O. SPERLING.

CENTRIFUGAL CHISELING IMPLEMENT.

APPLICATION FILED MAY 7, 1917.

1,370,767.

Patented Mar. 8, 1921.

2 SHEETS—SHEET 1.

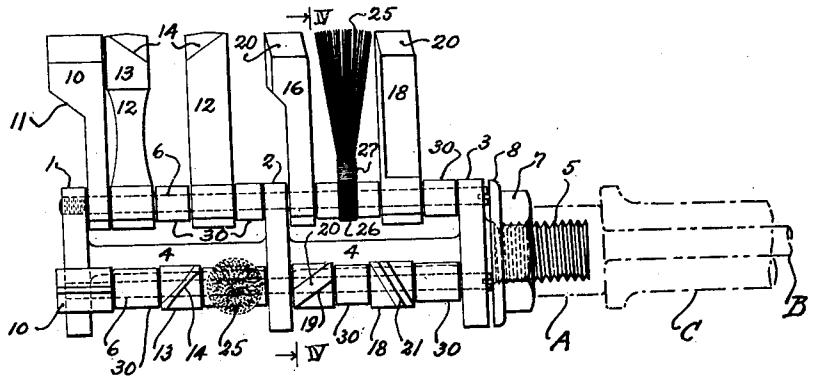


Fig. I

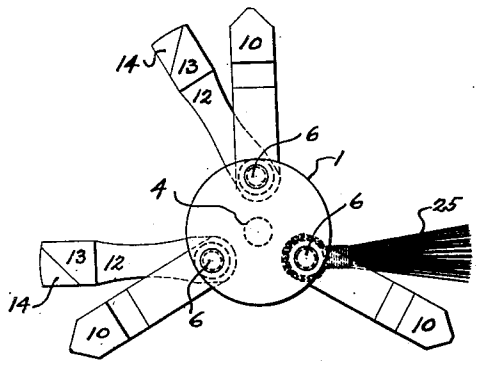


Fig. II

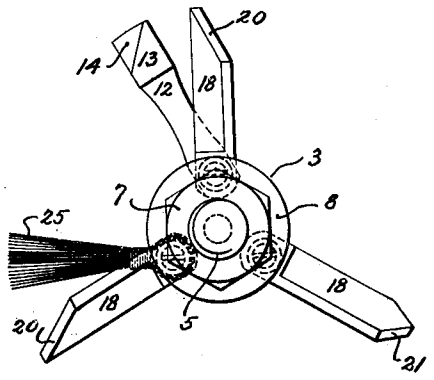


Fig. III

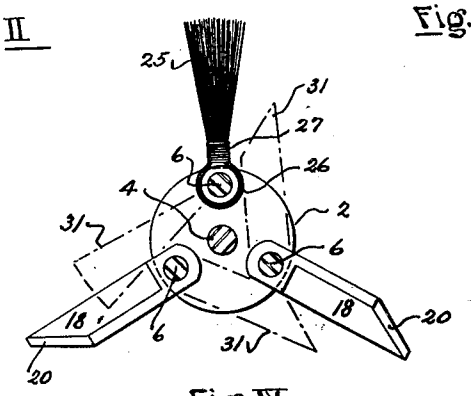


Fig. IV

Inventor

Oscar Sperling

By his Attorney

H C Karlson

O. SPERLING.

CENTRIFUGAL CHISELING IMPLEMENT.

APPLICATION FILED MAY 7, 1917.

1,370,767.

Patented Mar. 8, 1921.

2 SHEETS—SHEET 2.

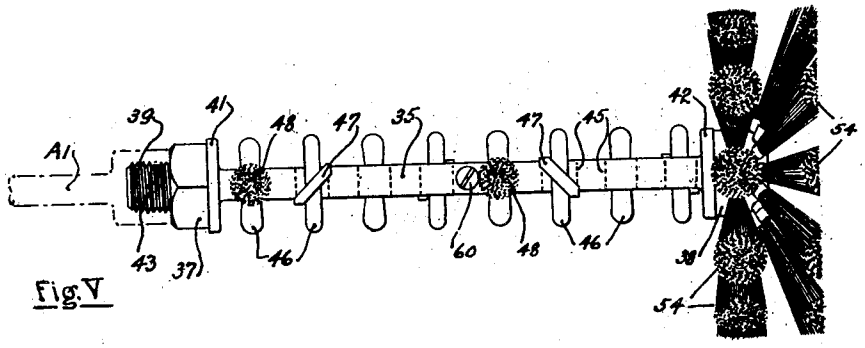


Fig.V

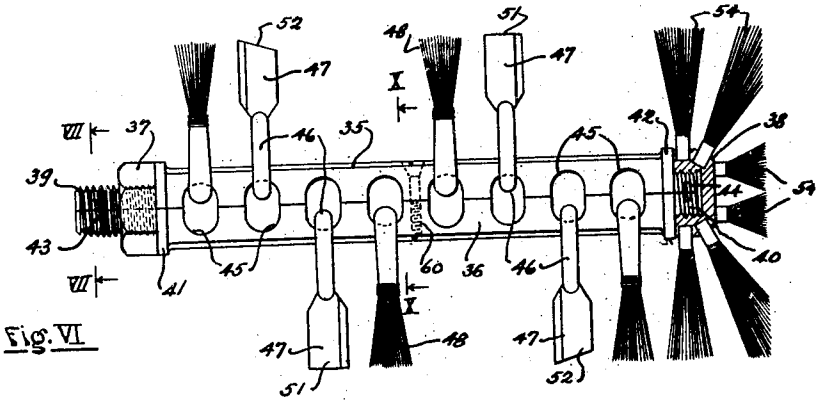


Fig.VI

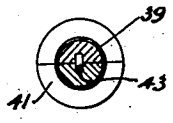


Fig.VII

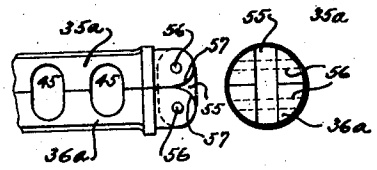


Fig.VIII

Fig.IX

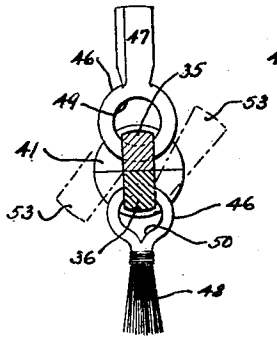


Fig.X

Inventor

Oscar Sperling

By his Attorney

H C Karlson

UNITED STATES PATENT OFFICE.

OSCAR SPERLING, OF NEW YORK, N. Y., ASSIGNOR TO ROTARY SCRAPER COMPANY, INC., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

CENTRIFUGAL CHISELING IMPLEMENT.

1,370,767. Specification of Letters Patent. Patented Mar. 8, 1921.

Application filed May 7, 1917. Serial No. 166,960.

To all whom it may concern:

Be it known that I, OSCAR SPERLING, a citizen of Sweden, and a resident of the Borough of Manhattan, in the county, city, and State of New York, have invented certain new and useful Improvements in Centrifugal Chiseling Implements, of which the following is a specification.

This invention relates to devices for removing scale, rust, and other incrustation from metal tubes and plates, either interiorly or exteriorly thereof, and it appertains more especially to that class of such devices wherein there is employed a plurality of cleaning instruments that are mechanically driven with a circular motion against the surface to be scoured.

One of the objects of the invention is to produce an improved device of the nature set forth comprising a number of chiseling elements, individually as well as collectively adapted to develop a centrifugal force and to apply the same in consecutive, short and sharp, scraping blows, delivered throughout the surface over which they are moved.

A further object is the production of a device of the class mentioned having plural sets of impinging elements characterized by a diversity of working edges and ponderal proportions, and mounted independently of one another in such a way as to be commensurately influenced by the centrifugal force both when striking the blows and recuperating therefrom.

Another object is to provide a device of the character described with serially disposed groups of combined chiseling and sweeping elements, which shall perform their respective functions each unaffected by the other while being subjected to the action of the centrifugal force, and shall severally be capable of quick insertion, or removal for repairs, replacement, and substitution.

Still another object is the provision of a device of the type specified which shall be convenient to manipulate, readily set in working order, and designed to consume a minimum of power for its operation.

A still further object is to supply a device of the species referred to which shall be composed of few parts, simple and durable in their nature, as well as susceptible of standardization, conveniently assembled, and amenable to low cost of manufacture.

Other objects and advantages will become apparent as the specification proceeds.

With the aforesaid objects in view, the invention consists of the improvements, novel construction, arrangements and combinations of parts hereinafter described, defined in the subjoined claims, and illustrated in their preferred embodiments by the annexed drawings, wherein like elements are designated by the same reference characters throughout the different views.

Succinctly outlined, the invention comprises a plurality of abrading elements, which are best assimilated to a compound series of cold chisels, accompanied with interspersed sweepers, and arranged to oscillate loosely in suitably spaced groups on parallel spindles that are carried circularly around a common axis of rotation. The working edges of the divers chisels, and corresponding ends of the sweepers, are caused to come in contact with the surface to be cleaned, through the action of the centrifugal force generated by the circulatory movement, and serve to disintegrate, comminute, and remove the incrustation formed thereon, or other matter intended to be obliterated from the said surface. Some of the said working edges are positioned at right angles to the plane of oscillation of their respective chisels, while others are situate on lines oblique thereto in reverse directions, the ends of the sweepers occupying intermediate spaces therebetween. All of the chisels and sweepers are pivotally attached to a discoidal carrier, the component parts whereof are extended in such a manner as to protect the several points of junction. The pivots of the various chisels and sweepers are disposed symmetrically along spindles, placed equidistantly within and between the disks of the carrier, the arrangement providing for a close alternation of the said working edges and ends, as well as for uninterrupted superficial application thereof, and further permitting folding of the operative elements preparatorily to their being set before surfaces located in quarters otherwise inaccessible. As previously intimated, the chisels are of varied weights, so may be the sweepers. The im-

plement, including the aggregate of elements mentioned, is designed to be held broadside, manually, opposite the surface which it is intended to clean, though mechanically operated.

The advantages of the invention, as above briefly described, are best realized when all its features and instrumentalities are combined in the one and same structure, but useful combinations may be produced embodying less than the whole.

It will be obvious to persons skilled in the art to which the invention appertains that the details thereof may be incorporated in different structures. Therefore the accompanying drawings are submitted herewith as exhibiting only the preferred exemplification of the invention.

In the said drawings:—

Figure I is a front view of the invention, *i. e.* showing the device facing the operator;

Fig. II is an end view of the same, looking from the left.

Fig. III is a view of the other end, that is, looking from the right;

Fig. IV is a transverse section taken irregularly on the line IV—IV of Fig. I, viewed in the direction of the arrows;

Fig. V is a top plan view of a modified form of the invention;

Fig. VI is a front view of this modified form, one part thereof appearing in section;

Fig. VII is a cross-section on the line VII—VII of Fig. VI, looking in the direction pointed out by the arrows;

Fig. VIII is a fragmentary view showing in front elevation a modified method of constructing a certain part pertaining to the right-hand side of the structure illustrated in Fig. VI;

Fig. IX is an end view of the construction represented by Fig. VIII, as seen from the right-hand side; and

Fig. X is a transverse sectional elevation, taken from the middle section line X—X of Fig. VI, viewed in the direction of the arrows.

As shown in Figs. I to IV, inclusive, the invention includes a discoidal carrier, composed preferably of three disks or circular flanges 1, 2 and 3, placed in parallelism at equal distances apart, and united by a central stem 4. For convenience in explaining the invention, the disk numbered 1, on the left, will be termed the outer disk; the one in the middle indicated by the numeral 2 will be called the intermediate disk; and that on the right marked 3 will be referred to as the inner disk. A threaded shank 5 is made to project outwardly from this inner disk 3, in line with the said stem.

The said carrier is designed to support a plurality of spindles 6, of which two or three may be employed, or more. Three such spindles are shown in the present exemplification of the invention. These spindles consist of rods threaded at one end into the outer disk 1, and set or fitted in suitable bearings at their middle and other end portions in the intermediate and inner disks 2 and 3, respectively. The inner ends of the spindles may be adapted for the reception of a screw-driver or wrench, by means of which they can be tightened so as to remain firmly in place. In order to obviate any tendency to axial movement of the set of spindles, a nut 7, having a flanged base 8, is screwed over the said side shank 5 and against the spindles' inner extremities. Although the said nut 7 and flange 8 thereof are here represented as being formed integrally in one piece, it is understood that a separate nut and detached washer may be employed instead.

To the projecting end of the shank 5 is attached a socket A, of a flexible or other shaft B, by means of which the discoidal carrier aforesaid can be readily rotated, together with the spindles mounted thereon and connected elements hereinafter described, through the instrumentality of an electric motor or other suitable prime mover (not shown). A handle whereby an operator holds and guides the device is indicated by the reference letter C. The said shaft B is journaled in this handle. As the several parts just enumerated, to wit, those severally designated A, B and C, do not specifically appertain to the invention forming subject matter hereof, they are represented merely by dot-and-dash lines in the annexed drawings.

The aforesaid spindles 6 are mounted parallel to one another, as also to the stem 4, on and between the disks 1, 2 and 3, of the said carrier. Preferably and as shown, they are placed at equal intervals apart, each within the peripheries of the several disks. Upon these spindles are pivotally supported as many sets of chiseling elements and sweeping members, of various sizes and descriptions, the pivot portions of all of which are arranged in straight rows fully within the said peripheries, and protected thereby. The sizes are graduated according to predetermined arrangement, so as to administer blows of different percussive power, when the coacting elements and members are whirled around by rotating the discoidal carrier hereinabove described.

By preference, the said abrading elements are all of the edged tool variety, and are arranged with their working edges extending in different planes intersecting one another. Thus, some of these working edges may be parallel with the axis of rotation of the device, while others will traverse it at diverse angles. For example, the outer chisels marked 10, *i. e.*, those adjacent to the disk 1, are shown as having their work-

ing edges in parallelism with the axes of the spindles to which their hub portions are respectively pivoted, and with the common center of the stem or distance bar 4 and the shank 5, which center also coincides with the axis of rotation. In order to enable the outer elements 10 to reach outward beyond the disk 11 the former is made to overhang the latter as indicated at 11, Fig. I. Adjacent to the outer elements 10, on the said spindles, are placed other chiseling elements 12, having heads 13 with obliquely disposed working edges 14, which edges are arranged in opposition to one another so as to counteract any tendency to axial displacement which the device might otherwise have, by working itself endwise in one direction. Additional overhanging elements 16 are located contiguous to the intermediate disk 2. Of course, in a rotary chiseling device of comparatively short dimension, there would be no occasion to use the latter named disk and thereto appertaining overhung element. If employed, the elements 12 may have obliquely disposed working edges, as shown. Further inward, that is, closer to the shank 5 of the carrier are placed other chiseling elements, designated by the numeral 18, which likewise have their working edges each at an angle to the direction of rotation.

Both the elements designated by the numerals 16 and 18 are made lighter than those previously described. That is, each one among them weighs less than any in either the outer set of elements 10 or the next adjoining sets 12. Consequently, the said elements 16 and 18 are adapted to deliver blows of less intensity. The oblique angle and diminished weight of these inner elements are conveniently obtained by making their body portions of rhomboidal section, as indicated most clearly at 19, Fig. I. In this way it becomes a comparatively easy matter to sharpen the free ends of the elements to either a single or a double beveled working edge, as represented at 20 and 21, respectively.

It will be noted that the working edges of the different sets of chiseling elements herein illustrated are arranged to lap over one another in delivering the blows upon the surface to be cleaned. As a consequence, the surface is acted upon with perfect continuity throughout its length and breadth, without breaks or streaks as formerly, when the device is moved within operative distance thereover. A plate, or the like, can thus be thoroughly cleaned at a single operation.

Interposed between the various sets of chiseling elements are individual brushes or sweeping members 25, each of which may consist of multiple wire strands bent upon themselves to form looped portions 26 adapted to encircle the spindles 6, the strands in each looped portion being tied closely together by circumferential layers of other wire 27, that cause them to retain their shapes.

Collars 30 are interposed between the said chiseling elements and sweeping members, for the purpose of maintaining them at the proper distances apart, on the said spindles 6. These collars may be of different lengths, so as to produce the desired staggered or overlapping arrangement of the working edges as the latter successively come into contact with the surface which is being cleaned, whereby the surface is operated upon without streaks or solution of continuity, as before recited.

The angular disposition of the brushes or sweepers 25, relatively to one another and to the chiseling elements, is such that no unbalancing effect is produced. Thus, in a device like the one herein described, the three outermost working parts may consist exclusively of chisels, while the adjoining sets may include two chisels and one brush, each. The next set can also be composed of two chisels and one brush, but with the latter located one angular space in advance of the brush first named. The following set again may consist of two chisels and one brush disposed two angular spaces ahead of that mentioned in the first place, and the last or innermost set may be made up entirely of chisels, as at the opposite end of the device. The particular advantage in having elements varying from one another as to their weights and working edges, interspersed with cleaning brushes, resides in that they are thereby enabled to deliver blows of different intensities, and differential scraping and chipping actions are exerted upon the surface against which they operate, as they are moved along the same. It is obvious that blows of one sort will loosen one kind of scale while blows of varied nature will scrape off another species of incrustation. Besides, an edge of a certain shape will more readily enter small crevices or indentations, than if it were of other form, due to its peculiar configuration or presentment, which are best fitted to the unevenness encountered. The brush elements in the meanwhile exert a final cleaning action upon the surface, sweeping the same clean and bright, ready to receive paint or other protective covering.

Whenever it is desired to insert the device for operation in close or cramped quarters, as for instance passing the same through narrow tube openings or hand-holes, or among closely set tubes, or between the latter and the shell of a boiler, the chiseling elements can be folded back or over one another, owing to the described spacing of their respective spindles, as indicated by

the dot-and-dash lines 31 in Fig. IV. The angular spacing between the various sets of elements and their centrally offset disposition not only prevent interference between them, but also enable any one among them to regain its momentum, derived from the centrifugal force exerted thereon, after striking a blow, and without danger of being caught up by the elements next following.

Figs. V, VI, VII and X disclose a modified species of the type of rotary chiseling implement hereinbefore described. In Fig. VI which presents a front view thereof, the modification is shown as consisting of a split bar composed of two approximately equal parts 35, 36, held together at the opposite ends by retainers, which may be in the nature of a nut, 37, and an internally threaded cap 38, engaging correspondingly formed end portions 39, 40, at the respective extremities of the said bar. These retainers are brought up against shoulder flanges 41, 42, formed on the superposed halves 35, 36, of the split bar, in proximity to the threaded ends thereof. To insure correct register of the said halves, dowels 43, 44, are driven into either half, at each end of the same, in position to enter each a corresponding clearance recess in the opposite half of the bar. The inner abutting faces of said halves 35, 36, are provided with opposed, comparatively wide notches 45, within which are received the heads 46 of chiseling elements 47, and of sweeping members 48. To this end, the last-named elements and members are formed with enlarged eyes 49, 50, respectively, which permit of their being moved over the half of the split bar having the notches to which they are assigned. As shown, the opposite longitudinal edges are bound by the before mentioned flanges 41, 42, over which the eyes 49, 50 are also passed. At 60 is indicated a screw having its head countersunk in one of the halves of the split bar and with the shank thereof threaded into the other half of the same to hold it together at the middle. In split bars of comparatively long dimensions several of these screws can be used.

Notwithstanding that only one chisel and one brush are shown as accompanying each of the opposed notches in the split-bar aforesaid, it is manifest that two of them may be placed at opposite points in each pair of these notches, that is, either two chisels, or two brushes, or one of each kind, within the elliptical opening formed thereby, as seen in Fig. VI. As shown in this view, the outer edges of the chisels 47 are obliquely disposed with relation to the direction of rotation, and they have both straight and slanting working edges, as indicated at 51, 52, respectively, the arrangement being such that there are as many chisels and brushes at one side as on the other side of the bar, to maintain proper balance when the device is in rotation. The foldable character of the opposed sets of chisels and brushes is depicted by dot-and-dash lines 53 in Fig. X.

The cap 38, before referred to, may be provided with brush members 54, as represented in Figs. V and VI, in the right hand portion of each view. Brushes of the kind illustrated, disposed around the face and sides of the cap will enable the user of the device readily to loosen impurities from the bottom of containers, tube ends, and like parts desired to be cleaned.

In Figs. VIII and IX is shown a modification of the means for holding together endwise the halves of the said split bar at its outer extremity. The said halves are designated by 35^a and 36^a in the figures last named. As there shown, the outer end of the split bar is slotted to receive a link 55, hinged on pins 56, forced into the opposite halves of the bar. The meeting corners of the bar are chamfered, as at 57, to permit of its being swung open, incidentally to the insertion or removal of the chiseling elements and sweeping members, into or from their receiving notches. It is understood that in this modified structure, only one retaining nut is required to lock the superposed, opposite ends of the halves of the split bar together, and even for smaller sizes of these devices, it is only necessary to enter the threaded inner end, or shank, into the socket A^1 of the driving shaft, without the instrumentality of a nut to hold the said halves in position.

While certain preferred embodiments of this implement have been shown and described, it will be understood that changes in the form, arrangements, sizes, proportions and details thereof may be made without departing from the scope of the invention as defined by the appended claims.

Having described my invention what I desire to secure by Letters Patent and claim is:—

1. A device for the purpose described consisting of a body portion with a handle, said body portion having disks with spindles mounted thereon, scraping elements freely pivotally mounted on said spindles, and brush or sweeping members pivotally mounted on the spindles between some of said scraping elements.

2. A device for the purpose described consisting of a body portion with disks having spindles mounted thereon, abrading elements pivotally mounted on said spindles, and sweeping members on the spindles between said abrading elements; said sweeping members being spirally arranged on said body portion substantially as described.

3. A device for the purpose described having a body portion consisting of disks with

a plurality of connecting spindles, cutting or abrading elements and brush or sweeping members freely mounted on each of said spindles; said brush members being located between some of said cutting elements.

4. A device for the purpose described having a body portion consisting of disks with a plurality of connecting members, interspersed cutting or abrading and sweeping elements freely mounted on each of said members, and spacers between the inner ends of said elements serving to hold the outer ends thereof at predetermined distances apart.

5. A device for the purpose described having a body portion consisting of a plurality of carriers, and cutting or abrading elements and sweeping members freely mounted on each of said carriers; said sweeping members being interspersed between said cutting or abrading elements.

6. A device for the purpose described having a body portion with pivotally mounted scraping members and a pivotally mounted brush, the latter arranged between said scraping members; and said scraping members and brush being adapted to freely swing transversely of the said body portion.

Signed at the borough of Manhattan, in the county, city and State of New York this 5th day of May, 1917.

OSCAR SPERLING.

Witnesses:
H. C. KARLSON,
W. H. GEE.