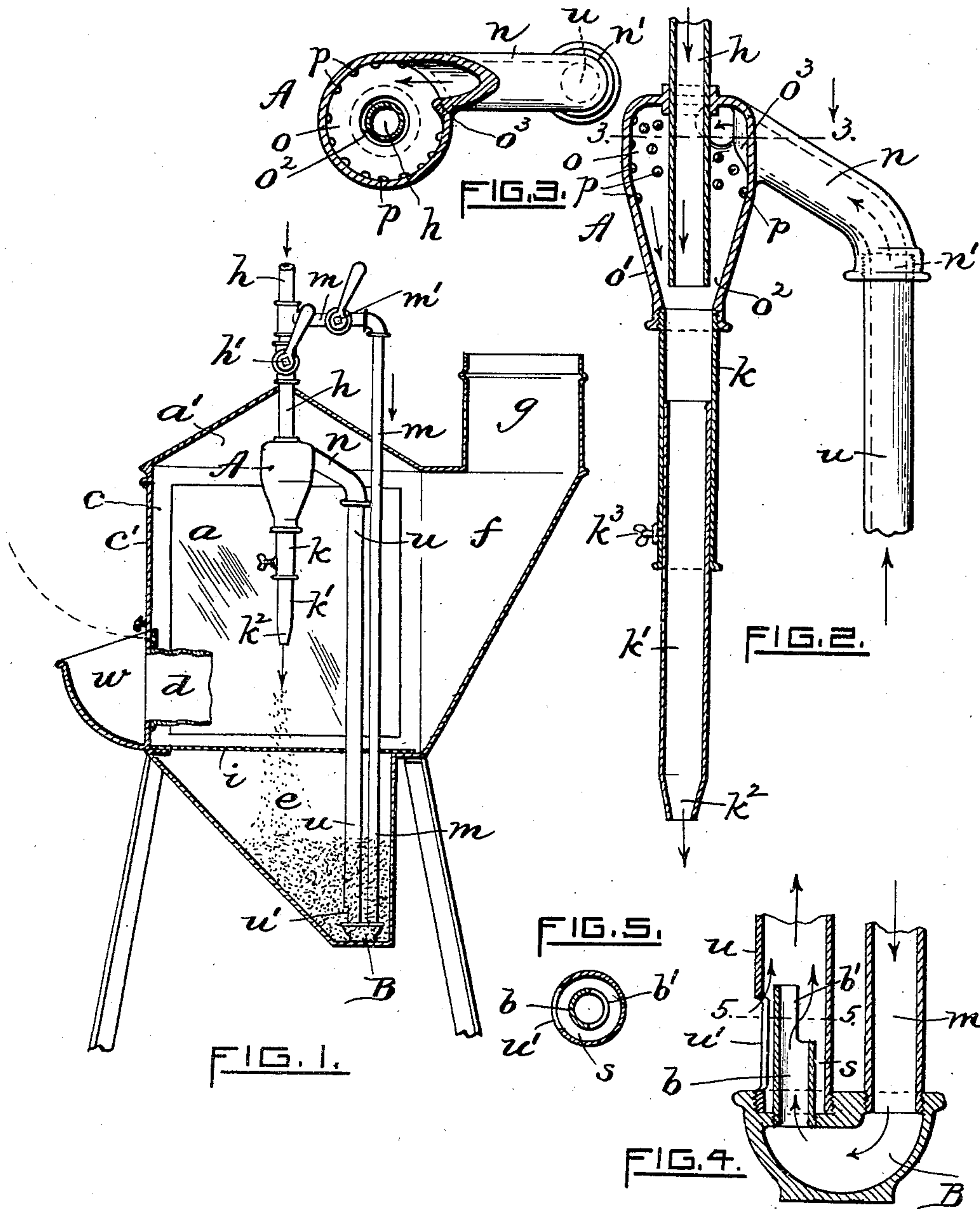


F. P. BOLAND.
SAND BLAST MACHINE.
APPLICATION FILED NOV. 27, 1908.

914,783.

Patented Mar. 9, 1909.



WITNESSES:

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UNITED STATES PATENT OFFICE.

FRANCIS P. BOLAND, OF PROVIDENCE, RHODE ISLAND.

SAND-BLAST MACHINE.

No. 914,783.

Specification of Letters Patent.

Patented March 9, 1909.

Application filed November 27, 1908. Serial No. 464,729.

To all whom it may concern:

Be it known that I, FRANCIS P. BOLAND, a citizen of the United States of America, and a resident of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Sand-Blast Machines, of which the following is a specification.

My invention relates to sand-blast machines, and it consists in certain novel improvements in the air and sand feeding means and also in the construction of the mixing head or chamber, from which latter the abrading material is discharged via the outlet-nozzle, all as more fully hereinafter set forth and claimed.

In the accompanying sheet of drawings, Figure 1 represents a vertical sectional view, in partial elevation, of a sand-blast machine embodying my improvements. Fig. 2 is a vertical central section of the mixing head and its connections, in enlarged scale. Fig. 3 is a horizontal sectional view taken on line 3 3 of Fig. 2. Fig. 4 is a vertical central sectional view, also in enlarged scale, showing the construction of the sand and air feeding device adapted to be located at the bottom of the sand reservoir, and Fig. 5 is a horizontal section, taken on line 5 5 of Fig. 4.

In my improved sand-blast machine I employ a suitably supported preferably square or rectangular casing *c* having glass sides, inclosing the working chamber *a*, a beveled top *a*¹ and a sand reservoir *e*, the latter being located immediately below the chamber *a* and communicating therewith via the perforated plate *i*. An extension *f* terminating in the exhaust flue *g* leads from the rear of the chamber *a*. The front side of the casing is provided with a swinging door *c*¹ and a guard or protector *w* arranged with respect to the usual hand-holes *d* and located below said door. I make no claim to the elements before described.

An air-blast pipe *h* adapted to be connected with a suitable source of air supply passes centrally downward through the top of the machine and terminates in the mixing head A, soon to be described. A branch pipe *m* extends rearwardly and downwardly from the pipe *h* and is secured in the top of the hollow casting B, in turn adapted to rest on and be supported by the bottom wall of said reservoir *e*. Cocks *h*¹ and *m*¹ interposed in the respective pipes *h* and *m* are employed for controlling the flow of air. The said casting

B, shown more clearly in Fig. 4, practically forms a chambered return-bend, the air from the inlet-pipe *m* in this case flows directly therefrom through an open short upright nozzle *b* tapped into the top of the casting. The lower end of what may be termed the main circulating-pipe *u* freely surrounds the nozzle *b* and is also tapped into the member B. One side of pipe *u* is provided with an opening *u*¹ near the bottom extending to or nearly to the top of the nozzle, the upper portion of the latter being cut away at *b*¹ on the side opposed to said opening *u*¹. As thus constructed the casting and the lower portion of pipes *m* and *u* are when in service completely surrounded by the sand or abrading material contained in the reservoir *e*; the arrangement being such that the sand flows by gravity through opening *u*¹ and fills the annular space *s* lying between the members *u* and *b*, while at the same time the pressure of the air issuing from the nozzle *b* drives the sand from the space *s* and forces it upwardly in the circulating-pipe to be further mingled with air in the mixing-head A and finally discharged from the latter onto the work. The said member A comprises a casting provided with an enlarged chambered cylindrical upper portion *o* having converging side walls terminating at the bottom in a central nozzle *o*¹, and having an upwardly inclined branch or nozzle *n* arranged tangentially to and being in continuous open communication with said chamber *o*. The lower portion *n*¹ of the member *n* is secured to the upper end of the circulating-pipe *u*. The inner walls of the chamber *o* may be provided with suitably disposed integral lugs or button-like projections *p*; these latter as well as the inwardly extending lug *o*³ located contiguous to one side of the outlet end of the tubular branch *n* are employed to break up the rotative or swirling action of the sand discharged into the chamber and cause it to fall in a more uniform or even manner so as to be acted upon more efficiently by the air discharged from the mouth of pipe *h* at the annular point *o*², Fig. 2. The thus acted upon sand passes, via tube *k*, into said nozzle *o*¹ and the telescoping tube *k*¹ to the suitably shaped outlet nozzle *k*² and is discharged therefrom onto the work supported beneath. A screw *k*³ may be employed for readily changing the position of the discharge-nozzle *k*² vertically with relation to the plate *i*.

I am aware that it is a well-known practice to provide sand-blast machines with means for continuously circulating and re-using the sand, and therefore I disclaim such feature broadly, except as to the novel construction and arrangement of devices employed as set forth in the following claims.

I claim as my invention and desire to secure by United States Letters Patent:—

1. In a sand-blast machine, provided with a working chamber and a sand reservoir located therebelow, the combination therewith of a chambered member or casting B supported in the reservoir so as to be embedded in the sand, a pipe for admitting air under pressure into the casting, a short outlet-nozzle secured to and extending upwardly from the latter, said inlet and outlet members being in continuous open communication with the chamber of said casting, a circulating-pipe also secured to the casting having its lower portion perforated and inclosing said nozzle and forming an annular space therebetween into which space sand may flow by gravity but not into the casting's chamber, a hollow head member located in the said working chamber connected to and being in continuous open communication with the circulating-pipe for introducing sand into the head, a nozzle connected with the lower portion of said head, and means for forcing the thus introduced sand downwardly from the head and discharging it through the nozzle, substantially as hereinbefore described.
2. In a machine of the character described, the combination of a chambered casting member B constituting a return-bend, an air-inlet pipe *m* tapped into the said member, a main circulating-pipe *u* having its lower end tapped into the member B but not extending into its chamber having a lateral opening through its wall, a smaller pipe *b*

forming an air-outlet nozzle tapped into the casting for discharging air therefrom, and having said nozzle arranged concentrically with and inclosed by the circulating-pipe so as to form a space between them, the upper end of the nozzle extending to or beyond the upper edge of said lateral opening.

3. In a machine of the character described, the combination of a head member having a mixing-chamber proper therein provided with downwardly converging side walls terminating at its lower end in a discharge-outlet having a materially reduced cross-sectional area, a pipe extending downwardly through the head into the chamber for admitting air under pressure, a branch nozzle opening into the mixing-chamber, said nozzle being non-central or offset with relation to the latter and also extending downward at an angle therefrom, and a circulating-pipe connected to the lower or free end of said branch nozzle for conducting sand and air from a source of supply into the mixing-chamber.

4. In a machine of the character described, the head member A provided with a mixing chamber, a tubular branch member adapted to discharge sand into the chamber and being offset or tangentially arranged with relation thereto, an open air-tube extending downwardly into the chamber, an outlet-nozzle forming the lower termination of the head and being in alinement with said air-tube, and a series of short projections formed on the inner wall of the chamber for the purpose herein set forth.

Signed at Providence, R. I., this 24th day of November, 1908.

FRANCIS P. BOLAND.

Witnesses:

CALVIN H. BROWN,
GEO. H. REMINGTON.