J. F. W. GRIESE.

HAND RAMMER OPERATED BY COMPRESSED AIR.

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1,144,838. Patented June 29, 1915.

Fig. 1.

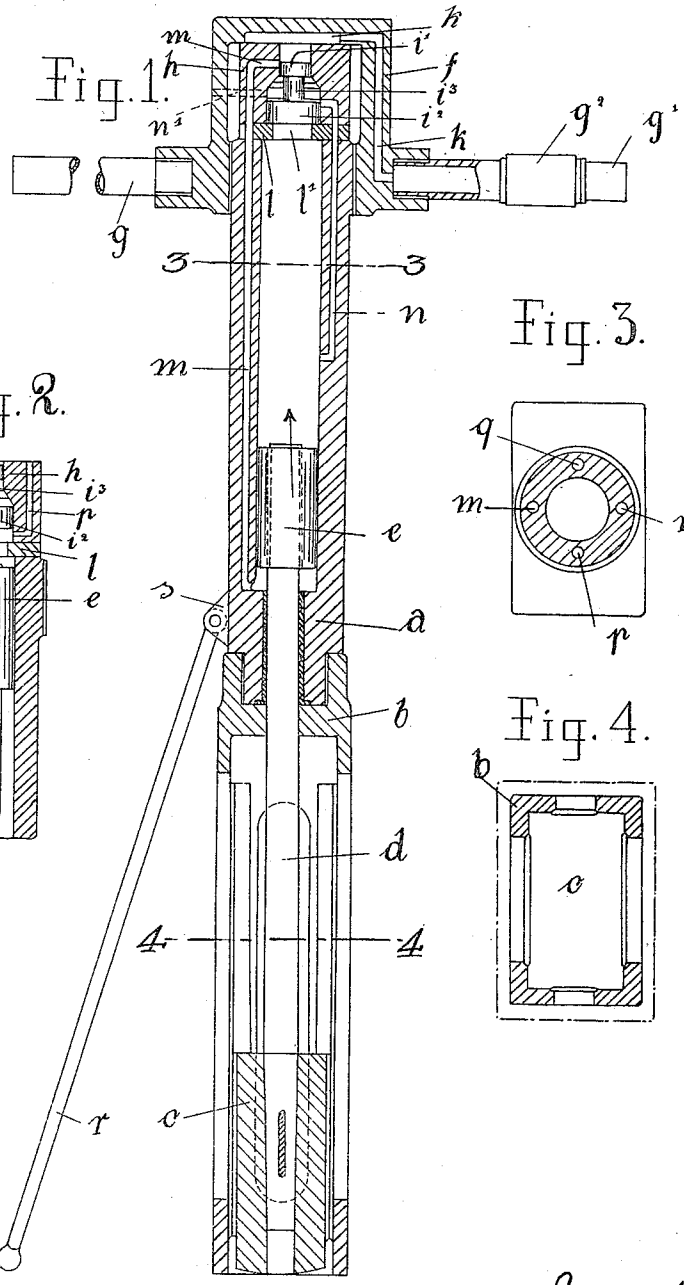


Fig. 2.

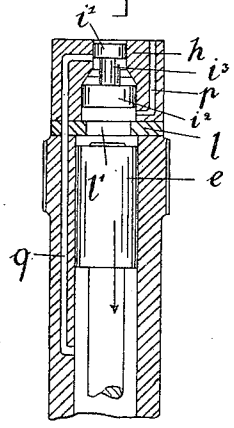


Fig. 3.

Fig. 4.

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HAND-RAMMER OPERATED BY COMPRESSED AIR.

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To all whom it may concern:

Be it known that I, JOHANN FRIEDRICH WILHELM GRIESE, a subject of the German Emperor, and residing at Hamburg, in the German Empire, have invented certain new and useful Improvements in Hand-Rammers Operated by Compressed Air, of which the following is a specification.

Paving rammers operated by compressed air are known in which the compressed air acts upon the upper face of a piston which is guided within the rammer frame or casing and bears against the ground whereby the rammer-weight is raised together with the complete frame. The ramming or paving operation takes place when an exhaust opening is thereby uncovered by the free falling down of the rammer-weight and frame. The compressed air is fed by a valve which is arranged on the frame and can be opened and closed on every stroke by hand. Paving rammers of this system have many drawbacks. The working man operating the rammer in a usual manner by means of handles must carry out every stroke and therefore will be soon tired out. A similar effect is felt by the necessity of adjusting the valve at each stroke, which diverts his attention from his proper ramming operation. The regulation of the power of each stroke corresponding to the height of the fall is left to the workman; therefore it will be difficult to obtain an even paving surface. It has also been found, that stones will become ruptured or crushed on account of the fact, that in the moment the weight falls down the supporting piston jumps up-ward and therefore an exact hitting of the weight in the center of the stone will not take place. The moving of the rammer from one stone to the other during the fall of the weight and the jumping of the piston is more detrimental still because in such case it is as good as impossible to place the rammers on the center of the stone. It finally happens, that by the falling rammer the workman is injured. All these drawbacks are avoided by the present invention. The rammer frame stands firmly on the stone and the ramming takes place by means of a piston, which is connected with a ramming block and guided in the frame and operated on its upward stroke as well as on its downward stroke by compressed air. The ramming operation according to the present invention is carried on automatically, once the feeding valves for the compressed air are adjusted by a distributing piston, operating in unison with the driving piston. The ramming block is preferably guided in a special frame on the rammer closely fitting within the same. The transmission can be carried out by aid of a prop pivoted to the frame.

The advantages gained by the new apparatus are the following: The workman need not carry out or assist the raising of the rammer-weight and therefore power is saved. Since the feeding valve need be adjusted only once the workman can pay full attention to the stone. All blows will be equally powerful when the valve is once adjusted (the adjustability allowing quick or slow, powerful or weak blows at will) and therefore there is no necessity of regulating the strength of the blows. The consequence is, that the pavement when finished will be extraordinarily even and uniform. Damages of the stones will very rarely happen, since the rammer will be placed by its guiding frame exactly on the center of the stone and this position can be maintained throughout. No transmission takes place during the operation of the blow and therefore it can be carried out exactly on the center of the stones. There is also no danger of the operator becoming injured, since the frame including the ramming block is standing quietly on the stone.

Figure 1 is the longitudinal section of a rammer constructed according to the present invention. Fig. 2 is a similar view of the upper part, the ramming piston being shown in its upward position. Figs. 3 and 4 are sections drawn to the line 3—3 and 4—4 respectively of Fig. 1.

The rammer comprises a cylinder *a* and a guide frame *b* for the ramming block *c*, the cylinder being connected to the said frame by any suitable means and the ramming block connected by a rod *d* with a driving piston *e* playing in the cylinder *a*, the ramming block *c* has a square cross section and is guided within the frame *b* merely along its edges. The cylinder *a* is closed on its top by a cap *f* which is provided laterally with handles *g* and g^1. The handle g^1 is constructed to serve as a feed for the compressed air having a rotatable valve g^2 which allows a regulation of the air. The chest *h* containing

the distributing valve is placed on the top of the cylinder a and fits on its top against the bottom of the cap f.

The distributing valve is preferably constructed as a differential piston consisting of the two cylindrical parts i^1, i^2 of different diameter, guided within bores of the chest h and connected by a central part i^3. The distributing valve is pressed with its part i^2 against the plate l by the compressed air which enters by way of the passage k and acts against the top of the valve part i^1. The port l^1 will be thus closed, but compressed air can pass through the passage m and enter below the piston e, and the consequence is, that the ramming block c will be raised. The air above the piston e is driven out through the exhaust passage n, the space between the two parts i^1 and i^2 of the valve and the exhaust n^1. This operation continues until the piston e covers the mouth of the passage n. When this passage is covered the air within the cylinder above the piston e will be compressed and since the lower surface of part i^2 of the valve is greater than the upper surface of part i^1, on which the fresh compressed air acts, the valve will be raised as soon as compression below the face i^2 increases to a certain extent. The distributing valve then moves into the position shown in Fig. 2, the compressed air now enters below the surface i^2 by way of the passage p and acts against the piston e, therefore the ramming block c in its fall downward will be also acted upon by compressed air. In its downward motion the piston e will finally uncover the lower mouth of the passage q thus allowing compressed air to enter between the two parts i^1, i^2 of the distributing valve, so that the part i^2 will be equally acted upon by compressed air on both sides (in addition to the pressure acting against i^1). The consequence is, that the valve i^1, i^2 will fall down and closes the passage p. Immediately hereafter the lower mouth of the passage n will be uncovered and compressed air may escape by this passage n^1. Since the passage m at its upper end will be uncovered by the distributing valve compressed air may again enter below the piston e, and the operation is repeated. The number and force of the blows is determined by the adjustment of the valve g^2. A prop r pivoted at its upper end to a lug s on the rammer serves for easily transmitting the rammer from one stone to the other.

I claim:

1. An improved paving rammer, comprising a cylinder, a piston within a cylinder, a ramming block attached to the said piston and means to allow pressure fluid to enter the cylinder above and below the piston and a prop, pivotally attached to the rammer and adapted to steady the rammer during transmission.

2. A pneumatic rammer comprising a cylinder, a piston therein, a ramming block attached to the piston, a frame on the lower end of the cylinder surrounding the block and serving as a support for the cylinder and as a guide for the block, and means to allow pressure fluid to enter the cylinder above and below the piston to reciprocate the latter.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."