No. 807,423. PATENTED DEC. 12, 1905.

W. H. FERN.

SCREEN.

APPLICATION FILED DEC. 5, 1904.

2 SHEETS—SHEET 1.

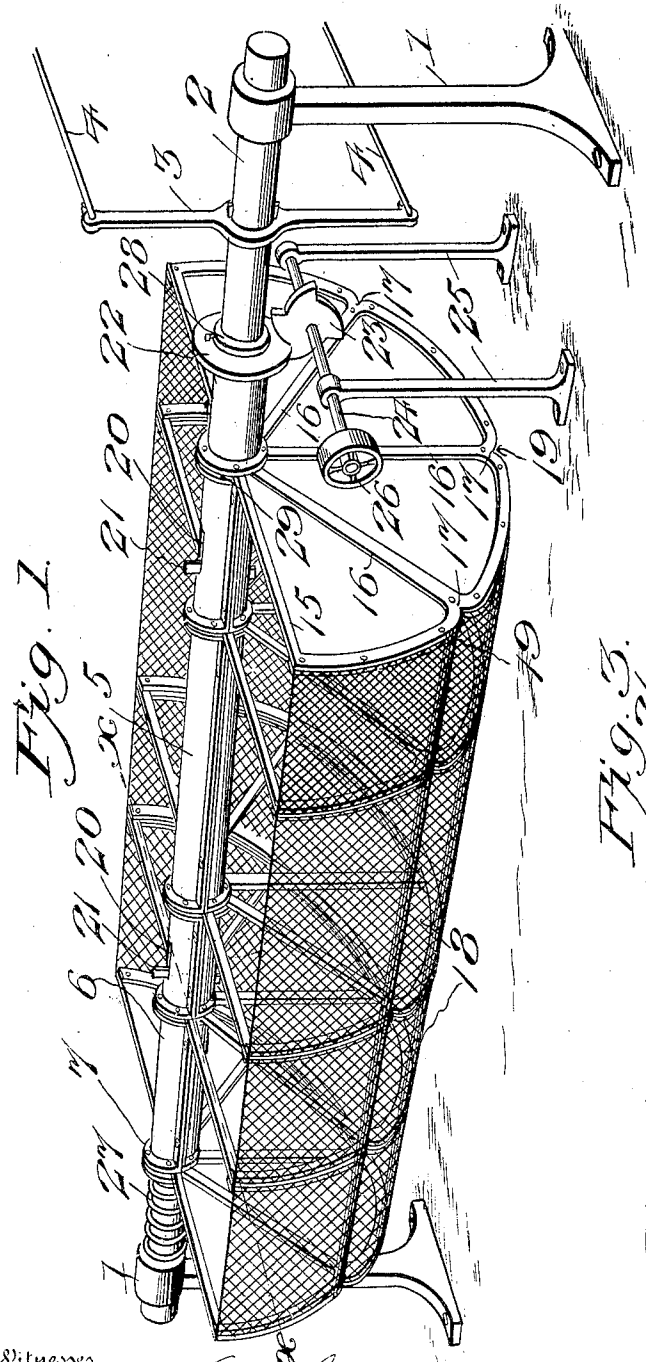


Fig. 1.

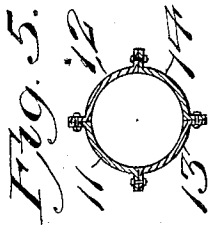


Fig. 5.

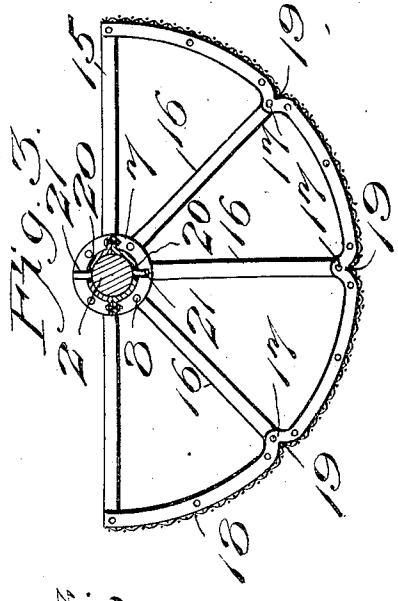


Fig. 3.

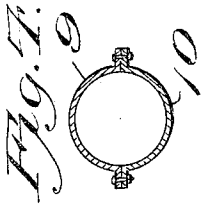


Fig. 4.

Witnesses
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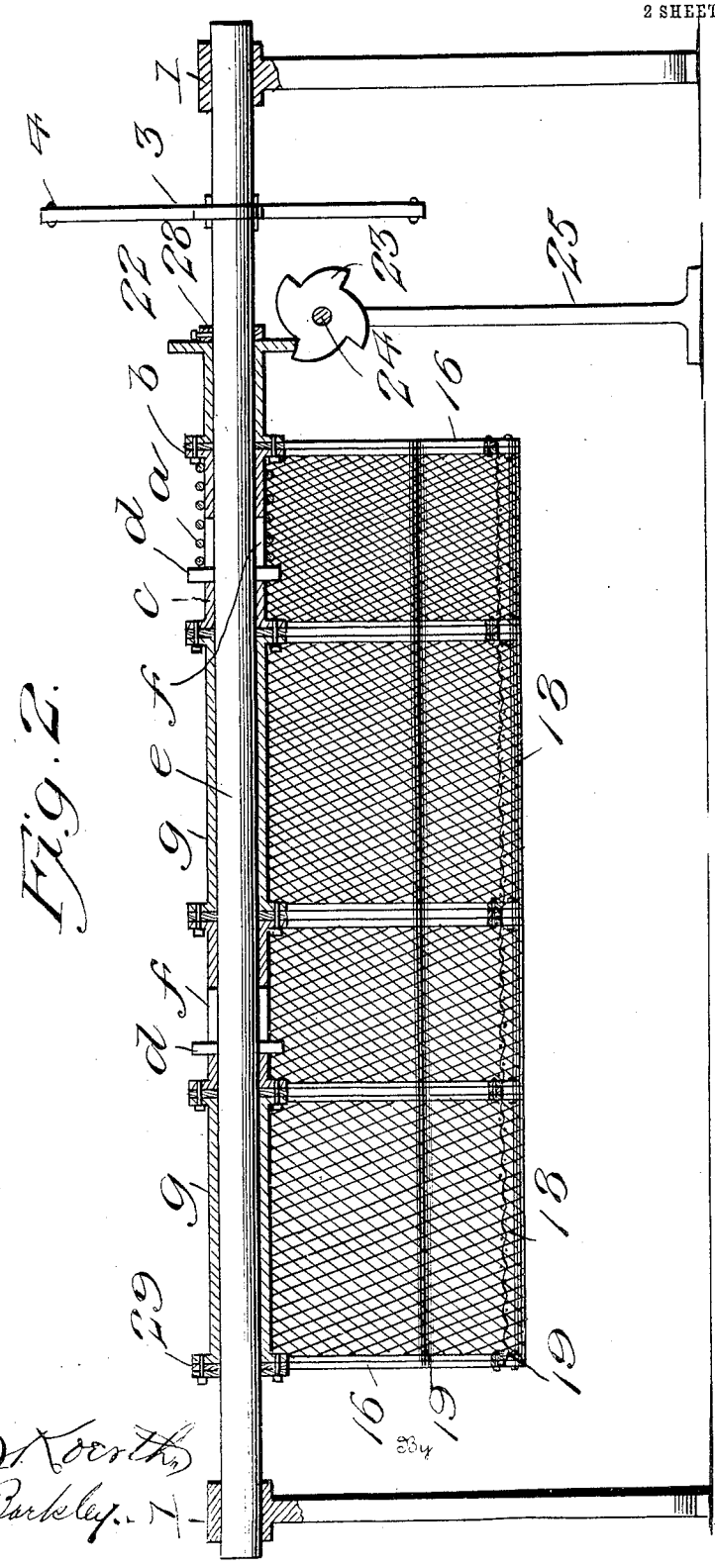
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2 SHEETS—SHEET 2.

Fig. 2.



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UNITED STATES PATENT OFFICE.

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SCREEN.

No. 807,423. Specification of Letters Patent. Patented Dec. 12, 1905.

Application filed December 5, 1904. Serial No. 235,513.

To all whom it may concern:

Be it known that I, WILLIAM H. FERN, a citizen of the United States of America, residing at Scranton, in the county of Lackawanna and State of Pennsylvania, have invented certain new and useful Improvements in Screens, of which the following is a specification.

This invention relates to sifters and screens, and relates more particularly to that class employed for separating the various grades of coal, it being understood that it may be employed for ore or any other material or substance.

An object of this invention is to provide a device of this character that will oscillate or swing in place of the ordinary form or revolving screen, and at the same time it is an object of the invention to provide means whereby the screen may be moved longitudinally.

It is also an object of the invention to provide a novel construction whereby the passage of the coal within the screen is obstructed, and thereby greatly facilitating the result.

Furthermore, an object of the invention is to provide means whereby the return motion of the longitudinal movement of the screen is quicker than the first motion.

The invention also has for an object the provision of means whereby the longitudinal movement of the screen is prevented from injuring the mechanism for causing such movement.

A further object of the invention is to provide a screen in which a hollow shaft is mounted on a second shaft, the said hollow shaft being adapted to move longitudinally of the second shaft, said hollow shaft being composed of sections in order that any portion becoming worn in practice may be easily replaced without undue cost, labor, or amount of time.

Still further, it is an object of the invention to produce a device of this character that will be simple in construction, economical to manufacture, and efficient in practice.

With the above and other objects in view the invention consists of the detail of construction and in the arrangement and combination of parts to be hereinafter more fully described and claimed.

In describing the invention in detail reference will be had to the accompanying drawings, forming part of the specification, wherein like characters of reference will denote corresponding parts in the several views, and in which—

Figure 1 is view in perspective of the invention. Fig. 2 is a longitudinal section of the invention with a part shown in slightly-modified form. Fig. 3 is a view in section taken on the line $x\,x$ of Fig. 1. Fig. 4 is a sectional view of the hollow shaft, and Fig. 5 is a sectional view of a slightly-modified form of hollow shaft.

In the drawings, 1 indicates suitable bearings or supports in which is mounted the solid shaft 2. The shaft is adapted to be rocked or oscillated by the oppositely-extending arms 3, which are suitably secured or keyed thereto. The free ends of the arms are attached to the pitmen or rods 4, which extend to suitable machinery or motor for giving the necessary movement thereto. Mounted on the solid shaft and independently movable thereof is a hollow shaft 5. This shaft 5 is composed of a plurality of transverse sections 6, which have formed on their meeting ends flanges 7, through which bolts or the like 8 are inserted for holding the sections in their assembled position. Each of these sections are formed of longitudinal sections, the two sections 9 and 10, as in Fig. 4, or in four sections 11, 12, 13, and 14, as in Fig. 5. Of course it is not desired to be limited to the number of sections, as such a number may be employed as will meet purposes of practice.

Secured to the hollow shaft 5 are the spiders 15, which are approximately semicircular in form, with the outer periphery thereof notched preferably at a point on a plane with the ends of the arms 16 of the spiders, as at 17. To these spiders are secured the screen-sections 18, which conform to the periphery of the spiders, and therefore through the medium of the notches 17 form in the completed screen the longitudinal ribs 19. These screen-sections are secured to the spider in any preferred or ordinary way, but should be so attached as to be easily removed. The screen-sections placed between the various spiders are of different mesh, as in general practice, a fine mesh at one end and increasing in size toward the opposite end. In order that the screen may oscillate with the solid shaft, elongated slots 20 are formed in certain of the transverse sections 6, through which pass the lugs 21, formed on the solid shaft. These slots and lugs are each oppositely arranged.

Coal is thrown into the screen at the end with the fine mesh, and the screen is caused to swing or oscillate, which imparts activity to the coal. This activity is further enlivened by the transverse ribs of the screen, which

permits the coal to be more positively separated. The spider-rim being within the screen also benefits the operation.

Formed on one end of the hollow shaft or secured thereto is a bearing-surface or plate 22, which is adapted to be engaged by a cam 23, mounted on a shaft 24, arranged at right angles to the shaft 2. The shaft 24 is suitably mounted in the bearings 25, and has on one end a pulley 26, over which a belt or the like is adapted to pass to rotate the same. By this construction the hollow shaft 5 is moved longitudinally of the solid shaft 2 in one direction, the said movement of the hollow shaft 5 on the shaft 2 being permitted by the elongated slots 20. To impart motion to the hollow shaft 5 in the opposite direction or to return it to its normal position, which is in close approximation to the cam, a spiral spring 27 is interposed between the opposite end of the shaft 5 and one of the supports 1, said spring embracing the solid shaft. This spring 27 is to be of great strength and is adapted to impart a quick motion to the shaft 5, much quicker than the movement given by the cam. Ordinarily the action of the shaft 6 on its return would affect the mechanism of the cam; but to prevent this a stop-collar 28 is attached to the solid shaft in a position over a point just in advance of the contacting edge of the cam, so that in its first movement the cam does not contact with the plate 22.

The longitudinal movement of the shaft 5 is liable to create friction between the walls of the slots 20 and the lugs 21. When a slot has become too much worn for efficient practice, it is necessary but to remove one of the longitudinal sections of the transverse section in which the slot is located and replace the section by a new one. The sections having the slots are preferably made much smaller than the remaining sections, thereby saving an expense in material and labor.

In Fig. 2 the invention illustrated is the same as the preceding in every particular, except in the arrangement and position of the spiral spring for causing the return of the hollow shaft. In this form the spring *a* is interposed between one of the end flanges *b* of a pipe-section *c* and the lugs *d* of the solid shaft *e*, the lugs of course riding in the elongated slots *f* of the hollow shaft *g*.

In the illustrations the hubs 29 of the spiders are shown as interposed between the end flanges of the transverse sections of the hollow tube; but of course they could be mounted on the said shaft and fully answer all purpose of practice.

From the foregoing the operation and construction of the device are thought to be clearly apparent, it being noted that all changes may be resorted to that fairly fall within the scope of the claims without departing from value thereof.

Having thus fully described the invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a device of the character described, a suitably-supported shaft, a hollow shaft thereon, means for oscillating the first-named shaft, connections between the first-named shaft and hollow shaft whereby said hollow shaft oscillates therewith, said connections being such as to allow a longitudinal movement of the hollow shaft on the first-named shaft, and means for imparting longitudinal movement to the hollow shaft and a screen supported by the hollow shaft.

2. In a device of the character described, a suitably-supported shaft, a hollow shaft thereon, lugs on the first-named shaft engaging the hollow shaft, means for oscillating the first-named shaft, and means for imparting longitudinal movement to the hollow shaft and a screen supported by the hollow shaft.

3. In a device of the character described, a suitably-supported shaft, a hollow shaft thereon, means whereby the shafts are oscillated simultaneously, means for imparting a longitudinal movement of the hollow shaft independent of the first-named shaft, and a screen supported by the hollow shaft.

4. In a device of the character described, a suitably-supported shaft, a hollow shaft thereon having slots, lugs on the first-named shaft passing through the slots of the hollow shaft and riding therein, means for oscillating the first-named shaft and means for reciprocating the hollow shaft.

5. In a device of the character described, a suitably-supported shaft, a hollow shaft mounted thereon, said hollow shaft being formed of a plurality of transverse sections, spiders having their hubs interposed between the opposing edges of the transverse sections and secured thereto and screen-sections secured to the spiders.

6. In a device of the character described, a suitably-supported shaft, a hollow shaft thereon, means for oscillating the first-named shaft, a plate secured to an end of the hollow shaft, connections between the first-named shaft and the hollow shaft, whereby said hollow shaft oscillates therewith, said connections being such as to allow a longitudinal movement of the hollow shaft on the first-named shaft, a suitably-driven cam engaging the plate of the hollow shaft for moving said shaft in one direction and means for imparting motion to the hollow shaft in the opposite direction.

7. In a device of the character described, a suitably-supported shaft, a hollow shaft thereon, means for oscillating the first-named shaft, a plate secured to an end of the hollow shaft, connections between the first-named shaft and the hollow shaft, whereby said hollow shaft oscillates therewith, said connections being such as to allow a longitudinal movement of

the hollow shaft on the first-named shaft, a suitably-driven cam engaging the plate of the hollow shaft for moving said shaft in one direction, means for imparting motion to the hollow shaft in the opposite direction, and a collar on the first-named shaft to limit the second movement of the hollow shaft, with relation to the cam.

In testimony whereof I affix my signature, in the presence of two witnesses, this 23d day of November, 1904.

WILLIAM H. FERN.

Witnesses:
R. W. MORGAN,
A. W. MUSGRAVE.