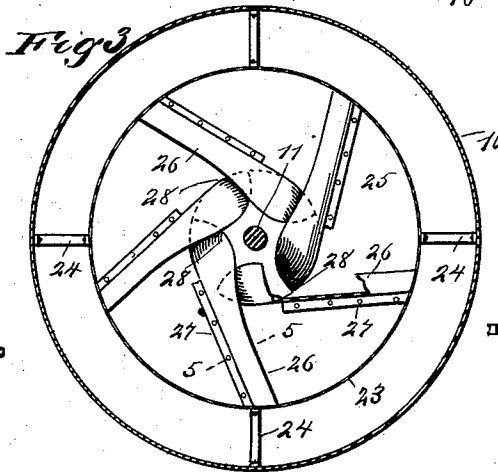
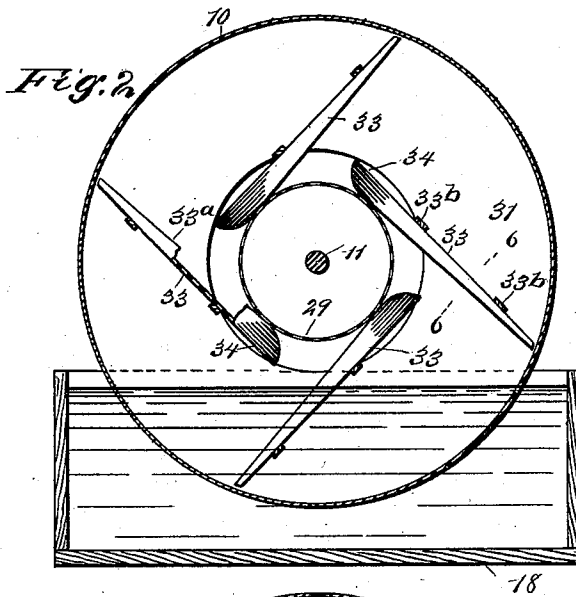
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2 Sheets—Sheet 2.

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WITNESSES:
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ATTORNEYS.

UNITED STATES PATENT OFFICE.

GEORGE H. TENCH, OF POTTSVILLE, PENNSYLVANIA.

WASHER, DRIER, AND SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 497,615, dated May 16, 1893.

Application filed November 18, 1892. Serial No. 452,447. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. TENCH, of Pottsville, in the county of Schuylkill and State of Pennsylvania, have invented a new and Improved Washer, Drier, and Separator, of which the following is a full, clear, and exact description.

My invention relates to improvements in that class of machines which are adapted for use in washing, drying and separating coal, culm, pebble phosphates, ore, and similar material, and the object of my invention is to produce a machine which will thoroughly wash, dry and separate any of the said materials, which will do the work rapidly and automatically, which is comparatively cheap, and which is adapted to do the screening under water so as to avoid creating a dust.

To this end, my invention consists in certain features of construction and combinations of parts, which will be hereinafter described and claimed.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar figures of reference indicate corresponding parts in all the views.

Figure 1 is a broken side elevation, partly in vertical section, of the entire apparatus. Fig. 2 is a cross section on the line 2—2 in Fig. 1. Fig. 3 is a cross section on the line 3—3 in Fig. 1. Fig. 4 is a cross section on the line 4—4 in Fig. 1. Fig. 5 is a cross section through one of the scoops, on the line 5—5 in Fig. 3; and Fig. 6 is a cross section through another scoop, on the line 6—6 in Fig. 2.

The apparatus is provided with an open-ended tapering drum 10, which is arranged in a nearly horizontal position and is carried by a shaft 11, the latter being supported in suitable bearings (not shown in the drawings) and the drum is strengthened by spokes 12, the end spokes connecting with the drum and shaft, and the middle spokes extending from the shaft to the cylindrical screen which is arranged within the drum and which will be described later. On the smaller end preferably, and on the exterior of the drum 10, is a cog wheel 13, which meshes with a gear wheel 14 on the driving shaft 15, and by this means the drum is rotated. The smaller end

of the drum is provided with an inwardly-inclined ring 16, into which extends a supply chute 17, from which the material to be screened is delivered into the drum. The lower portion of the drum turns in water which is held in an inclined tank 18, the tank 18 being supplied by a pipe 19, which is controlled by a valve 20, and which delivers into the small end of the drum, although it may deliver directly into the tank 18, if desired. From the lower end of the tank 18, extends a pipe 21, which is controlled by a valve 22, and through this pipe the dirty water may be withdrawn.

Arranged longitudinally in the drum 10, is a cylindrical screen 23, the lower portion of which is adapted to be submerged in water, and this screen is carried on the outer ends of the middle spokes 12, while on its outer side are short spokes 24, extending from it to the drum 10. The screen 23 is slightly inclined, as shown in Fig. 1, and at its lower end is a circular transverse partition 25, having a central hole to connect with the supplemental screen or strainer which will be hereinafter described, and on the inner face of this partition is a circular elevator comprising a series of nearly radial scoops 26, which extend inward from the screen 23 and deliver through the central opening in the partition 25. The scoops 26 are secured to the partition 25 by means of angle irons 27, and the outer edges of the scoops are curved inward, as shown at 28, so as to deliver through the central opening of the partition 25, and into the tapering supplemental screen or strainer 29. This strainer is of circular cross section and at its smaller end is secured to the partition 25, while its larger end projects outward through the end of the drum and is supported by spokes 30 carried by the shaft 11. It will be seen that the rotation of the drum and cylindrical screen will cause the screened material to be raised by the scoops or buckets 26 and delivered into and through the strainer 29, while the water and any fine material which may be elevated will fall outward and downward through the meshes of the strainer, back into the drum. The end wall of the larger end of the drum 10 is of perforated or screen-

ing material, as shown at 31, to admit the water and yet prevent solid matter from passing into the tank, and the middle portion of the drum end is open, being provided with a ring 32 which is inclined outwardly, that is, it tapers, and the smaller end of the ring is secured to the drum.

Between the end of the drum 10 and the partition 25, is a second series of scoops or buckets 33, which extend from the wall of the drum 10 and deliver through the ring 32, these buckets being adapted to raise the dirt or other fine material which has passed through the screens 23, and the buckets 33 are made of perforated or screening material and have their free edges turned upward, as shown at 33^a in Fig. 6. The buckets or scoops 33 are secured to the wall 31 by triangular brackets 33^b, and their upper ends are curved, as shown at 34, so as to deliver into and through the ring 32. The perforations in the buckets 33 allow the water lifter with the coal or culm to run back into the tank but are too small for the passage of solid matter.

Beneath the ring 32, and at one end of the tank 18, is a dirt pocket 35, which also extends beneath the strainer 29, and this pocket has an inclined bottom at the lower end of which is a door 36, which may be raised so as to permit the dirt to be taken from the pocket.

The coal or other material which is discharged through the strainer 29 is delivered into a cylindrical drier and separator 37, this separator being mounted on the shaft 11, and of the usual kind, except that it is inclosed near its front end by a steam jacket 38, which has side flanges 39 resting on supports 40 (see Fig. 4) and the jacket is supplied with steam supply and exhaust pipes 41 and 42.

It will be seen that by connecting the drier and separator with the washing and screening mechanism as described, the entire operation of washing, screening, drying and separating is carried on continuously and therefore rapidly.

The operation of the apparatus is as follows: The water is turned on so as to fill the tank 18, and it may be renewed as often as necessary. The drum 10 and its containing screen and elevators are set in motion, and the material to be washed, separated and dried is fed into the small end of the drum, from the chute 17. As the drum revolves the mass of material is caused to gravitate toward the lower end of the screen 23, and the finer particles and dirt will pass outward and downward through the screen and into the lower portion of the drum. This screening takes place in the water and consequently no dust is raised. When the screened material reaches the scoops 26, it is lifted by the scoops and delivered into the strainer 29, and the water and whatever fine particles may be left drop through the wall of the strainer, while the screened material passes onward into the

separator 37, where it is dried by the action of steam in the jacket 38, and separated in the usual way. The dirt in the drum 10 gravitates to the lower portion of the drum and is lifted by the scoops 33 and delivered through the ring 32 into the dirt pocket 35, from which it may be taken as often as is necessary.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination with two concentric cylinders, the inner one of which is of less length than the outer and formed of intersticed or foraminated material, of concentric tubular outlets in the adjacent ends of the two cylinders and delivering independently, a circularly arranged elevator in each of said cylinders and delivering into the respective outlets; whereby the cleaned material within the inner cylinder will be discharged through the inner outlet and the screenings contained within the outer cylinder will be discharged through the outer outlet, substantially as set forth.

2. An apparatus of the character described, comprising a tapering drum held to turn in water, a revoluble cylindrical screen inclined slightly and arranged within the drum, a strainer extending through the larger end of the drum, a discharge ring or spout arranged around the strainer, a circular elevator adapted to lift material from the screen and discharge it into the strainer, and a second circular elevator arranged at the larger end of the drum and adapted to discharge the screenings through the circular ring or spout, substantially as described.

3. An apparatus of the character described, comprising a tapering drum held to turn in a nearly horizontal position and having its lower portion submerged in water, a cylindrical screen arranged within the drum and inclined slightly toward the large end of the drum, a drier and separator arranged opposite the large end of the drum, a circular ring or spout projecting from the larger end of the drum, a strainer extending through the ring and adapted to deliver into the drier and separator, a series of curved scoops arranged at the opposite end of the screen and adapted to deliver into the strainer, and a second series of scoops arranged at the larger end of the drum and adapted to deliver into and through the circular ring or spout, substantially as described.

4. An apparatus of the character described, comprising an inclined tank, an inclined dirt pocket arranged at one end of the tank, a revoluble drum held to turn in the tank and having at one end a circular spout or ring adapted to deliver into the dirt pocket, a cylindrical screen arranged within the drum, a strainer leading through the ring or spout of the drum and adapted to deliver into a drier and separator, an elevator arranged to dis-

charge from the screen into the strainer, and a second elevator arranged to discharge from the drum through the ring and into the dirt pocket, substantially as described.

5 5. The combination, with a washing drum having screening and discharging mechanism therein, of the revoluble separator arranged

at the end of the drum, and a heating jacket embracing the separator, substantially as described.

GEORGE H. TENCH.

Witnesses:

GAETANO FERRARO,
WM. A. COCHRAN.