

No. 710,344.

Patented Sept. 30, 1902.

H. K. SWINSCOE & E. J. McCARTY.

FLUE SCRAPER.

(Application filed Oct. 11, 1901.)

2 Sheets—Sheet 1.

(No Model.)

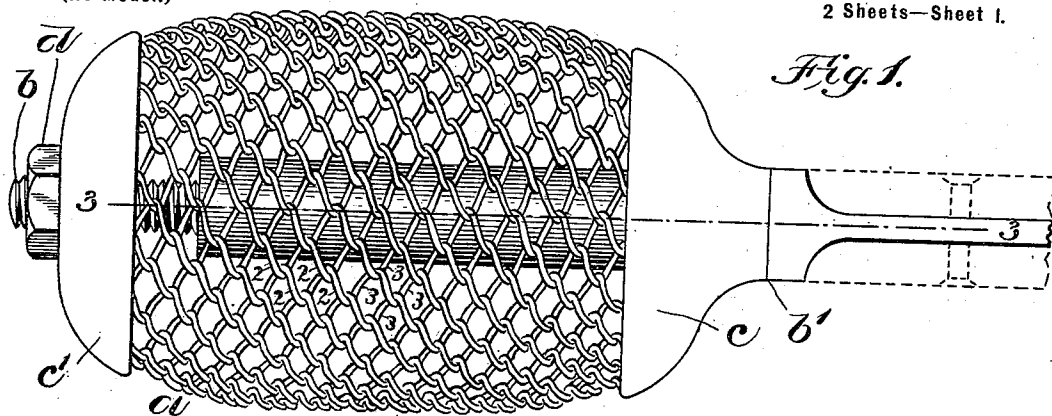


Fig. 2.

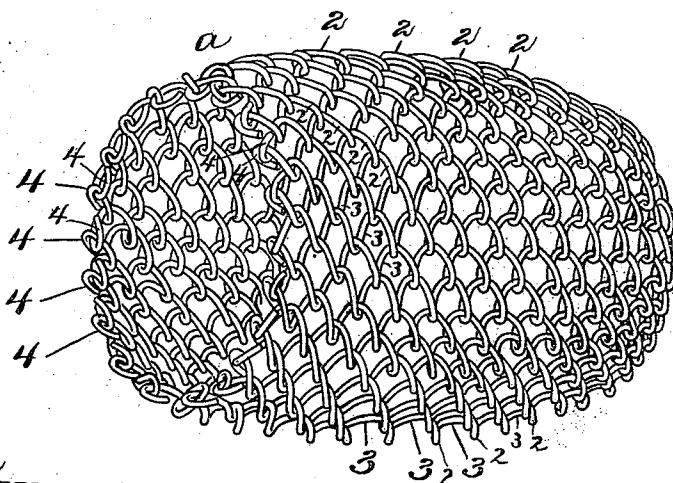
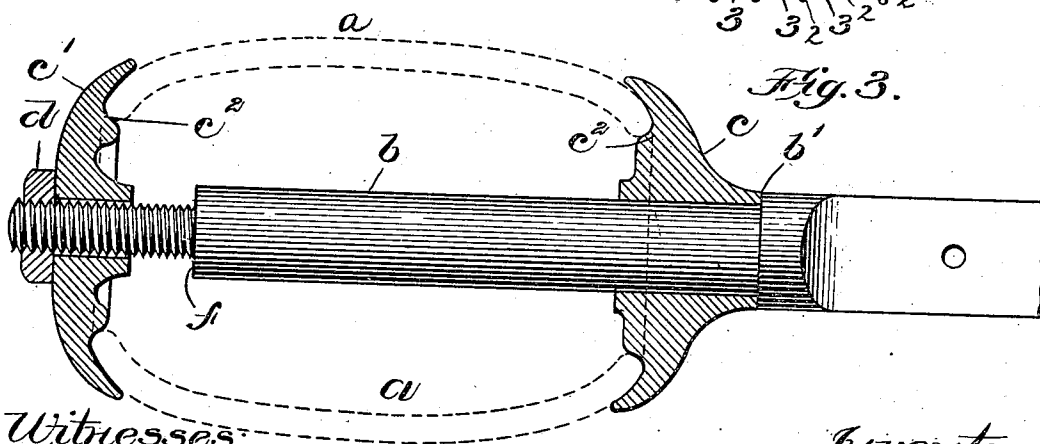


Fig. 3.



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Fig. 4.

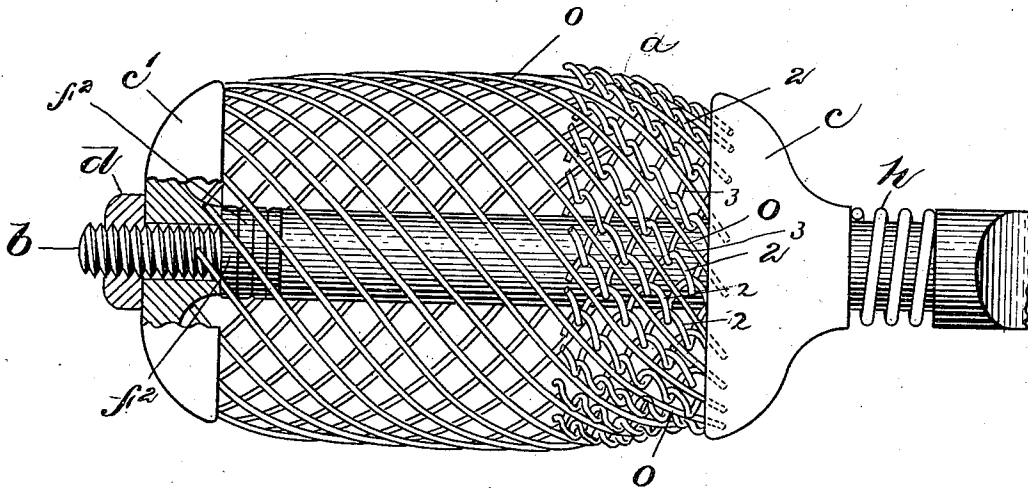


Fig. 5.

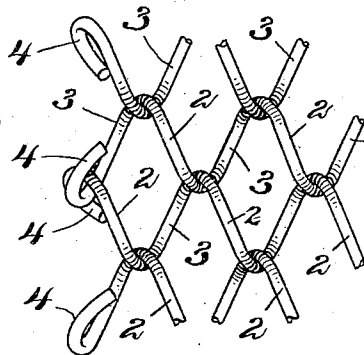


Fig. 2.

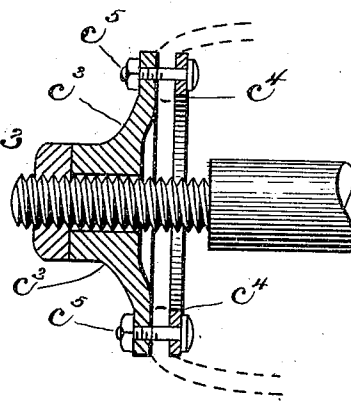
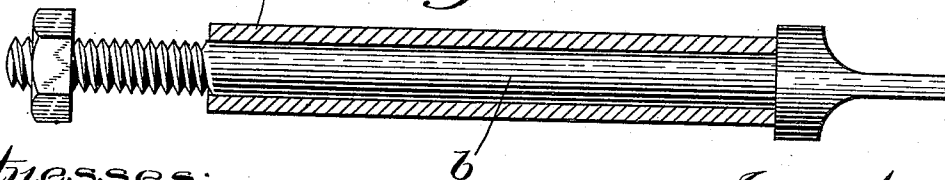


Fig. 6.



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UNITED STATES PATENT OFFICE.

HENRY K. SWINSCOE AND EUGENE J. McCARTY, OF CLINTON,
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FLUE-SCRAPER.

SPECIFICATION forming part of Letters Patent No. 710,344, dated September 30, 1902.

Application filed October 11, 1901. Serial No. 78,343. (No model.)

To all whom it may concern:

Be it known that we, HENRY K. SWINSCOE and EUGENE J. McCARTY, of Clinton, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Flue-Scrapers, of which the following is a specification.

This invention has for its object to provide a durable and effective scraper for boiler-flues, &c., adapted to conform accurately to the internal surface of a flue and to act on all parts of said surface.

The invention consists in the improvements which we will now proceed to describe and claim.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a side elevation of a flue-scraper embodying our invention. Fig. 2 represents a perspective view of the woven-wire tube which constitutes the working member of the scraper. Fig. 3 represents a section on line 3 3 of Fig. 1, the woven-wire tube being shown conventionally. Fig. 4 represents a side elevation showing one of the tube-holding heads yieldingly supported. Fig. 5 represents an enlarged view of a portion of the woven-wire tube. Fig. 6 represents a modification. Fig. 7 represents another modification.

The same reference characters indicate the same parts in all the figures.

In the drawings, *a* represents a tube of flexible expandible woven-wire fabric which constitutes the working member of our improved scraper and has open ends. Said tube is preferably composed of helical wire strands extending lengthwise of the tube, their convolutions being interlocked, as shown in Fig. 5, and arranged so that when the tube is subjected to longitudinal compression the outer portions 2 of said convolutions collectively constitute resilient helical ribs or ridges which are practically continuous and constitute the scraping-surfaces of the tube, said outer portions being preferably somewhat flattened, so that the radius of each is practically the radius of the tube. The inner portions 3 of the convolutions extend across the helical depressions between the

said helical grooves. The ends of the said wire strands are provided with eyes or loops 4 4, which are interlocked and form selvages at the ends of the tube.

The woven-wire tube *a* is held and controlled by a holder which, as here shown, comprises a rod or bar *b* and two opposed heads *c c'*, mounted thereon, said heads detachably engaging the ends of the tube to support it and impart relative rigidity thereto, or, in other words, to make the convolutions of the tube resilient, said convolutions being normally limp and devoid of resilience. Each head has its inner side formed to engage one end of the tube *a*, an annular groove *c²* being preferably formed in the inner side of each head, as shown in Fig. 3, the inner side of said groove forming a shoulder or abutment which bears against an end of the tube *a*, so that when one head is moved toward the other the tube *a* is compressed longitudinally and the said helical ribs become resilient. The marginal portions of the heads *c c'* overlap the ends of the tube and prevent outward displacement thereof.

In Figs. 1 and 3 the head *c* is shown as rigidly backed by a shoulder *b'* on the rod *b*, while the head *c'* is backed by a nut *d*, engaged with the threaded outer portion of the rod. The head *c'* is adapted to slide on said threaded portion, so that by adjusting the nut *d* the distance between the heads *c* and *c'* may be increased or diminished. When said distance is diminished, the length of the tube *a* is decreased and its diameter is correspondingly increased, the tube being caused to bulge outwardly. When the distance between the heads is increased, the resilience of the wire fabric of the tube *a* causes said tube to elongate, its diameter being at the same time correspondingly decreased. Provision is thus made for adapting the scraper to flues of various sizes. To prevent an excessive enlargement of the diameter of the tube *a*, we provide a stop to limit the inward movement of the head *c'*. Said stop may be a shoulder *f*, formed on the rod *b*, as shown in Fig. 3, or it may be one end of a tube *f'*, placed on said rod, as shown in Fig. 6, or it may be otherwise formed. The stop may be

adjustable and may be composed of a plurality of washers f^2 , placed removably on the rod b , as shown in Fig. 4, the removal of one or more of said washers adjusting the stop.

5 In Fig. 4 we show the head c yieldingly backed by a spring h , interposed between the said head and a shoulder on the rod b , the head c being adapted to slide freely on the rod. Said spring forces the head c yieldingly
10 toward the head c' , and thus yieldingly maintains a minimum distance between the two heads and a maximum diameter of the tube, so that the tube is adapted to expand automatically to a limited extent and to conform
15 automatically to the diameter of the flue in which it is inserted. The tube a is preferably tapered or contracted at its end portions and has an approximately cylindrical portion of uniform diameter between said tapered
20 end portions, the tube having its greatest diameter between its ends, so that when longitudinally compressed it bulges outwardly between its ends and becomes resilient or relatively rigid. The cylindrical central portion
25 of the tube insures a sufficiently-elongated bearing of the tube on the flue.

It will be seen that the outer portions 2 of the wire convolutions constitute practically-continuous flexible helical scraping-ribs
30 adapted to act on all parts of the internal surface of a flue and that the inner portions 3 of said convolutions constitute connections between said scraping-ribs, holding the latter in their proper relative positions and permitting the free passage into and out of the
35 interior of the tube of the matter dislodged from the flue-surfaces by the scraping-ribs. The said scraping-ribs and their connections constitute a unitary flexible structure adapted
40 to be applied and removed as a whole, so that the ribs can be applied and removed easily and conveniently and are not liable to be displaced. It will also be seen that the resilience of the wire members of the described
45 woven-wire tube is such as to keep the ends of the tube closely pressed against the heads $c c'$ when said heads are separated by a space the length of which is less than the maximum length of the tube, so that any decrease in
50 the length of said space is accompanied by a corresponding increase in the diameter of the tube, and vice versa.

The woven-wire tube a may be supplied as an article of manufacture. The ease and convenience with which it can be applied and removed enable a worn-out tube to be readily replaced by a new one.

We do not limit ourselves to the described structure of the woven-wire tube, as the wire
60 composing the tube may be interwoven in any other desired manner. The said wires may be square or rectangular in cross-section, if desired.

In Fig. 4 we show auxiliary scrapers o placed
65 in the helical depressions between the helical ribs formed by the portions 2 2 of the wire convolutions. Said auxiliary scrapers may

be flexible strips of wire or other suitable material; their ends being inserted under the portions of the heads $c c'$ which overlap the
70 ends of the tube a . The bar b is suitably extended to form an operating-handle.

The heads which engage the ends of the wire tube may have provisions for clamping the ends of the tube, as shown in Fig. 7. In
75 this figure, c^3 represents the outer head, the marginal portion of which is formed as a clamping member. c^4 represents a complementary clamping member, which is formed as a ring and is detachably secured to the head
80 c^3 by bolts c^5 . The end portions of the tube are clamped between the head c^3 and clamping-ring c^4 .

It is obvious that various other means may be employed for engaging the ends of the wire
85 tube without departing from the spirit of our invention.

The helical scraping edges formed by the outer portions or members 2 of the wire convolutions are, as above stated, practically continuous in the sense that each of said outer
90 portions or members bears against and is supported by the adjacent members, so that scraping edges of considerable strength are provided. The said scraping edges are corrugated, there being a recess or depression
95 between each outer portion or member 2 and the next. This serrated form improves the cleaning or scraping action, it being a fact that a serrated edge will scrape effectively
100 where a plain helical scraping edge, devoid of corrugations or recesses, would not be so effective, probably because each scraping part between two recesses takes an independent hold. The open interior of the tube
105 constitutes a receptacle for the matter removed by the scraping edges and enables such matter to be conveniently withdrawn from the flue.

The improved scraper is double-acting—
110 that is to say, it acts equally well in advancing and in retreating.

We claim—

1. A flue-scraper comprising an open-ended tube of flexible woven-wire fabric, and a
115 holder having heads detachably engaging the ends of said tube to support it and impart relative rigidity thereto.

2. A flue-scraper comprising an open-ended tube of flexible woven-wire fabric, and a
120 holder having heads detachably engaging the ends of said tube to support it and impart relative rigidity thereto, said heads being formed to overlap the end portions of the outer surface of the tube, and to furnish bearings or
125 abutments for the ends of the tube.

3. A flue-scraper comprising an open-ended tube of flexible woven-wire fabric, and a holder having heads detachably engaging the
130 ends of said tube to support it and impart relative rigidity thereto, and means for varying the distance between said heads to vary the diameter of the tube.

4. A flue-scraper comprising an open-end-

ed tube of flexible woven-wire fabric, and means for confining and holding the ends of said tube and imparting relative rigidity to it.

5 5. A flue-scraper comprising an open-ended tube of flexible, expansible woven-wire fabric, and a holder therefor having means for longitudinally compressing the tube to increase its diameter.

10 6. A flue-scraper comprising an open-ended tube of flexible, expansible woven-wire fabric, and a holder therefor having means for longitudinally compressing the tube to increase its diameter, and means for limiting the longitudinal compression of the tube.

15 7. A flue-scraper comprising an open-ended tube of flexible woven-wire fabric, the wire members of said tube being formed to present alternating helical ridges and depressions, a tube-holder having heads engaged with the
20 ends of said tube, said heads being formed to overlap the ends of the tube, and auxiliary helical scraping members contained in said helical depressions and extending at their ends under the overlapping portions of said
25 heads.

8. As an article of manufacture, a scraper member consisting essentially of a tube having its greatest diameter between its ends, said tube being composed of flexible woven-

wire fabric susceptible of presenting, under 30 longitudinal compression, a resilient outer surface.

9. As an article of manufacture, a tubular woven-wire scraper member composed of helical wires extending longitudinally of the tube, 35 and having their convolutions interlocked at their ends to form selvages, and at intermediate points to form helical scraping-ribs and open communications between said ribs, said tube being adapted to be made resilient by 40 longitudinal compression.

10. A flue-scraper having helical scraping edges, each composed of a series of wire members assembled and interlocked to form a corrugated scraping edge, and adapted to be 45 made resilient.

11. A flue-scraper having helical scraping edges, each adapted to be made resilient and composed of a series of interlocked wire members each bearing against and supported by 50 the adjacent member.

In testimony whereof we have affixed our signatures in presence of two witnesses.

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EUGENE J. McCARTY.

Witnesses:

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