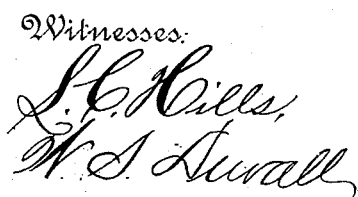


W. S. SHERMAN.
PNEUMATIC DENTAL PLUGGER.

Patented May 22, 1888.



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UNITED STATES PATENT OFFICE.

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PNEUMATIC DENTAL PLUGGER.

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To all whom it may concern:

Be it known that I, WILLIS S. SHERMAN, a citizen of the United States, residing at Marinette, in the county of Marinette, State of Wisconsin, have invented certain new and useful Improvements in Pneumatic Plugging Attachments, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention has relation to a pneumatic plugging attachment for dental engines or other motors, and among the objects in view are to provide a plugging attachment that is simple in construction, rapid in operation, and of a
15 uniform stroke, which stroke is adjustable and can be regulated at the will of the operator and in accordance with the character of work to be performed.

20 A further object of the invention is to reduce the cost of manufacture and provide a plugging attachment that may be easily and quickly attached to or detached from an engine or other motor.

25 Other objects and advantages of the invention will hereinafter appear, and the novel features thereof will be particularly pointed out in the claims.

Referring to the drawings, Figure 1 is a front elevation of a dental engine provided with a
30 pneumatic plugger attachment constructed in accordance with my invention. Fig. 2 is a similar view on an enlarged scale, parts being broken away. Fig. 3 is a side elevation of Fig. 2. Fig. 4 is a detail in plan, showing the means employed for connecting the attachment with the engine or motor. Fig. 5 is a
35 detail of a portion of the standard of the engine provided with means for supporting the plugger-tubing. Fig. 6 is an enlarged view of Fig. 5. Fig. 7 is a detail, partly in section,
40 showing the manner of connecting the pump-cylinder and its support with the flexible motor-connection. Fig. 8 is a side elevation, portions being in section, of the plugger cylinder
45 and piston.

Similar letters of reference indicate similar parts in all the figures of the drawings.

50 A represents an ordinary dental engine, or, it may be, other form of motor, and in this instance it consists of the usual standard, A', having the fly-wheel A² journaled therein and operated by the usual treadle-connection, A³.

At a suitable point upon the standard A is mounted an adjustable split collar, B, (see Fig. 4,) secured in place upon the standard
55 by means of a set-screw, B'. At one side of the collar is formed a perforated lug, B², in which one branch of a U-shaped spring is adapted to be held in an adjusted position by means of a set screw, B³, entering the lug and
60 bearing upon said branch. The opposite end of branch of the U-shaped spring C enters an aperture, D', formed in the end of a rigid arm, D, and is held in place by means of a set-screw, D², bearing thereon. (See Fig. 7.)

65 The arm D is formed with bearings D³ D⁴ at its upper and lower ends, respectively, and in the upper bearing is journaled the head E' of the cylinder E, in which cylinder is a piston-rod, E², provided with an ordinary piston-head. The cylinder E is also provided with a lower head, E³, which is perforated for the passage of the piston-rod and is provided with smaller perforations, E^{3*}, to prevent a vacuum being formed back of the piston-head, and also
75 prevent a back-pressure of air during the operation of the pump-cylinder E and its piston. In the lower bearing, D⁴, of the arm D is journaled a friction-pulley, E⁴, which is preferably formed with a rubber or other frictional
80 periphery, and in this instance of a convex form and adapted to run in a groove formed in the periphery of the fly-wheel of the dental engine or motor. The piston-rod E² is bent at its lower end and reduced to form a wrist-pin, E⁵, which is eccentrically connected with
85 the fly-wheel A², so that by the rotation of said wheel motion is imparted to the pulley E⁴, which in turn reciprocates the piston within the cylinder, which cylinder oscillates on its
90 bearing D³. The bearings D³ D⁴ are made adjustable, so that the cylinder and its piston and the pulley E⁴ can all be aligned with each other and work in perfect unison.

95 It is evident that by loosening the thumb-screw B³ the U-shaped spring-arm C may be raised to elevate the friction-pulley E⁴ from contact with the fly-wheel A²; also, that the desired amount of contact-pressure may be
100 secured between these two by raising or lowering the arm just referred to in the manner described.

A nipple, E⁶, is formed on the head E' of the cylinder E, which is the pump-cylinder, and

leading therefrom and connected therewith is a section, F, of a flexible tube, the opposite end of which embraces and is stretched over a coupling, G, which coupling is enlarged at its ends, as at G', to form a tight joint with the flexible section of tubing, and is provided with a ring or eye, G², adapted to take over a hook, H', formed on a split collar, H, which is adjustably secured to the standard. By this means the flexible tube is suspended from the standard and its removal therefrom is facilitated. At the opposite end of the metallic coupling H, and in the same manner, is connected one end of a similar section of tubing, F, and to its other end is connected the piston-rod J of the dental plugging-cylinder M. A nipple, I, is screwed upon the rear end of the piston-rod J, and over the end of said nipple is sprung the section F. Upon the nipple is formed or secured a hook, I', by which the plugger, hereinafter described, may be suspended from any fixed object—such as the operator's table I²—within easy access of the operator. The piston J is hollow and is provided with the usual socket for the reception of the plugging-tool L, which may be removed and replaced in the ordinary manner and in accordance with the character of the work to be performed.

Formed upon the piston-rod J or connected therewith is a piston-head, J', provided with bosses J², the front boss having ports J³, communicating with the interior of the piston-rod and affording communication between said rod and the interior of the plugging-cylinder M, which is mounted loosely upon the head and adapted to reciprocate upon the rod. The cylinder is provided with the rear head, M', having perforations M², to prevent a vacuum and back-pressure at the back of the piston-head, and also with an opposite head, M³, said heads being preferably brazed within the cylinder. The piston-rod J is provided with screw-threads in rear of the cylinder, or it may be at either or both ends, and screw-threaded thereon is a rubber, leather, or other suitable cushioning-nut, N, which limits the back-stroke of the cylinder.

The operation of my invention will be readily apparent from the above description; but for the purpose of a clearer understanding I will proceed to describe the same.

The fly-wheel A², having been set in motion by means of the treadle A³, communicates motion to the friction-pulley E⁴, which in turn reciprocates the piston-rod E² of the pump. This forces air up through the cylinder E, a vacuum in rear of the piston being avoided, as is also all back-pressure, by reason of air passing into the cylinder, at the upstroke of the piston, through the apertures E^{3*}. At each stroke of the piston the cylinder E swings or oscillates upon its bearing D³ on the arm D. In this manner air is pumped through the sections of tubing into the piston-rod J and cylinder M through the various passages described, in which cylinder it is condensed, by which the

down stroke or throw of the cylinder M is secured, said stroke being limited in its downward movement by contact of the head M' of the cylinder with the piston-head J'. As the piston E² is withdrawn from the pump cylinder E, air contained within the cylinder M is withdrawn into said pump-cylinder and the cylinder given the up or back stroke by suction, which upstroke is limited by the head M' of the cylinder coming in contact with the cushioning-nut N. Such a nut may also be placed below the cylinder, by which the down-stroke would also be limited. By thus limiting the stroke the strength of blow is also regulated or limited, the length of stroke determining the strength of blow desired for different operations. As the fly-wheel revolves, the piston-rod E² reciprocates, thus, in the manner described, causing the plugger-cylinder to render blows in rapid succession.

Having described my invention and its operation, what I claim is—

1. In combination with a dental engine and its standard, a collar mounted upon the standard and carrying a spring-arm, a rigid arm connected with said spring-arm and provided with bearings at its top and bottom, a cylinder mounted on one of the bearings, a friction-roll journaled in the other bearing, and a piston-rod connecting the cylinder and friction-pulley, substantially as specified.

2. The combination, in a dental engine and its standard, of an adjustable collar mounted on the standard and provided with a perforated lug, a U-shaped spring-arm adjustably mounted in said lug and adjustably connected with a rigid arm provided with bearings at its upper and lower ends, a cylinder pivoted for oscillation, the upper bearing, a friction-pulley mounted for rotation in the lower bearing, and a piston-rod carrying a piston mounted in the cylinder and eccentrically connected with the pulley, substantially as specified.

3. The combination, with the frame-work and fly-wheel of a dental engine, of a split collar mounted thereon and formed with a perforated lug having a set-screw, a U-shaped spring-arm mounted in said perforation and adapted to be acted upon by said screw, and having its opposite end adjustably secured in a rigid arm having adjustable bearings at its upper and lower ends, a cylinder the head of which is journaled in the upper bearing, a frictional pulley journaled in the lower bearing, and a piston-rod mounted in the cylinder and eccentrically connected with said pulley, substantially as specified.

4. In a dental engine, the combination, with its standard having a hook projecting therefrom, of a tube-section coupling formed of metal and provided with an eye adapted to take over said hook, substantially as specified.

5. In combination with two sections of tubes, a metallic elbow-coupling provided with a suspension device and with enlarged ends for the reception of said sections, substantially as specified.

6. The combination, with the piston-rod of a dental plugger, of a tip secured to the end thereof and enlarged for the reception of the tubing, and provided with a suspension-hook,
5 substantially as specified.

7. In a dental plugger, the combination of a piston-rod provided with screw-threads and a fixed piston-head, a cylinder mounted for movement on said rod, and an adjustable nut
10 mounted on the rod above the cylinder to limit the movement of the same, substantially as specified.

8. In a dental plugger, the combination of a screw-threaded hollow rod, a rubber nut or its described equivalent adjustably mounted upon
15 said screw-threads, a fixed piston-head, and a cylinder adapted for movement between said nut and head, substantially as specified.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIS S. SHERMAN.

Witnesses:

L. K. MACNEILL,
WILLIAM C. WILSON.