

(No Model.)

5 Sheets—Sheet 1.

J. B. STONE & F. W. HINDSON.

SAND BLAST APPARATUS.

No. 370,987.

Patented Oct. 4, 1887.

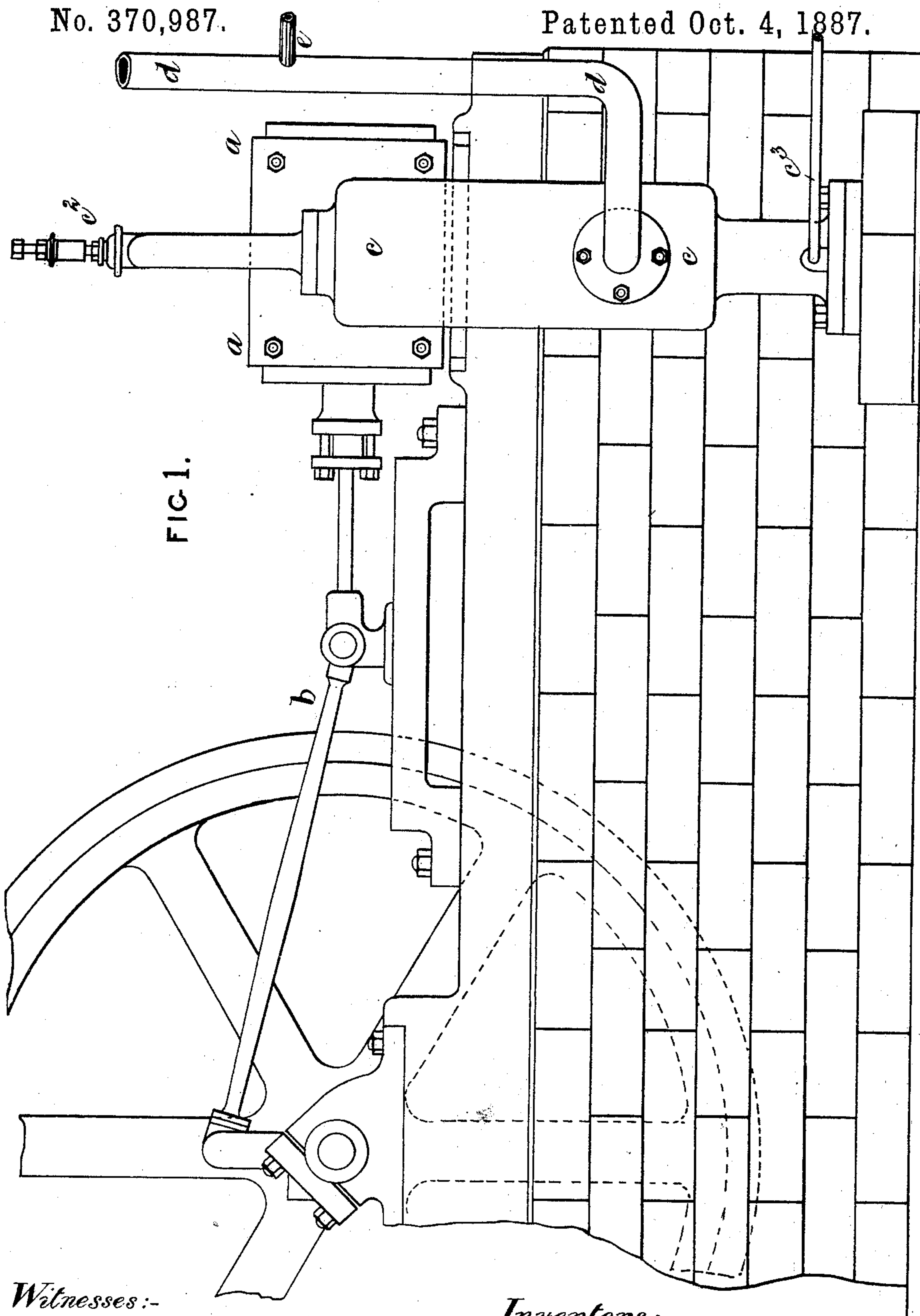


FIG 1.

Witnesses:-

Richard Bennett

Arthur J. Powell

Inventors:-

John Benjamin Stone

Fredrick William Hindson

(No Model.)

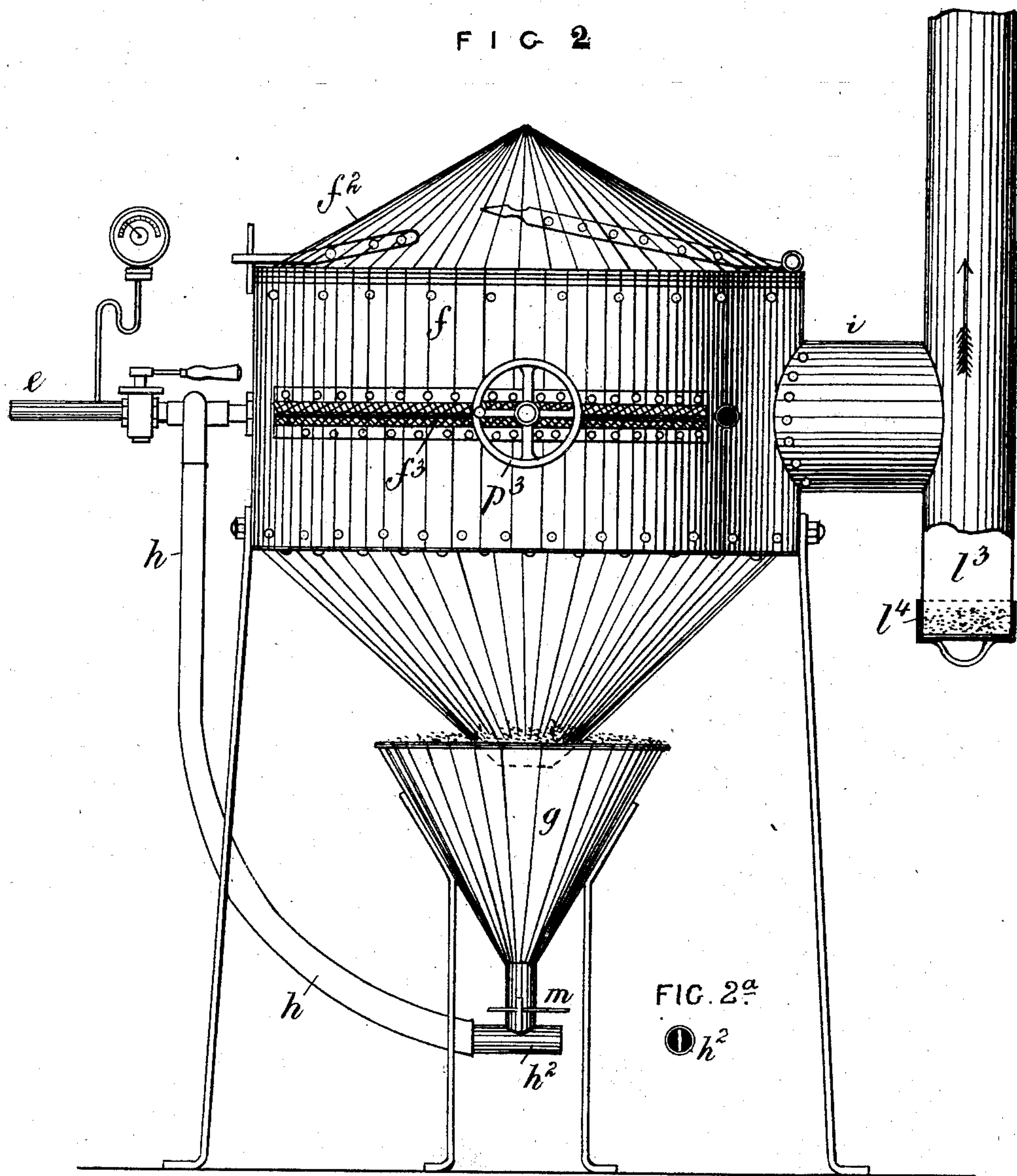
5 Sheets—Sheet 2.

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Witnesses:-

Richard Kerrett

Arthur J. Powell

Inventors:-

John Benjamin Stone

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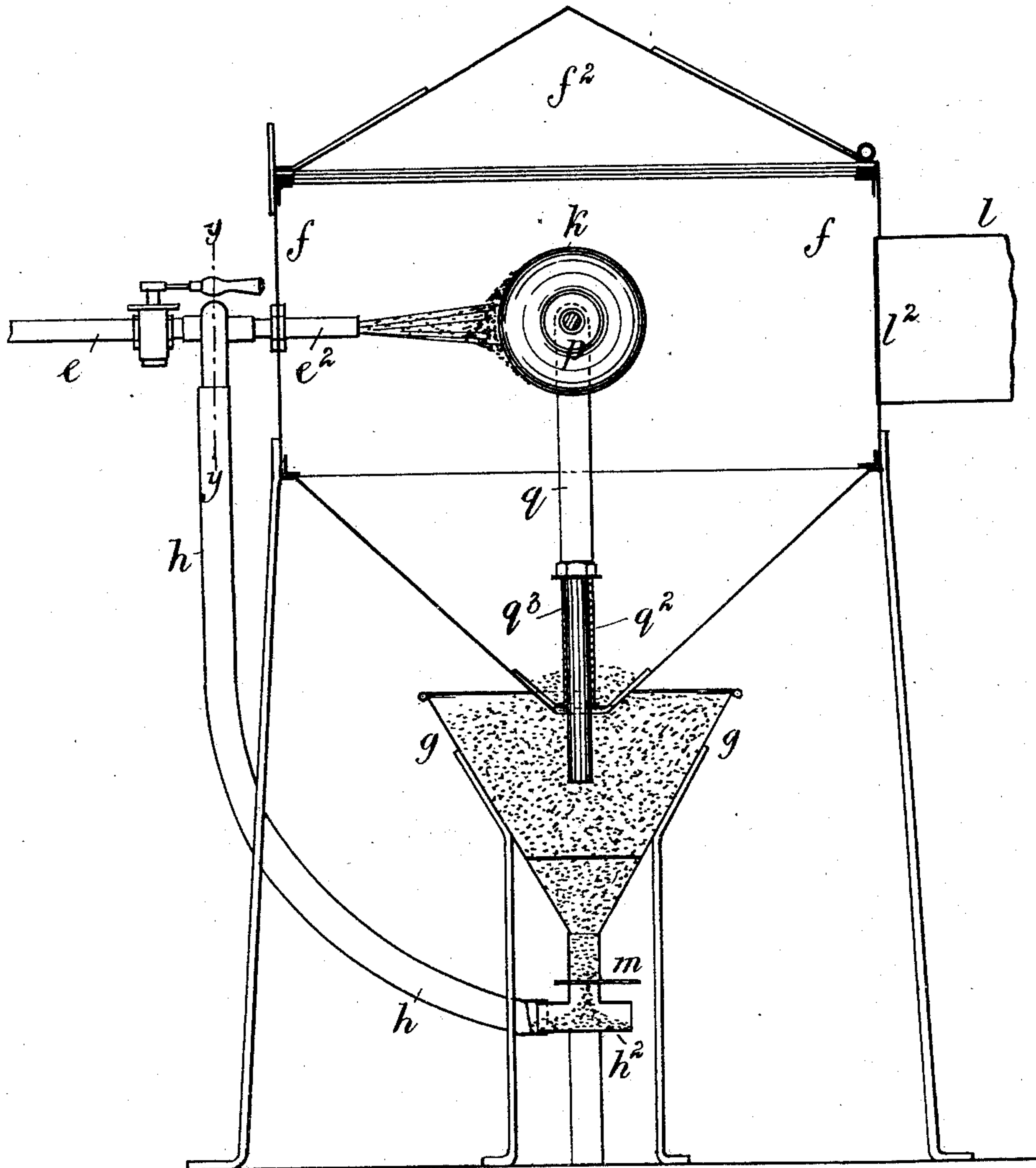
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FIG. 3.



Witnesses:-
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(No Model.)

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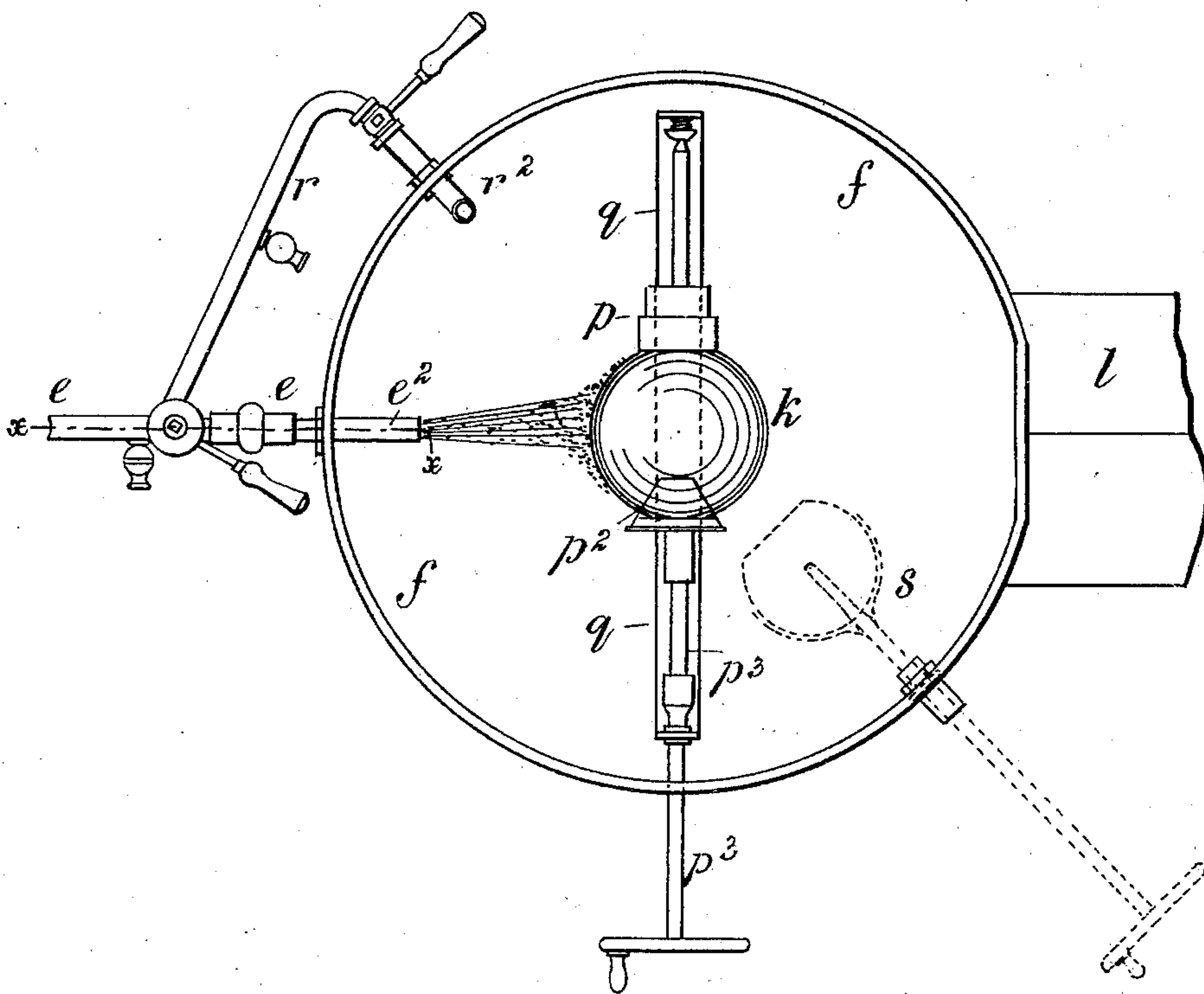
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FIG 4



Witnesses:-

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Inventors:-

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(No Model.)

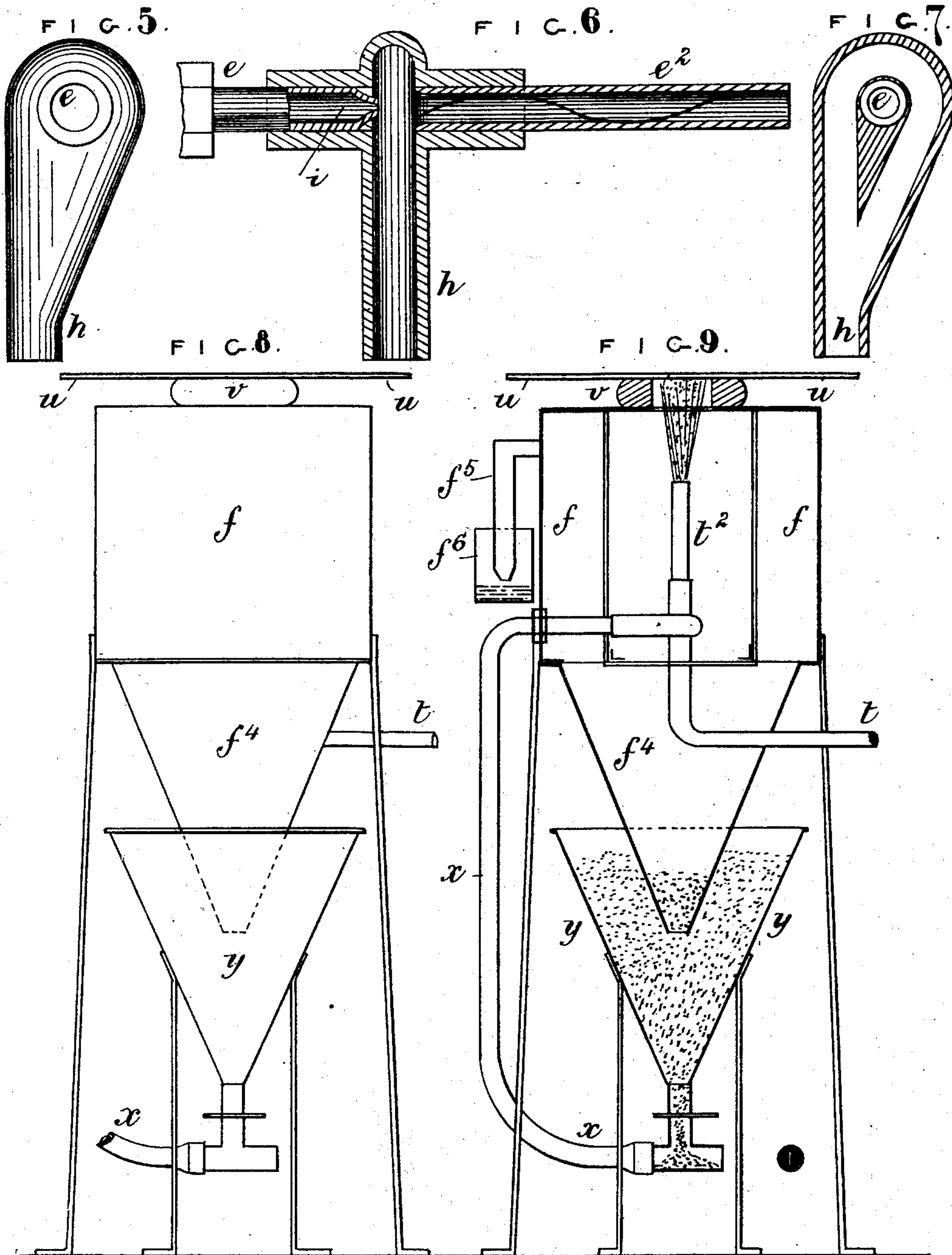
5 Sheets—Sheet 5.

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Witnesses:-
Richard Kerrett
Arthur J. Powell.

Inventors:-
John Benjamin Stone
Frederick William Hindson

UNITED STATES PATENT OFFICE.

JOHN BENJAMIN STONE AND FREDERICK WILLIAM HINDSON, OF BIRMINGHAM, COUNTY OF WARWICK, ENGLAND.

SAND-BLAST APPARATUS.

SPECIFICATION forming part of Letters Patent No. 370,987, dated October 4, 1887.

Application filed September 9, 1886. Serial No. 213,203. (No model.) Patented in England January 23, 1886, No. 1,062; in France August 2, 1886, No. 177,731, and in Belgium August 4, 1886, No. 74,114.

To all whom it may concern:

Be it known that we, JOHN BENJAMIN STONE, (trading as Stone, Fawdry & Stone,) of Birmingham, in the county of Warwick, England, and FREDERICK WILLIAM HINDSON, of Birmingham, aforesaid, subjects of the Queen of Great Britain, have invented Improvements in Sand-Blast Apparatus, (for which we have obtained patents in Great Britain, No. 1,062, dated January 23, 1886; in France, No. 177,731, dated August 2, 1886, and in Belgium, No. 74,114, dated August 4, 1886, and have filed applications for patents in Germany on the 10th of August, 1886, and in Austria-Hungary on the 30th of August, 1886,) of which the following is a specification.

This invention has for its object to provide novel means for finishing articles by sand impelled through the medium of a blast of condensed or compressed air; and to such end the invention consists in the features of construction and combination of devices hereinafter described and claimed, reference being made to the accompanying drawings, in which—

Figure 1 is a side elevation of an apparatus for compressing the air in a reservoir; Fig. 2, a side elevation of an apparatus embodying our invention for conducting the sand-blast process. Fig. 2^a is a cross section of the partitioned sand-pipe; Fig. 3, a vertical central sectional view of Fig. 2; Fig. 4, a horizontal sectional view through the sand-blast chamber, Fig. 3; Fig. 5, a detail view of portions of the pipes for conducting the air and sand to the sand-blast chamber; Fig. 6, a detail sectional view on the line *xx*, Fig. 4; Fig. 7, a detail sectional view on the line *yy*, Fig. 3; Fig. 8, a side elevation of a modification, and Fig. 9 a vertical central sectional view of Fig. 8.

a is the air-condensing pump or compressor worked by the crank-rod *b* of a steam-engine or other motive-power engine, and *c* is the reservoir in which the air is condensed or compressed by the condensing-pump *a*, the said air being condensed by preference to a pressure of about forty pounds to the square inch.

*c*² is a spring safety-valve to limit the pressure of the air condensed in the reservoir *c*.

*c*³ is a pipe at the bottom of the reservoir *c*

having a stop-cock. (Not represented in the drawings.) Any water condensed in the reservoir *c* may be drawn off by the stop-cock of the pipe *c*³.

The condensed air from the reservoir *c* is conveyed by the main pipe *d* to branch pipes in connection with the several chambers in which the sand-blast process is being conducted. One of these branch pipes is marked *e*, and is in communication with the chamber *f*. On the said pipe *e* is a Bourdon or other gage for indicating the pressure of the condensed air in the said pipe. The bottom of the chamber *f* is conical and opens into the top of the hopper *g*, containing the sand used in the process, the said hopper being in communication, by means of the sand-conducting pipe *h*, with the blast-pipe *e*. The junction of the sand-pipe *h* with the blast-pipe *e* is represented in end elevation in Fig. 3 and sections taken at right angles to one another in Figs. 6 and 7. The blast-pipe *e* opens into the sand-pipe *h* near its upper end by the nozzle *i* at one side, the delivery-pipe *e*² opening by a conical mouth at the other side, (see Fig. 6,) the interior of the delivery-pipe *e*² being by preference grooved with a helical groove, as represented. By means of the exhaust produced in the sand-pipe *h* by the blast passing its top the sand from the hopper *g* is drawn through the said pipe *h* into the blast-pipe *e* and is carried forward by the current of air to the globe *k*, or other article to be operated upon in the chamber *f*.

l is the exit-pipe for the blast in the chamber *f*, provided with a wire-gauze diaphragm, *l*². (See Fig. 3.) The exit blast-pipe *l* has on its under side a vessel or receiver *l*³, (see Fig. 2,) into which the fine sand carried with the blast falls. This fine sand is removed from the receiver *l*³ by taking off the cover *l*⁴. The sand from the blast, after it has operated upon the article, falls onto the conical bottom of the chamber *f*, and from thence passes into the hopper *g*, to be used over again. The sand stored in the hopper is screened from dirt before it is again drawn into the blast-pipe. By means of the valve *m* the sand passing to the pipe *h* is regulated or cut off.

The pipe *h*², immediately under the hopper

into which the sand falls, is divided by a central division, as seen at h^2 in Fig. 2^a.

The globe or shade k (or other article) on which the sand-blast is to operate is supported at one side by the support p and at the opposite side by the other support, p^2 , carried by the rod p^3 , having a hand-wheel for working it, the said rod p^3 working through a packed slot, f^3 , in the chamber f . (See Fig. 2.) These supports are situated in the top and bottom openings in the globe or shade k . The two supports p p^2 are carried by the angular frame q q , crossing the chamber f as a diameter. On the under side and middle of the frame q is a spindle, q^3 , capable of rotating in the fixed tube q^2 , carried by the bottom of the chamber f . By supporting the globe k in the manner represented all parts of it can be brought under the action of the sand-blast. The chamber f is furnished with a hinged cover, f^2 , by opening which the articles can be arranged in and removed from the said chamber.

By means of the supplementary sand-blast pipe r r^2 and branched holder s the insides of the shades or articles may be operated upon by the sand-blast, and by means of taps or stop-cocks the sand-blast may be put in communication with or cut off from the delivery-pipes e^2 or r^2 . Fig. 8 represents in elevation, and Fig. 9 in vertical section, the apparatus which we use for operating upon flat sheets or articles. In this arrangement the sand-blast delivery-pipe t^2 is situated centrally in the chamber f , and the flat sheet or article u to be operated upon is placed over the opening in the support v . By moving the sheet or flat article over the hole in the support v all parts of its surface can be operated upon in succession by the sand-blast. In the said Figs. 8 and 9 t is the blast-pipe and x the pipe through which the sand from the hopper y is drawn into the blast, as hereinbefore described. The air escapes from the chamber f by the pipe f^5 , the bottom of which nearly touches the water in the cistern f^6 , and the fine sand carried with the air is collected in the said cistern. The sand from the blast, after it has operated upon the article, falls into the hopper y by the inclined bottom f^4 .

In order to increase the efficiency of the condensed air it may be heated and its elastic force increased. To effect this the reservoir, after the air has been condensed in it, may be heated either by the direct application of a source of heat to the reservoir or by the intro-

duction of steam into a steam-jacket surrounding the reservoir.

Having thus described our invention, what we claim is—

1. The combination, in a sand-blast apparatus, of the compressed-air reservoir e , a pump for compressing the air in said reservoir, the sand-blast chamber f , having the cover f^2 , screen l^2 , pipe i , and dust-collector l^3 , the air-blast pipe e , having a horizontal nozzle i , the vertical sand-pipe h , into which said nozzle opens, the delivery-pipe e^2 , connecting said sand-pipe with the blast-chamber and entering the side wall of said chamber, the sand-hopper g , arranged below the blast-chamber and receiving the sand therefrom, and a connection, h^2 , between the bottom of the sand-hopper and the vertical sand-pipe, substantially as herein set forth.

2. The combination of the sand-blast chamber f , the angular rotary frame q therein, the fixed tube q^2 , the rotating spindle q^3 in said tube, and on which said frame is mounted, the support p , carried by a part of said rotary frame, the longitudinally-adjustable rod p^3 , carrying the other support, p^2 , and mounted on said angular frame, the air-blast pipe e , and the sand-pipe h , substantially as described.

3. The combination of the sand-blast chamber having a conical bottom, the conical hopper arranged beneath said bottom and receiving the sand therefrom, the valve m in the bottom of the hopper, the air blast pipe, and a sand-pipe extending from the bottom of the hopper below the valve to the air-blast pipe, substantially as described.

4. The combination, in a sand-blast apparatus, of the blast-chamber having a conical bottom, a sand-hopper located under said bottom and receiving the sand therefrom, an air-blast pipe having a nozzle, a sand-pipe into which said nozzle opens, a delivery-pipe entering the blast-chamber and connected with the sand-pipe in line with the nozzle of the air-blast pipe, a connection between the bottom of the hopper and the sand-pipe, and a valve for controlling the passage of sand from the hopper to said sand-pipe, substantially as described.

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Witnesses:

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