J. KINAN.

ROTARY WIRE BRUSH.

APPLICATION FILED JAN. 13, 1914.

1,171,962.

Patented Feb. 15, 1916.

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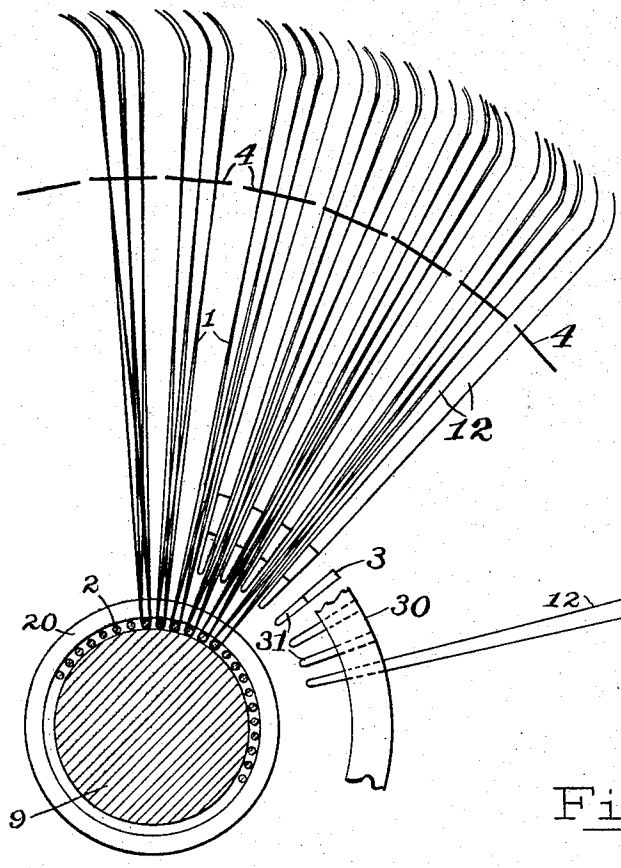
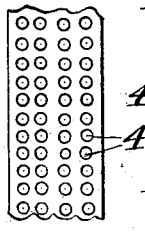


Fig. 1.

Fig. 2.

Fig. 4.



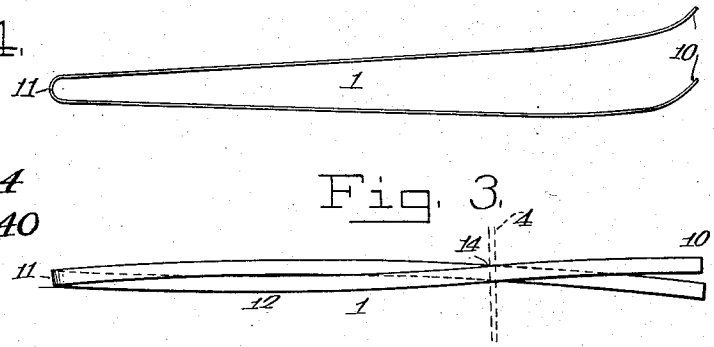


Fig. 3.

WITNESSES

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2 SHEETS—SHEET 2.

Fig. 5.

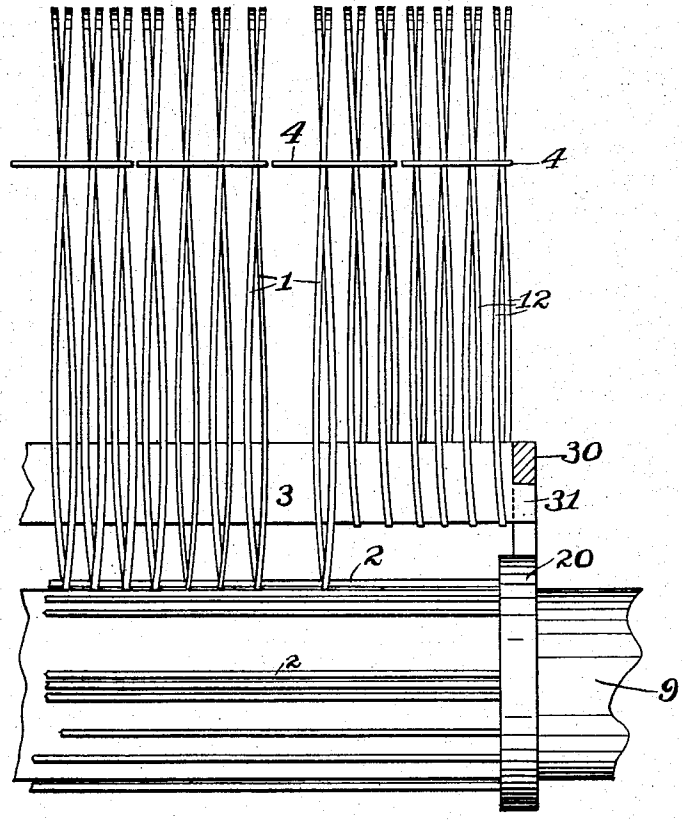


Fig. 9.

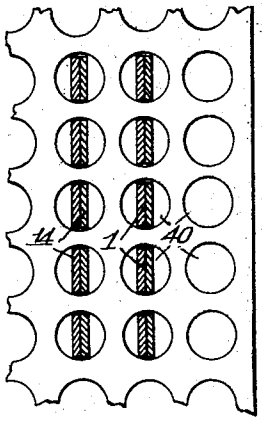


Fig. 6.

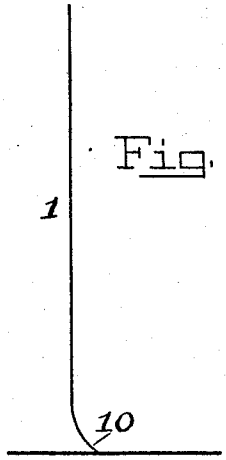


Fig. 7.

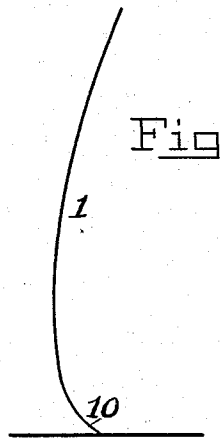
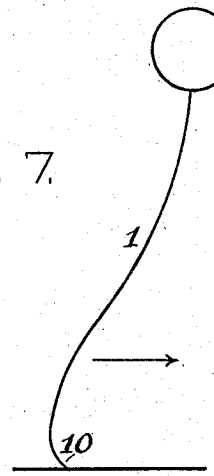


Fig. 8.



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ROTARY WIRE BRUSH.

1,171,962. Specification of Letters Patent. Patented Feb. 15, 1916.

Application filed January 13, 1914. Serial No. 811,927.

To all whom it may concern:

Be it known that I, JOHN KINAN, a citizen of the United States, and resident of Seattle, King county, Washington, have invented certain new and useful Improvements in Rotary Wire Brushes, of which the following is a specification.

My invention relates to brushes, and particularly to brushes in which the bristles or brushing elements are made of metal wires or strips and more particularly to those which are rotated and employed in sweeping street or floor surfaces.

The object of my invention is to make such a brush which will be superior in its effectiveness, particularly in thoroughness of sweeping effect and in capability of automatic adjustment to fit irregular or uneven surfaces.

Another object is to provide a cheap type of construction and one which is capable of readily accommodating a large number of bristles or brushing members.

My invention comprises certain novel constructive features and combinations which will be hereinafter described and particularly pointed out in the claims.

In the accompanying drawings I have shown my invention in the form which is now preferred by me.

Figure 1 shows in transverse section and end view, a segment of a brush built in accordance with my invention. Fig. 2 is an edge view of a single pair of bristles. Fig. 3 is a side view of a pair of bristles showing them crossed or twisted as they are in the completed brush. Fig. 4 shows a short section of the type of holder used to hold the bristles in the twisted relation shown in Fig. 3 and to maintain the proper relative position of the individual bristles in the brush. Fig. 5 shows, in side elevation, a small section of a brush illustrating the manner of securing the bristles in the brush. Figs. 6, 7 and 8, show different positions assumed by the individual bristles under different conditions. Fig. 9 is a face view of a small section of the perforated plate which is used to hold the wire bristles in proper crossed relation.

It has been my desire to construct a brush which may be employed for such purposes as sweeping paved surfaces, in which the bristles, or brushing members, may be made of spring metal. I have found that straight bristles or brushing elements, are unsatisfactory in operation, for the reason that the brush will not yield to pressure applied thereto. If sufficient bristles are used to make it an efficient brush, the multiplicity of wires have a combined strength capable of sustaining more weight than it is practicable to apply thereto, the brush being therefore ineffective in sweeping surfaces containing even small inequalities. To avoid the above difficulty and to make a brush which may be easily compressed or dented by inequalities of the surface being swept, I give the wires forming the bristles, a curve, so that force applied lengthwise thereof may easily bend or buckle them, thus making it easy to dent or compress the brush and enabling it to cleanly sweep uneven surfaces. The preferred location for this bend is at the outer end of the wire, as is shown in Figs. 1 and 2.

In Figs. 6, 7 and 8 I have shown positions assumed by the wires under different conditions. In Fig. 6 is shown the position assumed when unaffected by force applied lengthwise thereof. The body 1 is straight. The end 10 contacts with the surface to be swept at a point to one side of the line of the body of the bristle. The direction of this curvature should be in the direction toward which the brush is to be moved. In Fig. 7 is shown the position assumed when pressure is applied. The end 10 being offset from the direction of the body of the wire, a slight pressure will buckle it, causing it to assume the bent position shown in Fig. 7. If at the same time a sweeping movement be given from an engagement with the other end, as would occur if it was incorporated in a rotary brush, it would assume the position shown in Fig. 8. Should a portion of the brush be over a depression, the bristles at this point would be able to straighten out and thus reach down into the depression and sweep it clean. By placing the wires so that the bent ends 10 curve toward the direction in which the surface of the brush moves over the pavement, a further important advantage is gained. The backward inclination of wire next the point, causes the point, at all times, to dig under the dirt and to loosen and lift it. With straight wires the effect would be for the wire to incline forwardly, thus acting to press the dirt down instead of lifting it, making a much less effective brush.

The form of the bristle elements which I

prefer is shown in Figs. 2 and 3. These consist of a wire bent upon itself so as to form two bristles or prongs. I also prefer to make this of a wire which is flat, or considerably wider than thick, thus making it easier to bend in planes normal to the axis of the brush.

In making a rotary brush, I prefer to build the brush in the following manner. I use a shaft 9 and secure a multiplicity of bristle segments thereon in the following manner. Next the shaft are a series of securing wires 2, extending parallel with the shaft and each passing through the looped ends 11, of a large number of the doubled wires. These wires 2 are secured in place by a series of rings 20 or by other equivalent means. To secure a larger number of the bristles in the brush, I employ a second set of shorter wires 12 which are passed about bars 3, each of these groups of wires being placed between consecutive groups of the longer wires, and forced down between them as is shown in Fig. 1. The bars 3 are thus partially held in place by the tension of the longer wires. I have shown these bars as notched at their outer upper corners, thus forming tongues 31 at their ends, over which are slipped securing rings 30. The rings 30 and bars 3 thus support each other, the whole being supported by the longer wires, between which the bars 3 are forced. The rings hold the bars in proximity to the shaft 9, and the tongues 31 upon the bars 3 support the rings and prevent their removal. If the brush is of a length to demand it, such rings or equivalent securing means may be employed at intermediate points.

As a means for binding the wires forming the bristles together so that they will in a measure support each other, to keep their outer ends spaced, and for other reasons, I prefer to employ spacing bars or plates 4 which are located toward the outer ends of the wires. A short section of one of these spacing plates or bars is shown in Fig. 4. This is of thin metal and has a series of small holes 40 therein. Each hole receives both arms of a looped or double-bristle wire. By placing these plates at the proper distance from the shaft they engage the wires of the groups located adjacent thereto, and effectively support each other to form a substantial brush cylinder.

If the two sides of a double-bristle wire were inserted through the same hole and also maintained in their normal relative positions, the two ends would coincide in position and the ends of the two would cover no more surface than would one. To avoid this I shift the relative positions of the two sides by crossing them or reversing their normal position without twisting the wire itself, or as shown in Figs. 3 and 5. The result of this is to separate their ends, as is shown in Fig. 5, thus doubling the surface swept by their ends. This result follows from the fact that the wires used are not round, but of a flattened cross section and the holes, while of ample size to accommodate two wires when their flat sides are facing each other, are too small to accommodate the same wires when their major planes are common; that is, when placed edge to edge.

What I claim as my invention and desire to patent is:

1. A brush comprising a central core, and having brushing elements each composed of a wire bent upon itself to bring its ends alongside each other, means for securing said brushing elements upon said core, a series of restraining plates engaging the wires intermediate their ends, said plates having holes through each of which is passed the two ends of a single wire, each plate receiving the wires of only a small segment of the brush.

2. A brush comprising a cylindrical bore, and having brushing elements each composed of a wire of flattened cross section bent upon itself to bring its two ends alongside each other, means for securing said brushing elements upon said core, wire restraining members having a series of holes therein, each of a size but little more than sufficient to receive the two ends of an individual wire and engaging the wires well inward from their outer ends, said wires being crossed or reversed in position where they pass through the said restraining member and held thereby in crossed relation.

3. A brush comprising a cylindrical core, brushing elements each composed of a wire of flattened cross section bent at its middle upon itself, means for securing the bent ends of the doubled wires in groups upon said core, plates having series of holes therein each of a size to receive the two ends of a single wire and occupying a position well inward from their outer ends and outward of their supporting means, said wires being crossed or reversed in position where they pass through said plates.

4. A brush comprising a shaft, bristles composed of looped wires, binding wires extending lengthwise the shaft and each through the looped ends of a group of the bristle wires, a series of bars, each extending through the loops of a group of the remainder of the bristle wires, and means for holding said bars in place between the groups of bristles of the other set.

5. A rotary brush comprising a central core, bristle wires, each bent upon itself to form a loop, means for securing one set of bristles in groups with their looped ends at the central core, and means for securing the remainder of the bristles in groups between the groups of the first named set and

with their looped ends somewhat outwardly of the central core.

6. A rotary brush comprising a central core, two sets of bristle wires bent upon themselves to form loops, a series of binding wires, each passing through the loops of a group of the wires of one set, means for securing said binding wires against and extending lengthwise the core, a series of bars each passing through the loops of a group of wires of the other set, said bars and their attached wires being alternated in position with the groups composing the other set and at a greater distance from the central core, and rings engaging said bars and holding them in position about the core.

7. A rotary brush comprising a central core, two sets of bristle wires bent upon themselves to form loops, a series of binding wires, each passing through the loops of a group of the wires of one set, means for securing said binding wires against and extending lengthwise the core, a series of bars each passing through the loops of a group of wires of the other set, said bars and their attached wires being alternated in position with the groups composing the other set and at a greater distance from the central core, and rings engaging said bars and holding them in position about the core, and perforated spacer plates located toward the outer ends of said wires through the holes of each of which plates a series of the bristle wires pass.

In testimony whereof I have hereunto affixed my signature this 7th day of January, 1914.

JOHN KINAN.

Witnesses:
H. L. REYNOLDS,
PENROSE L. MCELWAIN.

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