

Dec. 15, 1936.

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2,064,660

APPARATUS FOR EXTRACTING MATERIALS

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2 Sheets-Sheet 1

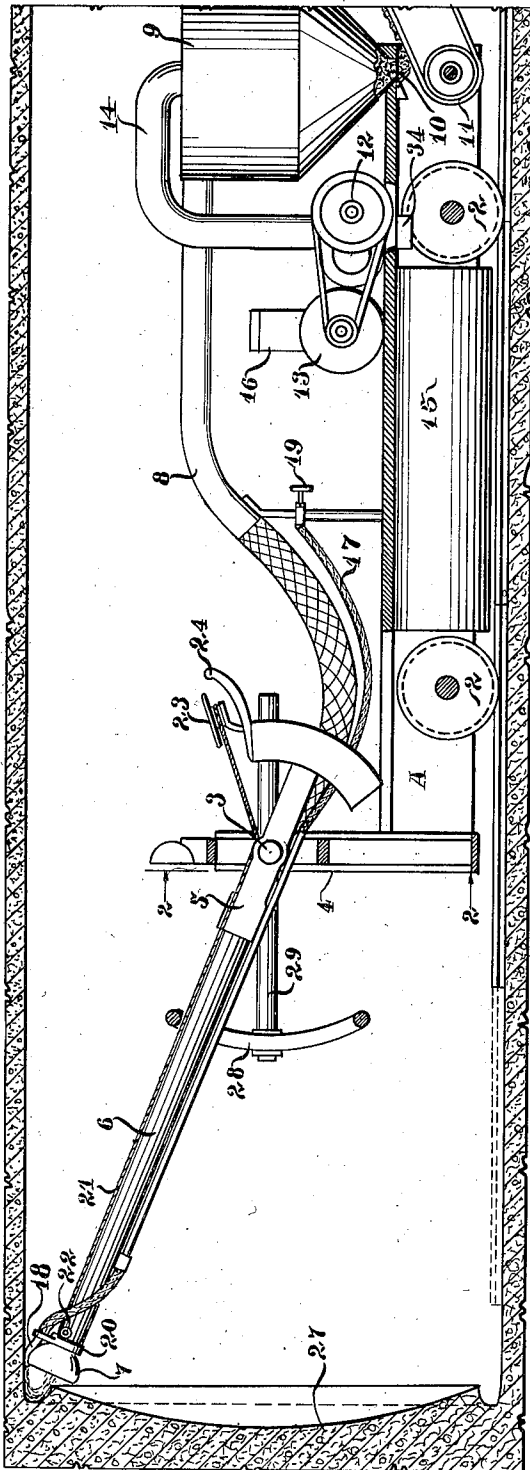


Fig. 1.

BY

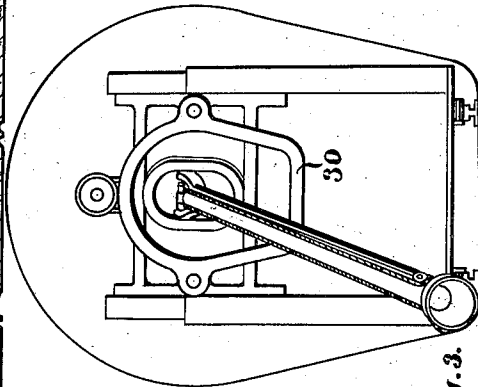


Fig. 3.

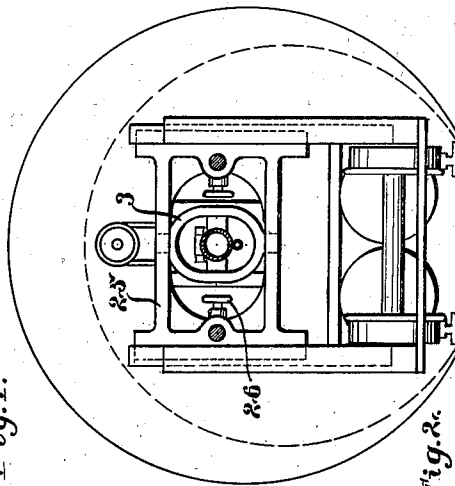


Fig. 2.

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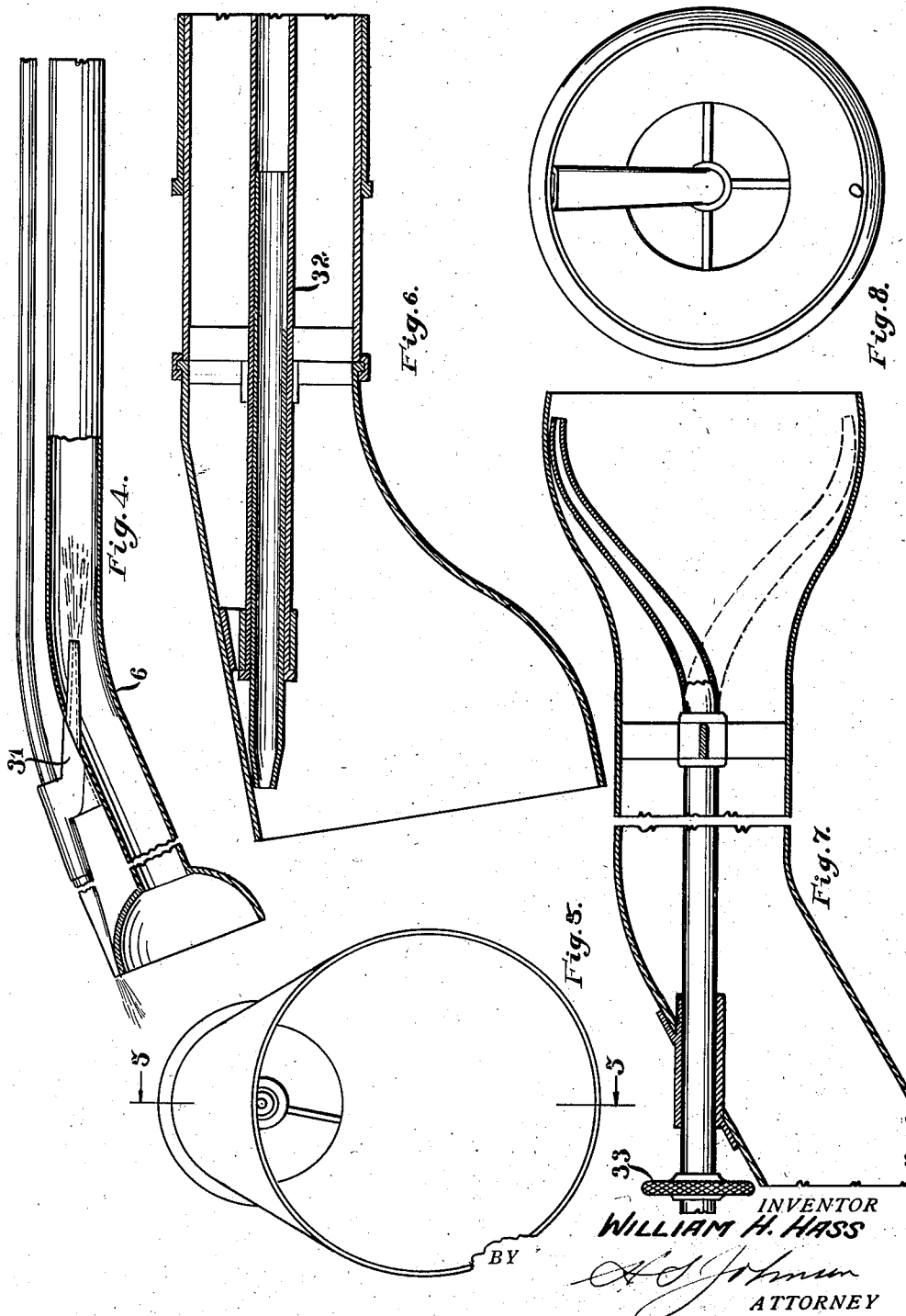
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2 Sheets-Sheet 2



UNITED STATES PATENT OFFICE

2,064,660

APPARATUS FOR EXTRACTING MATERIALS

William H. Haas, St. Paul, Minn.

Application November 12, 1934, Serial No. 752,650

2 Claims. (Cl. 262—5)

My invention relates to improvements in means and process for extracting material, as sand rock, from its base by means of a compressed air blast in conjunction with air suction.

My invention has for its object to render the process of doing this more expeditious and cheaper.

In carrying out my invention I provide means for blowing a blast of compressed air against the material to be extracted to break the same up, and in connection therewith, air suction means for carrying away the broken up material and improved means for regulating and controlling the blasting and suction mechanism.

The necessary equipment for the operation is placed where it is most convenient and where it will give best results to suit the particular job. By means of my process utilizing compressed air and air suction for the extracting and removal, particularly in tunnel and shaft excavation, the material to be extracted, such as sand rock or silica or other material adapted to be handled by this method, may be extracted from the face of the excavation and removed in the most expeditious and cheap manner.

Another advantage of my invention is the removing of foul air from the tunnel in which the work is being done.

In the accompanying drawings, forming part of the application:

Figure 1 is a longitudinal view of my invention in operative position in a tunnel.

Figure 2 is a section on line 2—2 of Figure 1.

Figure 3 illustrates a modified form of support for the blasting and suction mechanism.

Figure 4 illustrates a longitudinal view partly in section of a modified form of blasting nozzle.

Figure 5 is a detail view of a hinged hood forming part of my invention.

Figure 6 is a section on line 6—6 of Figure 5.

Figure 7 is a view of another modified form of my blasting and suction nozzle; and

Figure 8 is an end view of Figure 7.

Referring to the drawings in detail, and particularly to the construction shown in Figures 1 and 2, A represents the chassis of my apparatus mounted upon wheels 2 having a universal joint support 3. In the vertical framework 4 of the chassis is the counter-weighted support 5 for a suction pipe 6, said suction pipe having a hooded free end 7 and being connected by a pipe 8 with a metal separating tank 9.

The tank 9 has an outlet opening 10 for the material to permit the same to pass through a

delivery conveyor belt 11. Suction is created through the tank to the suction pipes 6 and 8 from the vacuum pump 12 operated by a suitable engine mechanism 13, said vacuum pump being connected to the inlet tube 14 with the tank 9.

Supported upon the chassis is an air pressure tank 15 in which compressed air is produced from the compressor 16 operated from the motor 13. A flexible tube 17 leads from the air tank 15 to the outlet nozzle 18. The tube 17 is provided with a controlling valve 19 and is suitably supported, as shown in Figure 1, alongside the suction pipe 6. The nozzle 18 is supported alongside the hood 7 by a rotatable collar 20.

The collar 20 is rotatable through the medium of a cable 21 passing over pulleys 22 supported by the suction pipe 6 and leading back to a controlling wheel 23 mounted upon the counterbalance support 5 for the suction pipe 6. The counter-balanced member 5 is provided with a suitable controlling handle 24. The universal joint 3 is mounted within a frame 25 having slidable support in the upright 4 and being securable in vertically adjusted positions through the medium of the screws 26. The hand control 24 is usable by the operator to swing the suction pipe 6 with the supported blast nozzle to any position in relation to the end wall 27 of the tunnel being worked upon. The tube 6 swings within a templet 28 supported in front of the upright 2 of the apparatus, as by a bar 29.

In Figure 3 I show a modified shape of templet 30 adaptable for use for certain shapes of tunnels.

In Figure 4 I show a modified construction of blasting nozzle. In the form shown in Figure 4 I provide an outlet tube 31 directed from the front end of the nozzle backwardly into the suction pipe 6 to assist in forcing the blasted material back through the suction pipe.

In the form shown in Figure 6 I support a discharge air nozzle 32 inside the suction pipe. Also, as shown in Figure 6 I may make the discharge air pipe telescoping as well as the suction pipe.

In Figure 7 I show another modified form of combination suction tube and air discharge nozzle. In the form shown in Figure 7 the air discharge nozzle is rotatably mounted and operable by a wheel 33 to swing the curved outlet end of the nozzle around the inside of the hood of the suction tube, as indicated in dotted lines.

While I have shown my apparatus constructed for use inside of a tunnel, with the parts supported in connection with the wheeled chassis,

there are many uses where it is necessary to support the operating parts exteriorly of the work and carry the suction nozzle and air discharge nozzle into an extended line of work, as underground. In such case I may use, as long as I may support my apparatus outside of the work being done, long standard steel pipe and flexible tube connections for the nozzle which may be carried to the work. I may also use any means for air pressure and suction instead of the particular means shown in Figure 1. I may also, to assist in the discharging of the material that is drawn back from the work, utilize the discharge from the exhaust 34 of the motor.

The principle of my invention lies in the combination of means for utilizing compressed air blast in conjunction with suction to remove the blasted material, and, while I have shown one operative mechanism for achieving the result, it will

be evident that the constructive features of the apparatus may be more or less modified.

I claim:

1. Means for extracting and removing material of the class described, comprising in combination with an air suction nozzle and associated means for delivering a blast of compressed air adjacent the mouth of said nozzle, a pivotal support for said nozzle, means permitting the swinging of said nozzle in a universal plane upon said support, and a counter-weight for said nozzle extending rearwardly from said pivotal support.

2. Means for extracting and removing material of the class described, comprising in combination with an air suction nozzle and associated means for delivering a blast of compressed air adjacent the mouth of said nozzle, a pivotal support for said nozzle, and a supporting frame permitting vertical adjustment of said pivotal support.

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