

No. 821,415.

C. A. P. HESS.
SAND BLAST MACHINE.
APPLICATION FILED FEB. 10, 1904.

PATENTED MAY 22, 1906.

3 SHEETS—SHEET 1.

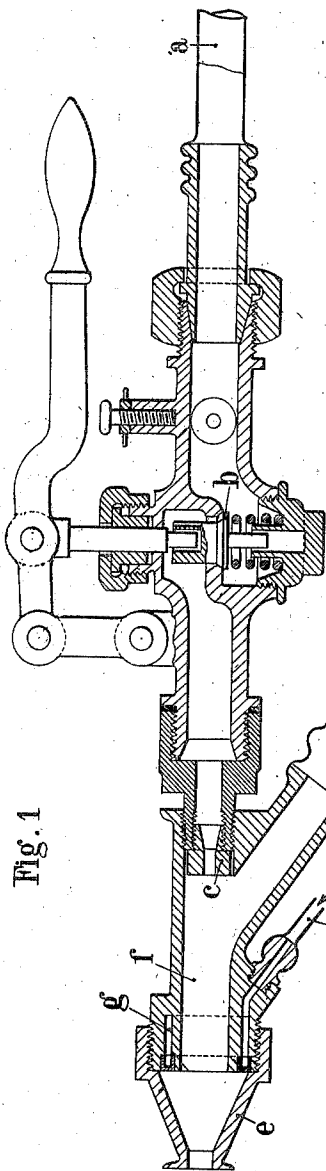


Fig. 1

Fig. 9

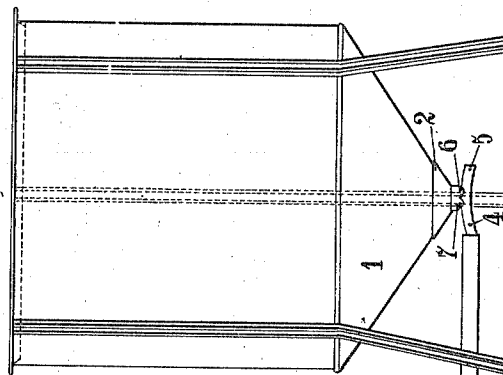
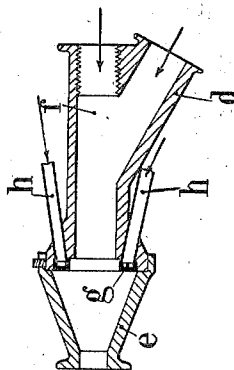


Fig. 2



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Fig. 3

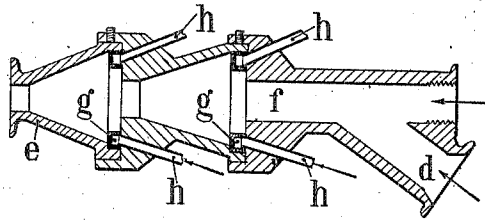


Fig. 4

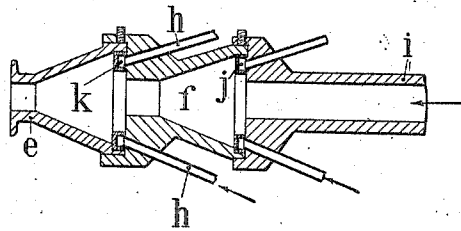


Fig. 5

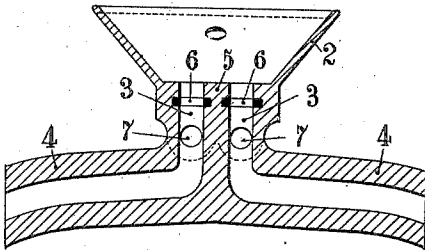


Fig. 6

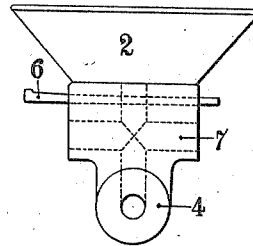


Fig. 7

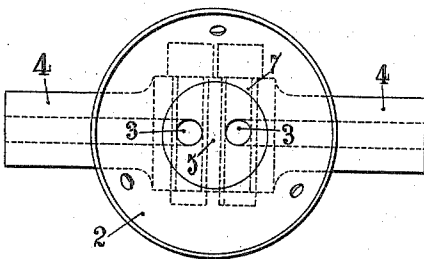
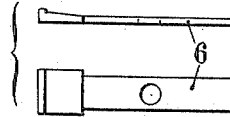


Fig. 8



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3 SHEETS—SHEET 3.

Fig. 10

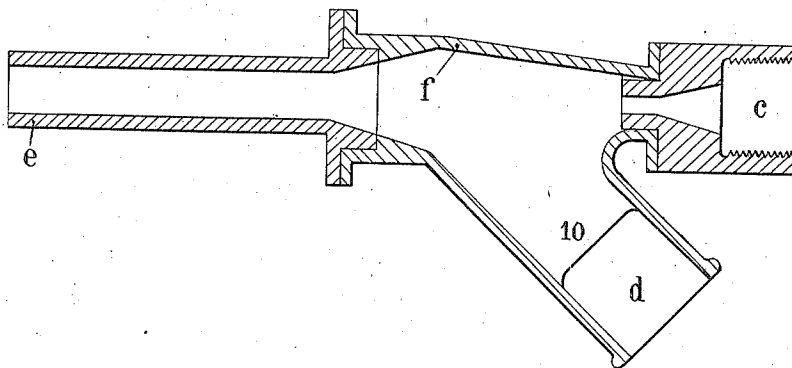


Fig. 11

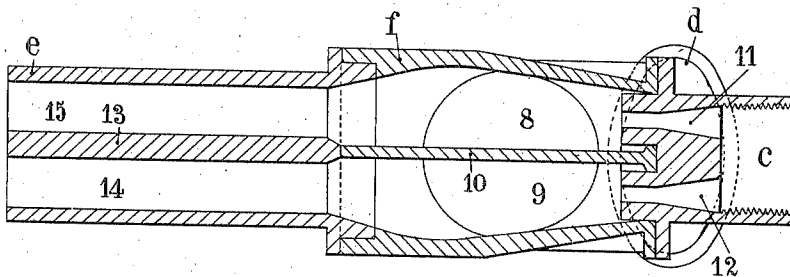
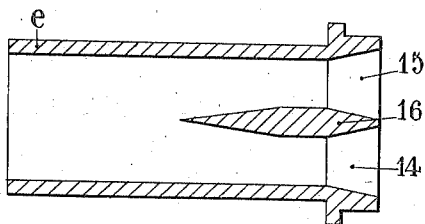


Fig. 12



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UNITED STATES PATENT OFFICE.

CHARLES AUGUSTUS PLATO HESS, OF PARIS, FRANCE.

SAND-BLAST MACHINE.

No. 821,415.

Specification of Letters Patent.

Patented May 22, 1906.

Application filed February 10, 1904. Serial No. 192,928.

To all whom it may concern:

Be it known that I, CHARLES AUGUSTUS PLATO HESS, a citizen of the French Republic, residing at 5 Avenue de l'Opéra, Paris, France, have invented certain new and useful Improvements in Sand-Blast Machines, of which the following is a specification.

This invention has for its objects improvements in sand-blast machines.

In certain machines, as is well known, one and the same current of compressed air sucks the sand and at the same time projects it against the surfaces to be scraped or cleaned. There is thus produced within the projector an agitation or eddy due to the fact that the operations of suction and projection of the sand are simultaneous and not distinct and successive. By reason of this the energy of projection does not correspond with the pressure of the compressed air at the generator. In order to obviate this defect, a device is employed which permits of separating the suction and the projection—that is to say, of first of all effecting the suction and then the projection of the sand upon the surface to be operated on. This process, therefore, permits of imparting to the jet an excess pressure which compensates for the loss of charge which may have taken place during the passage through the conduits. In certain machines the sand-box arranged at a distance is connected with the projector by means of a conduit serving for the transport of the sand which is displaced therein under the influence of the suction exerted by the compressed air acting in the projector. The sand on leaving the sand-box falls into this conduit and presents a tendency to accumulate at the commencement of this latter and obstruct it. In other words, the flow of sand into this conduit is neither regular nor uniform. This is easily explained. The sand in the conduit constitutes a kind of sandy vein at the extremity of which (in the projector) a suction effect only is produced. In order to assure its flow, it is necessary to act upon its other extremity by forcing. In this manner the vein of sand is acted upon at its two extremities by two forces which act in the same direction. With this object there are formed at the commencement of the sand-conduit at the place at which it leaves the hopper apertures communicating with the open air. It will be understood that the atmospheric air in entering through these apertures under the influence of the suction of the compressed air

acts upon the vein of sand in the conditions above mentioned.

The sand issues from the conveyer-conduit, and enters the projector where in a mixing-chamber it mixes with the compressed air. In view of the fact that the sand forms a kind of vein the section of which is approximately that of the conveyer-conduit it may happen that the compressed air is not able to attack the sand throughout the entire thickness of the vein and does not come into contact with all the sandy particles. In other words, collections of sand may arise which will block the projection ajutage, and thus decrease the efficiency. In order to obviate this defect and prevent the formation of these accumulations of sand, the plan is adopted of splitting up the compressed air entering the mixing-chamber into several parts, and consequently also subdividing the vein of sand into as many parts. This sectioning also permits of obtaining an important practical result by imparting to the projection jet a form which is either convergent or divergent, which is of importance in certain applications.

In the accompanying drawings, Figure 1 is a longitudinal section of the improvement, showing it applied. Figs. 2, 3, and 4 are longitudinal sections of various forms of the improvement. Fig. 5 is a longitudinal vertical section through the funnel 2. Fig. 6 is a side elevation of the same. Fig. 7 is a plan view of the same. Fig. 8 shows the register in elevation and in plan. Fig. 9 shows the funnel 2 on a smaller scale arranged upon the sand-box, which is mounted upon three feet. Figs. 10, 11, and 12 represent longitudinal and horizontal sections through the device for splitting up the vein of sand in order to prevent the formation of accumulations in the mixing-chamber of the projector.

In Fig. 1, combined with Fig. 9, the compressed air enters through *a*, passes through the valve *b*, operated by a hand-lever, issues through the air ajutage *c*, where it sucks the sand coming from sand-box 1 through the pipe *d*. The mixture of air and sand takes place in the mixing-chamber *f*, and it is projected by the projection ajutage *e*. At this point is arranged an excess-pressure device, which may be constituted, as in Fig. 1, by an annular perforated hollow crown *g*, supplied with compressed air by means, Fig. 1, of one, or, Fig. 2, two, feed-pipes *h*, or by two crowns *g*¹ *g*², each provided with two feed-pipes *h*, Fig. 3.

In Fig. 4 the sand enters through the pipe *i* on the axis of the projector. It is sucked by the crown *j*. The crown *k* imparts the excess pressure.

The forcing device is represented in Figs. 5, 6, 7, and 8. The sand is contained in the hopper 1, Fig. 9, terminating in the funnel 2, in the bottom of which is formed a vertical passage 3, opening into a horizontal passage 4. The walls of the vertical passage 3 are formed with an aperture for the passage of a register 6, Fig. 8, provided with an aperture, and with another aperture 7, communicating with the open air and situated a little above the place at which the passages 3 and 4 join. The drawing, Fig. 5, shows upon the right and upon the left hand, respectively, two similar systems of passages 3 3, separated by a partition 5. This arrangement permits of feeding two projectors with one and the same funnel 2.

The operation of the forcing device is as follows: The register 6 being arranged in position for permitting of the flow of the desired quantity of sand, the air issuing from the ajutage *c*, Fig. 1, produces a suction effect upon the sand which falls from the hopper 1 into the pipe 4 and also upon the atmospheric air which enters the pipe 4, Fig. 5, in passing through the hole 7. This atmospheric air thus forces the vein of sand, emulsifies the accumulated sand, divides it and forces it into the conduit 4 at the same time that this vein of sand undergoes a suction effect at its other extremity.

The sectioning device is represented in Figs. 10, 11, and 12. The mixing-chamber *f*², Fig. 10, is divided into two compartments 8 and 9, Fig. 11, by a longitudinal partition 10, which enters the pipe *d*, through which the sand is supplied in such a manner as to divide this pipe into two equal portions for a portion of its length. The compressed-air ajutage *c*², Fig. 10, is divided into two ajutages 11 and 12, Fig. 11, each of which supplies the chambers 8 and 9. The projection ajutage *e*² is divided into two ajutages 14 and 15 by a longitudinal partition 13, which forms a prolongation of the partition 10.

It will be seen that the compressed air which reaches the ajutage *c* in a single vein is divided by the ajutages 11 and 12 into two veins, each of which sucks the sand from the conduit *d*, the sandy vein in which is therefore divided into two veins also. The projection takes place in the form of two veins, which unite outside the projector, following a divergent jet.

Obviously a multiple sectioning may be effected instead of a double sectioning only.

In order to obtain a convergent jet, Fig. 12, a portion of the partition dividing the ajutage *e*² is omitted and only a portion of the partition 16 is retained. The two projection jets 14 and 15 unite within the ajutage *e*², which they leave in the form of a convergent jet.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, what I claim is—

1. In a sand-blasting machine, a mixing-chamber divided by a longitudinal partition into two compartments, a projecting nozzle secured to the chamber and provided with a partition in alinement with the partition of the chamber, and means for forcing air and sand into the compartments of said chamber.

2. In a sand-blasting machine, a mixing-chamber having a longitudinal partition, a nozzle secured to the chamber and having a partition in alinement with the partition of the chamber, said partition having a wedge-shaped forward end terminating short of the end of the nozzle, and means for forcing air and sand into the compartments of the said chamber.

3. In a sand-blasting machine, a mixing-chamber, having an air-inlet in alinement therewith and a sand-inlet at an angle thereto and provided with a longitudinal partition extending from the air-inlet end of the chamber and into the sand-inlet, a nozzle provided with a partition in alinement with the partition of the chamber, and means for forcing air and sand into the said chamber.

4. In a sand-blasting machine, a mixing-chamber having a sand-conduit entering the same at an angle, and provided with a longitudinal partition extending into the sand-conduit, an air-nozzle secured to one end of the chamber and provided with two passages, a nozzle secured to the other end of the chamber and provided with a partition in alinement with the partition of the chamber, and means connected with the nozzle whereby air will be forced into said chamber.

In witness whereof I have hereunto set my hand in presence of two witnesses.

CHARLES AUGUSTUS PLATO HESS.

Witnesses:

MARIN CABORNETTE,
HANSON C. COXE.