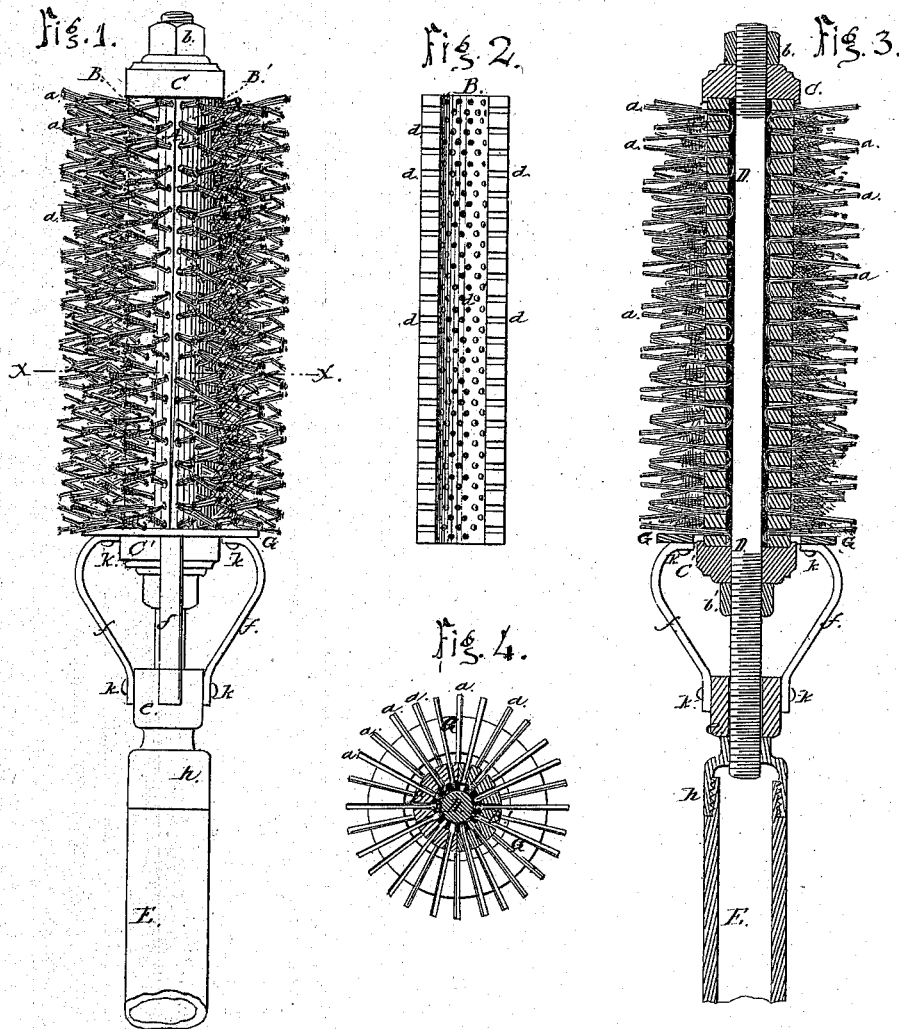


*B. M. Spencer,*

*File Brush.*

*No. 112045.*

*Patented Mar. 14, 1871.*



*Witnesses;*  
*Abraham Moore*  
*D. P. Lord*

*Inventor;*  
*Benjamin M. Spencer.*

# UNITED STATES PATENT OFFICE.

BENJAMIN M. SPENCER, OF NEWARK, NEW JERSEY.

## IMPROVEMENT IN BOILER-FLUE BRUSHES.

Specification forming part of Letters Patent No. **112,645**, dated March 14, 1871.

I, BENJAMIN M. SPENCER, of the city of Newark, county of Essex, and State of New Jersey, have invented certain Improvements in Boiler-Flue Brushes, of which the following is a specification:

My invention is intended to be used for removing rust or any incrustation from the tubes or flues of steam-boilers or steam-generators.

My device consists of a hollow metal cylinder, composed of two or more segments of cylinders, secured together by means of the head-pieces or caps, and clamped by nuts screwed onto a rod, which forms a complete screw-bolt.

The cylinder is drilled radially with small holes at intervals, suited to the size of the brush. Through these holes pass freely elastic metal bristles, to form with the above a cylindrical scraper and brush.

In my drawing I show the hub or cylinder in two semi-cylinders, which form I prefer, although it may be composed of more segments, if necessary or convenient in the manufacture of the brush.

I am aware that brushes have been constructed and used, for the purpose above stated, with metal bristles, secured in cylinders of wood incased in sheet metal, as a protection from the heat encountered in the practical operation of cleaning flues or tubes.

In the accompanying drawing, Figure 1 is an elevation of the brush complete. Fig. 2 is an elevation of one of the semi-cylinders. Fig. 3 is a longitudinal section of the brush on line  $x'x'$ . Fig. 4 is a transverse section on line  $xx$ .

Similar letters of reference are used in corresponding parts.

A is the hub or cylinder, composed of two parts, B B'. This cylinder is drilled or pierced at regular intervals with holes  $d$ , through which pass freely metallic strips or wires  $a$ , made of steel, tempered in such a manner as to admit of their being bent double, and having a toughness combined with elasticity sufficient to enable them to resist any obstruction met with without snapping.

The holes  $d$ , to receive the bristles  $a$ , are made rather larger than is necessary to receive them, in order to give play to the bristles, and allow them to receive full benefit from the elastic properties of the metal.

D is the rod of iron which forms a core for the cylinder or hub, and, as it has a bearing against the bight or bend of the bristles, serves to keep them in their proper places, and gives solidity to the hub or cylinder.

The cylinder A has at either end head-pieces or caps C C', which fit closely over the ends of the cylinder or hub, and through which passes the rod D.

The semi-cylinders are clamped by means of the nuts  $b b'$  and the screw-threads on the rod D, and form the hub or complete cylinder A.

The metal ring  $g$  serves as a backing to the bristles, and is attached to the collar  $e$  by means of the guard-rods  $f$  and rivets  $k$ , as seen in the drawing. The guard-rods  $f$  support the ring  $g$ , and when the brush is passed entirely through the flues or tubes and drops beyond, these guard-rods assist the operator in recovering the brush to the flues or tubes without damage to it.

The guard-rods which I use are not attached to the head of the brush, which, in this case, would be very difficult, but to a metal ring, which enables the party using the brush to remove the guards at will.

In the manufacture of brushes of various sizes of diameter, by dividing the cylinders, as I propose, there is great facility gained, as it would be quite impossible to construct brushes of these sizes with undivided wooden cylinders, for the reasons, first, it would be impossible to construct brushes of small sizes on account of the impossibility of filling them with metal bristles when the cylinders are undivided; and, further, wooden cylinders would not be sufficiently strong to accomplish the work required when filled with metal bristles.

The collar  $e$  may be screwed onto the rod D or not, as per choice.

At the extreme end of the rod D is fastened, by means of screw-threads, the coupling  $h$ , to which is attached the handle E.

Having thus described my invention, I proceed to give the manner of its construction.

I take the strips of steel or wire  $a$ , one or more, as may be necessary, bend them in form of a lady's hair-pin, or in a U shape.

Having the cylinder A separated in its parts B B', I thrust the strips or bristles  $a$  into the holes  $d$  from the concave side of the cylinder,

and allow the ends to be free from the convex side. I perform the same operation until all the holes in the semi-cylinders are filled—two holes in each case forming a set, as shown in the drawing. I now take the two semi-cylinders and bring them together to form the complete cylinder. The caps C C' are then placed over the ends of the cylinder.

The nut *b* being screwed onto the end of the rod D, the rod is forced through the cap C, cylinder or hub A, and cap C' until the nut *b* bears on the cap C'. The nut *b'* is then put in its place and screwed tightly, to clamp the semi-cylinders firmly together. I now place the collar *e*, with its guard-rods *f* and ring *g*, on the rod D, and screw on the coupling *h*. The handle I is then attached, and the brush or scraper is complete and ready for use.

What I claim as new, and desire to secure by Letters Patent, is—

1. The divided or segmental cylinder A, as shown and described.

2. In combination with segmental cylinder A, flanged disks or heads *c* and *c'*, whereby said cylinder-segments are held together, as and for the purpose shown and described.

3. In combination with segment-cylinder A and flanged heads C and C', the guard-ring G, by which the guards are secured independent of said heads, all constructed and arranged substantially as described.

BENJAMIN M. SPENCER.

Witnesses:

ABRAHAM MOORE,  
D. P. COWL.