

J. W. BROWN, JR.

APPARATUS FOR SEPARATING MAGNETIC METAL FROM SAND.

APPLICATION FILED MAY 6, 1910.

1,034,969

Patented Aug. 6, 1912.

3 SHEETS-SHEET 1.

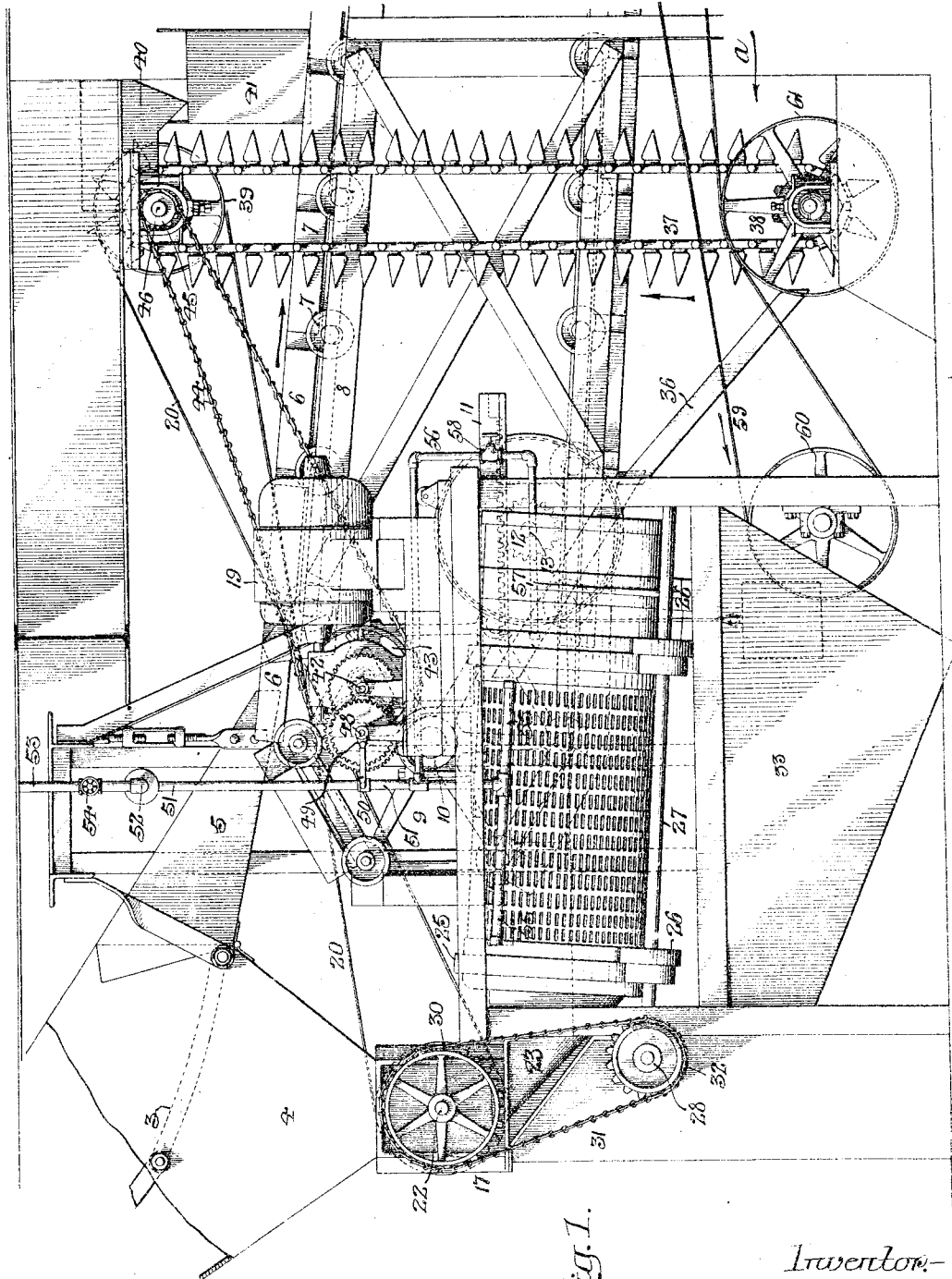


Fig. 1.

Witnesses—
Walker D. Pullinger
Wills A. Burrows

Inventor—
John W. Brown, Jr.
by His Attorneys—
Hornum & Hornum

J. W. BROWN, JR.

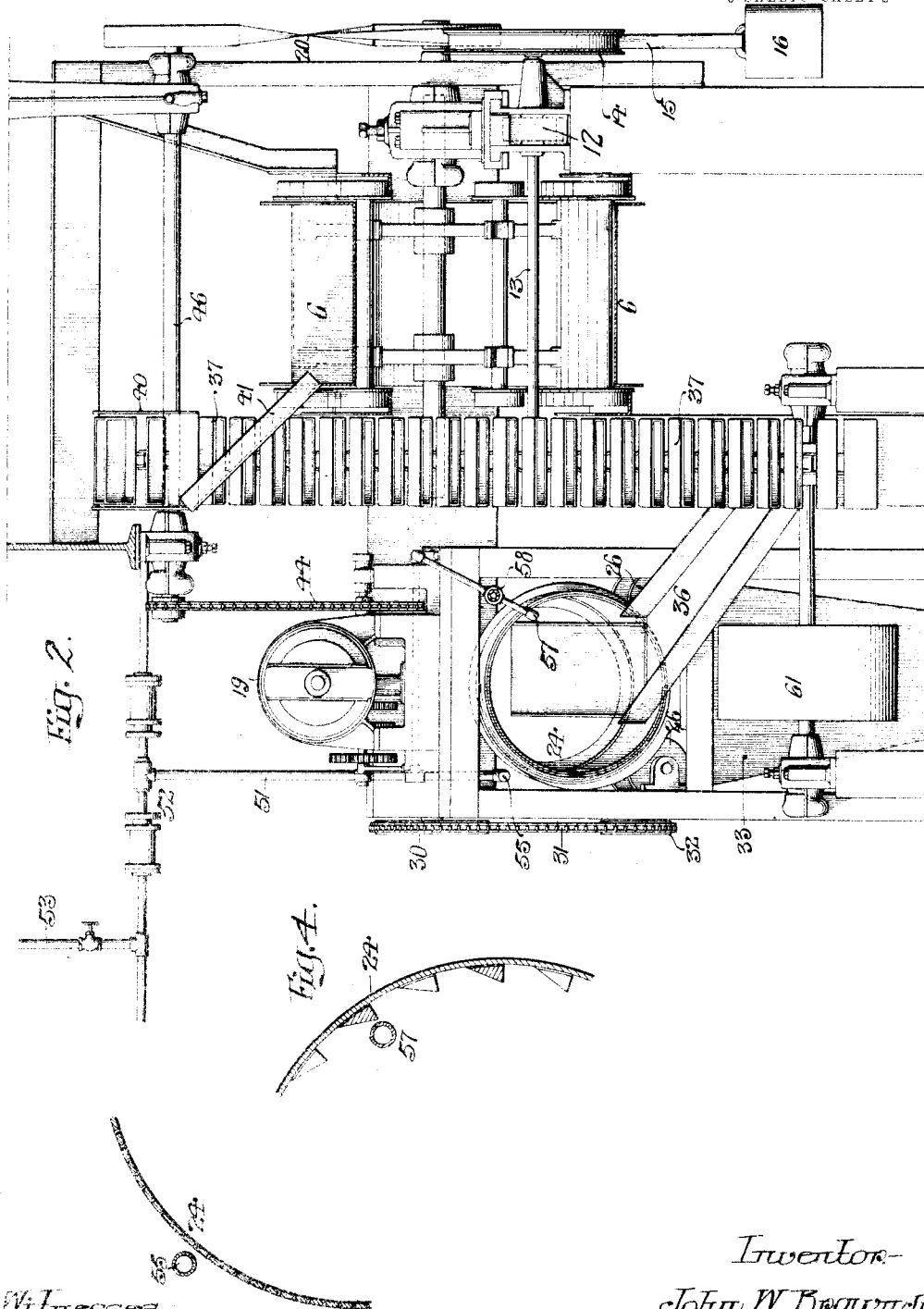
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3 SHEETS SHEET 2



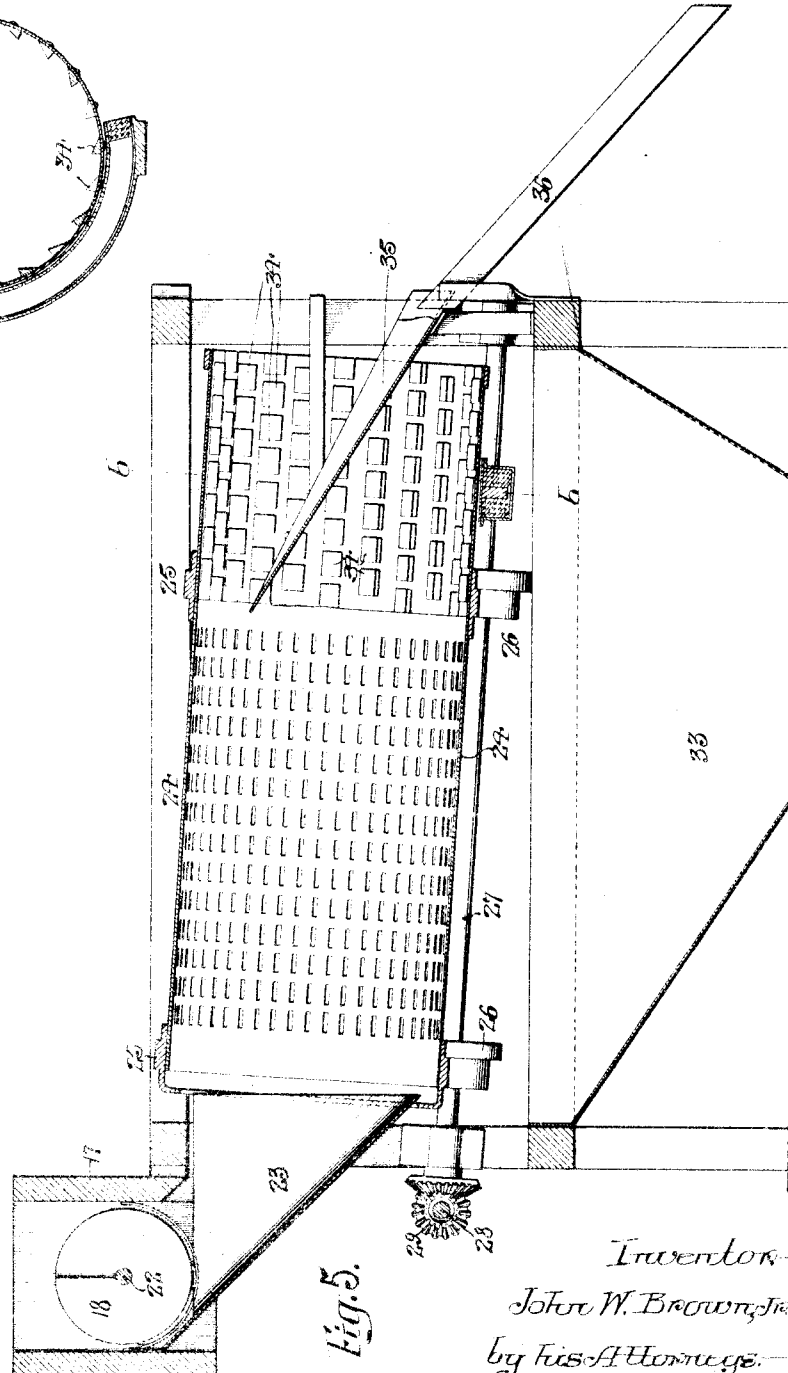
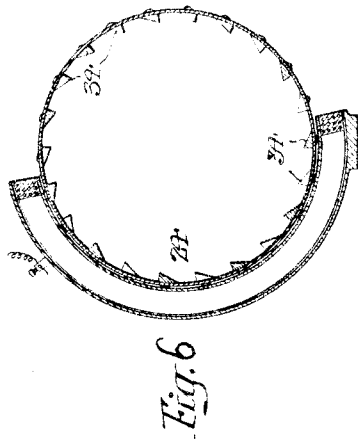
Witnesses
 H. H. Pullinger
 W. A. Burrows

Inventor
 John W. Brown, Jr.
 by His Attorneys
 H. H. Pullinger

J. W. BROWN, JR.
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 3 SHEETS-SHEET 3



Witnesses—
 Walter D. Sullivan
 Charles H. Burrows

Fig. 5.

Inventor—
 John W. Brown, Jr.
 by His Attorneys—
 Howard & Brown

UNITED STATES PATENT OFFICE.

JOHN WILSON BROWN, JR., OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE ENTERPRISE MANUFACTURING COMPANY OF PENNSYLVANIA, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

APPARATUS FOR SEPARATING MAGNETIC METAL FROM SAND.

1,034,969.

Specification of Letters Patent.

Patented Aug. 6, 1912.

Application filed May 6, 1910. Serial No. 559,773.

To all whom it may concern:

Be it known that I, JOHN WILSON BROWN, Jr., a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Apparatus for Separating Magnetic Metal from Sand, of which the following is a specification.

The object of my invention is to construct an apparatus for separating the magnetic metal from sand after the sand has been discharged from a molding flask and before it is used again.

In the accompanying drawings:—Figure 1, is a view in elevation illustrating my improved apparatus for separating metallic particles from sand; Fig. 2, is an end view looking in the direction of the arrow, *a*, Fig. 1; Figs. 3 and 4, are enlarged views of details of Fig. 2; Fig. 5, is a longitudinal section through the magnetic separator; and Fig. 6, is a sectional view on the line *b—b*, Fig. 5.

My invention relates particularly to mechanism for treating sand after it has been discharged from the flasks of what is known as a continuous molding machine, such machine is fully illustrated and described in the patent granted to me on the 21st day of May 1912, No. 1,027,316. The castings and sand as they drop from the flasks of this machine fall onto the screen 3, under which is a hopper 4, Fig. 1. The screen is made up of a series of bars spaced apart; the spaces being of such a size as to prevent the castings passing through the screen, allowing only the sand to pass through and small particles of metal, such as shot, pieces broken off the fins, or pieces broken off the body of the casting. The castings travel down the screen and pass onto a chute 5 which delivers them onto an endless pan conveyer 6, in the present instance having wheels 7 which travel on rails 8. The castings are carried by the conveyer to the cleaning room where they are introduced into rumblers. The conveyer 6 passes around a sprocket wheel 9 mounted on a shaft 10; the conveyer being driven from the opposite end. The bearings 11 for the shaft 10 are extended and have teeth on the underside which engage teeth of the sprocket wheel 12 mounted on a shaft 13 on which is a band wheel 14. A band 15 is secured to this wheel and suspended from

the band is a weight 16 which tends to keep the conveyer taut.

The sand hopper 4 communicates with a trough 17 in which is a screw conveyer 18 driven from the electric motor 19 by means of the belt 20 which passes around a wheel 21 on a shaft 22 of the screw conveyer. The screw conveyer feeds sand toward a chute 23 where it is delivered into one end of a rotary magnetic separator 24. The cylinder of the separator has bands 25 which are supported and rotated by wheels 26 on a shaft 27; this shaft is geared to a shaft 28 through bevel gears 29 and is driven from the screw shaft 22. In the present instance on the screw shaft is a sprocket wheel 30 around which passes a chain 31 which also passes around a sprocket wheel 32 on the shaft 28. About two-thirds of the cylinder is perforated in the present instance; the perforations being in the form of narrow slots which allow particles of sand to pass through, but are of such a width as to prevent the passage of small particles of metal, such as shot which is formed during the casting process. The sand passes through the perforations in the shell and drops into the hopper 33. At the outlet end of the cylinder is a series of magnets 34 extending, in the present instance, about one-third the length of the cylinder, and these magnets are connected with an automatic cut-out so that they are energized during one-half the rotation, namely, when they are traveling upward, and when they reach the top the magnets are cut out, so that as the sand, which cannot pass through the perforations in the cylinder, comes in contact with the magnets any particles of metal will adhere to the magnets and will be carried up away from the sand, which continues its travel, passing out the end of the cylinder and discharging into the hopper 33.

Extending into the outlet end of the cylinder is an inclined chute 35 and this inclined chute extends to a point beyond the line of magnets, so that when the magnets are cut out the metallic particles will drop onto the chute and flow down the chute away from the cylinder. This chute connects with another chute 36 which discharges into a bucket elevator 37 which passes around sprocket wheels 38, 39; the sprocket

wheel 39 being the driven sprocket wheel; and the buckets discharge into a hopper 40 which in turn discharges into an inclined chute 41, which delivers the metallic particles onto the conveyer 6 where they are carried with the castings to the cleaning room. The sand can be conveyed from the hopper 33 to any suitable point.

The motor 19 is geared to a shaft 42 on which is a sprocket wheel 43, passing around this sprocket wheel is a chain 44 which passes around a wheel 45 on a shaft 46 on which is mounted the sprocket wheel 39 of the bucket elevator 37. On one end of this shaft is a belt wheel 47 around which passes the belt 20 which also passes around the belt wheel 21; the belt being twisted in the present instance so that the conveyer screw will be turned in the proper direction.

On the shaft 48, which is geared to the shaft 42 by a train of reducing gears, is a crank 49 which is connected by a rod 50 to a pipe 51 swiveled at 52 to an air in-take pipe 53 which is provided with a valve 54. On the end of the pipe 51 is a long nozzle 55 which is perforated throughout its length so that a blast of air will be projected against the outside of the cylinder 24 in line with the perforation to clear the perforations of any sand which may be caught, thus keeping the perforations always clear. By reciprocating the pipe through the means stated above the air blast will contact with all portions of the cylinder as it is rotated.

56 is a branch of the pipe 51 which extends into the discharge end of the cylinder, having a nozzle 57 which is perforated, and this branch has a valve 58 for controlling the flow of air to the nozzle. As the air is projected from the nozzle it plays upon the magnets, keeping the surfaces clean and bright.

59 is an endless belt which passes around

a pulley 60 and also passes around an idler 61 on the shaft of the sprocket wheel 38. This belt carries green sand from any source of supply and discharges it into the hopper 33. The amount of green sand is regulated according to the waste of the used sand during the process of casting.

Thus it will be seen by the above construction that I provide an apparatus which will thoroughly separate any magnetic metallic particles from the used sand as it is delivered from the flasks, so that before it is used again it is entirely free from metallic particles. The metallic particles are collected and carried to the cleaning room and from this cleaning room they are conveyed back to the cupola so that there is practically no waste of metal.

I claim:—

1. The combination in an apparatus for separating magnetic metallic particles from sand, of a cylinder having a screen section and a magnetic separator section; a primary air supply pipe reciprocable longitudinally of the cylinder; with nozzles connected thereto to reciprocate therewith and extending respectively along and in proximity to the screen section and externally thereof, and along and in proximity to the inner surface of the magnetic separating section.

2. A magnetic cylinder for separating magnetic metal particles from sand, with a longitudinally reciprocable air blast conduit extending along and in proximity to the separating surface of said magnetic separator.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

JOHN WILSON BROWN, JR.

Witnesses:

WM. E. SHUPE,
WM. A. BARR.