March 23, 1954

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SCALE REMOVER

2,672,677

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Fig. 1

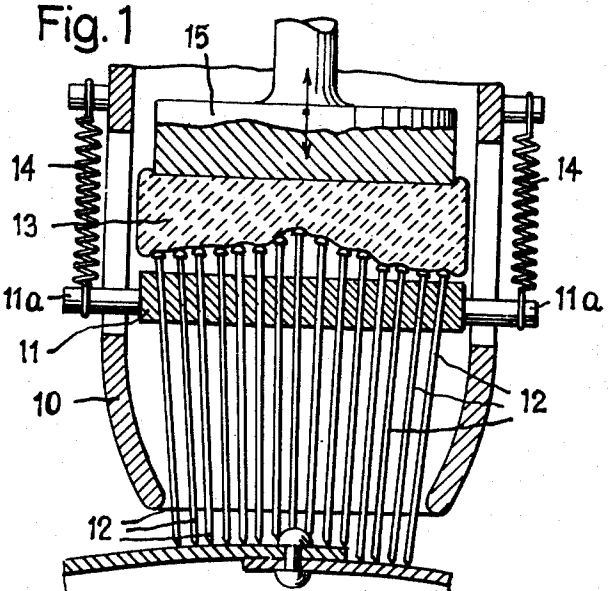
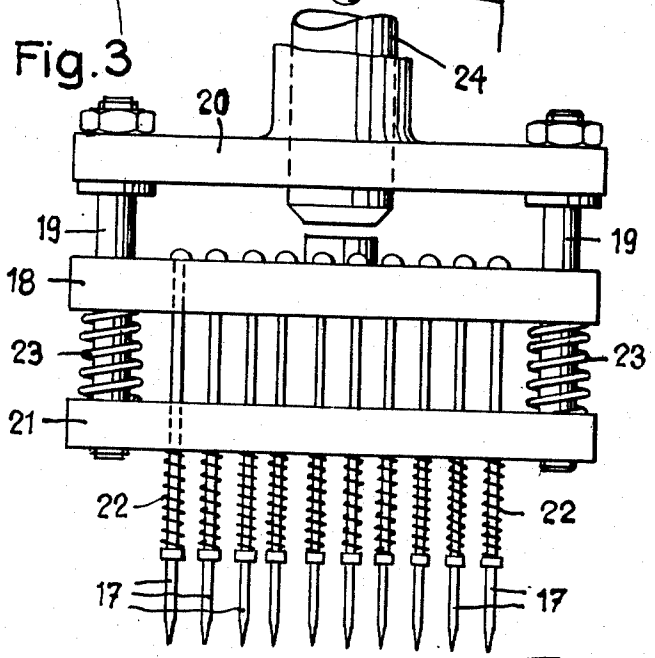


Fig. 3



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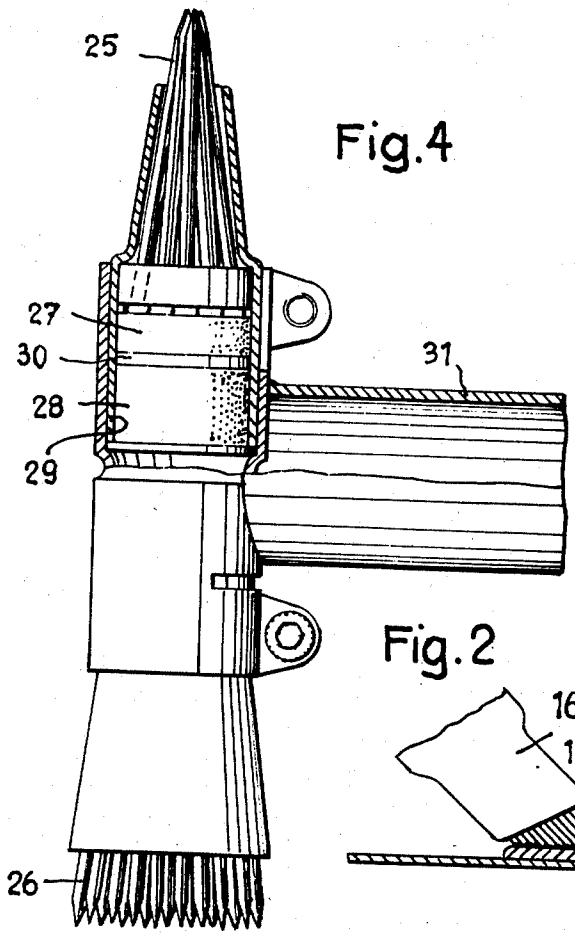


Fig.4

Fig.2

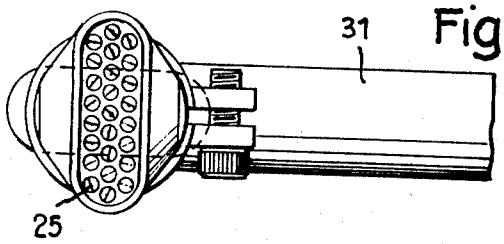


Fig.5

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UNITED STATES PATENT OFFICE

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SCALE REMOVER

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Claims priority, application Switzerland November 1, 1950

4 Claims. (Cl. 29—81)

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My invention has for its object an arrangement for removing rust from metal bodies through mechanical action on the rusted parts. Said arrangement is characterized by a plurality of pins provided each with a head and slidably engaging longitudinally a corresponding guiding member, said pins being held elastically in a retracted position and cooperating with a hammer reciprocating under the action of suitable control means, said hammer acting on the different pins through the agency of damping means in a manner such that the pins may exert vibratory impacts on the metal surface to be freed of rust so as to hammer said rust away, the operative arrangement being set with the tips of the pins engaging the said metal surface.

I have illustrated by way of example in accompanying drawings a number of preferred embodiments of my invention, said embodiments being shown only to the extent required for the understanding of the invention. In said drawings:

Fig. 1 is a vertical section through the head portion of the arrangement according to a first embodiment of the invention;

Fig. 2 shows a structural modification of this arrangement;

Fig. 3 is a side view of the head portion of the arrangement according to a further embodiment;

Figs. 4 and 5 are a side and a front view of a last embodiment.

Turning to Fig. 1, it is apparent that the arrangement includes a tubular chamber 10 with a a restricted outlet end. In said casing 10 and at a predetermined distance from the output end thereof, is mounted slidingly a guiding plate 11 that shows two pivots 11*a* arranged in opposite directions and held slidingly in two vertical grooves or slots 10*a* provided in the casing 10. The guiding plate 11 includes a number of perforations adapted to receive slidingly corresponding pins 12 provided each with a head at the inner end thereof. These pins 12 are guided in the perforations of the guiding plate 11 and they are thus carried in the latter in a manner such that the bundle constituted by the pins considered as a whole, is slightly conical and converges towards a point beyond the outlet of the casing. The heads of the pins 12 carry a rubber cushion 13 forming damping means and said cushion is also adapted to slide inside the casing 10. The guiding plate 11 is submitted to the tractional action of springs 14 inserted between the pivots 11*a* and corresponding laterally projecting studs on the casing 10 whereby the pins 12 are urged

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rearwardly so that their heads bear against the rubber cushion which is held in its turn in contact with the plate-shaped head of a hammer 15 slidingly carried inside the casing 19. This hammer 15 is connected with control means of a suitable type adapted to shift the hammer in either direction after the manner of a pneumatic hammer. These control means may be pneumatic as in the case of a pneumatic hammer or else they may be of an electric type. As these control means are known per se, and correspond, as concerns the present arrangement, only to an application of means that are known per se, it is unnecessary to illustrate and describe such means with further detail.

During operation of the arrangement, the hammer 15 executes, as already stated, a reciprocatory movement. The arrangement itself is caused to rest on the portion of a pipe, beam or the like metal body that is to be freed of rust, preferably through application of a slight pressure so that the pins 12 engage said portion of the metal body. The hammer will then strike in quick succession the pins 12 the rear ends of which engage elastically the rubber cushion 13 and the blows thus executed are transmitted through the pins 12 to the metal body in the shape of a vibratory percussion, whereby any rust flakes appearing on the corresponding points of the metal body are hammered off.

Fig. 2 shows the head portion 16 of a similar arrangement wherein, however, the actual pins 16*a* assume different lengths so that they may readily engage corners. As apparent, these pins assume greater lengths as they are considered nearer one end of the bundle of pins.

In the arrangement according to Fig. 3, the pins 17 are guided through the perforations of a guiding plate 18 that is carried in its turn slidingly over rods 19 providing a rigid connection between the upper and lower stationary carrier plates 20 and 21. The pins 17 pass also through the lower stationary carrier plate 21 and are surrounded by helical springs 22 bearing through one end against the said carrier plate 21 while their other ends are anchored in the peripheral grooves of the pins 17. Thus, the heads of the pins 17 are urged into engagement with the upper surface of the upper plate 18. On the other hand, the rods 19 are each surrounded by a strong compression spring 23 inserted between the movable guiding plate 18 and the lower stationary plate 21, said springs 23 urging the guiding plate 18 upwardly into engagement against the lower part of the hammer 24 that reciprocates again, as preced-

ingly, under the action of suitable control means. The pins **17** are thereby urged downwardly and individually by their own springs **22**, while the arrangement of pins considered as a whole is urged upwardly by the springs **23**. The latter are sized in a manner such that they exert together a more considerable action than the springs **22** considered together so that the guiding plate **18** is actually urged, as precedingly, into engagement with the hammer **24**. The operation of this arrangement is similar to that of the arrangement according to Fig. 1 inasmuch as vibratory blows are transmitted by the hammer **24** to the metal body through the agency of pins submitted to the action of elastic means, and consequently the metal body may be freed of its rust deposit through this hammering.

In the embodiment illustrated in Figs. 4 and 5, there is a double bundle of pins **25** and **26**, each bundle being held by an interchangeable auxiliary rubber pad **27**, said pad holding the corresponding pins through the side of their heads that faces their tips and forming a substitute for the rigid guiding members such as the plate **11** shown in the embodiment illustrated in Fig. 1. The main rubber cushion **28** is arranged to the rear of the pin heads in the manner already disclosed hereinabove, and it may include, for furthering its reciprocation inside the casing **29**, an intermediary disc of metal **30** the periphery of which matches the inner surface of the casing.

A common handle **31** may carry a plurality of different scale and dust removing bundles of the type just described; the two bundles carried by the handle **31** in the case of Fig. 4 are in alignment with reference to each other and they extend preferably in two orthogonal directions e. g. in a plane perpendicular to the handle axis and in a plane passing through same respectively. This allows using, as required, either of the pin bundles according to requirements, the same control means and hammer being obviously resorted to in both cases. All the above described arrangements could also be used for treating (cleaning) stone surfaces.

What I claim is:

1. A tool for cleaning metal and stone surfaces, comprising a casing, a bundle of pins having tips adapted to engage the surface to be cleaned, an enlarged head on each said pin, a guiding member holding the different pins, elastic means biassing the guiding member and the pins into a retracted position with respect to the location of the surface, a hammer adapted to reciprocate with respect to the heads of the pins to impart thereto a rhythmic movement towards the surface, said movement producing a vibratory action on the surface, damping means associated with the pins for damping the action of the hammer on the pins, said casing extending in proximity to the ends of said pins and forming therearound a guiding skirt for preventing bending of the pins.

2. A tool as claimed in claim 1, said guiding member comprising a plate having perforations slidingly carrying said pins in corresponding perforations.

3. A tool as claimed in claim 1, said damping means comprising a resilient cushion fitted between the hammer and the heads of the pins.

4. A tool as claimed in claim 1, said casing being tubular and having longitudinally extending grooves therein, pivots carried by said plate and slidably engaging in said grooves, springs urging said pivots rearwardly with respect to the surface and constituting said elastic means.

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