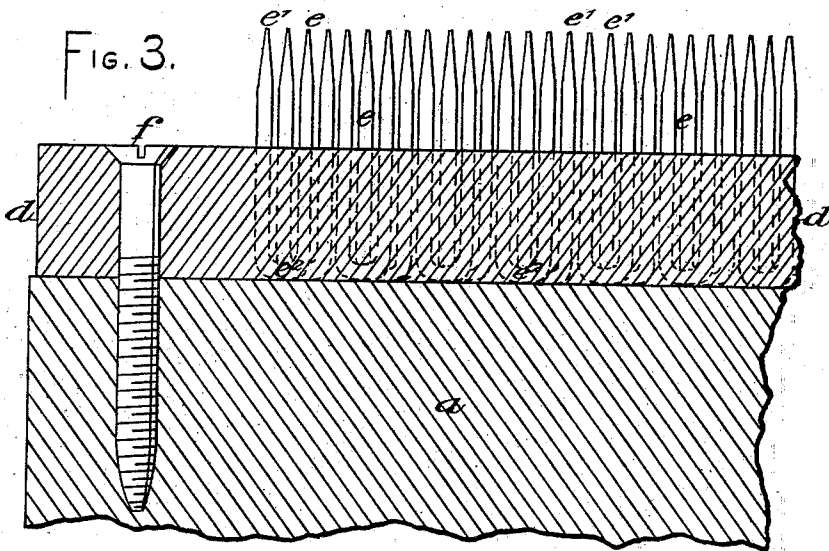
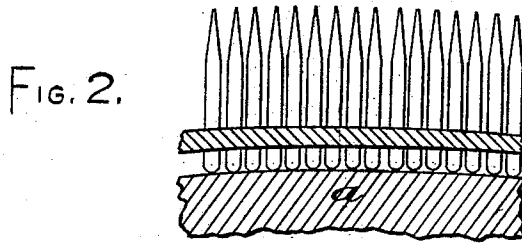
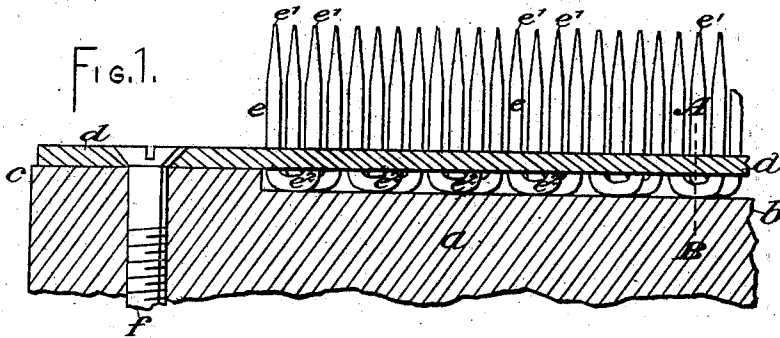


T. W. HARDING.  
Rag-Machine.

No. 217,100.

Patented July 1, 1879.



— WITNESSES: —

*E. B. Bolton*  
*Charles C. Stetson*

— INVENTOR: —

*T. W. Harding*  
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*J. L. Stetson*

# UNITED STATES PATENT OFFICE.

THOMAS W. HARDING, OF LEEDS, COUNTY OF YORK, GREAT BRITAIN.

## IMPROVEMENT IN RAG-MACHINES.

Specification forming part of Letters Patent No. 217,100, dated July 1, 1879; application filed May 8, 1879.

*To all whom it may concern:*

Be it known that I, THOMAS WALTER HARDING, of the Tower Works, Globe Road, Leeds, in the county of York, Kingdom of Great Britain and Ireland, hackle, gill, and pin manufacturer, have invented new and useful Improvements in Rag-Engines, of which the following is a specification.

My improvements in rag-engines relate to the steel-pin coverings of their cylinders. Such coverings have been made in various ways. One usual plan is to make the coverings in wooden segments or lags, into which are driven steel teeth, tapered by forging, and having their shanks square. In some cases teeth with a ground taper and made of round steel have been used; but they are liable to become loose, to fly out in working, and to turn round in the holes when, after the pins have become bent, it is attempted to straighten them, or if their action in working be reversed. It has been attempted to obviate these evils by the use of round pins or wires made with nail-heads, or having their roots slightly flattened.

Now, my invention has for its object to produce a steel-pin cover for rag-engine cylinders so constructed that the pins cannot either fly out or turn round, as aforesaid. For this purpose I cover the cylinder with a case, cover, or lagging of metal in segments, provided with pins ground or tapered at the ends, and made with round parts, bent or curved, as hereinafter described. The ground or tapered ends or prongs of these pins I pass through the thickness of said case, cover, lagging, or segments, so that said bends bear, rest, or bed against or between the surfaces of the cylinder-body and case, cover, lagging, or segments, as hereinafter described.

Referring to the accompanying drawings, Figure 1 shows, in section, part of a rag-engine cylinder with my invention applied to it; and Fig. 2 is a sectional view at right angles to Fig. 1.

The cylinder-body *a* is formed with an annular recess, *b*, or, in other words, is of larger diameter at its ends *c* than at its intermediate part, *b*.

*d* is an iron case or cover, in segments, surrounding the cylinder-body *a*.

*e e* are round steel pins, ground or tapered at both ends, *e<sup>1</sup> e<sup>1</sup>*, bent at *e<sup>2</sup>* into the form of staples, and driven through said iron case, cover, or segments *d*, so that the prongs project outwardly, as at *e<sup>1</sup> e<sup>1</sup>*, and the connecting portions or bends *e<sup>2</sup>* are jammed between the cylinder-body *a* and the metal case, cover, or segments *d*, which is, or are, fastened (it may be by screws *f*, as shown) to the cylinder-body *a*.

I do not, however, limit myself to the use of my improved pins with ground or tapered ends *e<sup>1</sup>* and round, curved, or bent parts *e<sup>2</sup>*, in combination with a metal case, cover, or segments, as they may be used in combination with a case or cover of wood, as shown in Fig. 3, where *a* is the cylinder-body; *d*, the case or cover, made of wood in segments, (as already practiced;) and *e e* are the round steel pins, ground or tapered at both ends, *e<sup>1</sup> e<sup>1</sup>*, bent at *e<sup>2</sup>* into the form of staples, and driven through said wooden case or cover *d*.

The bends *e<sup>2</sup>* are pressed or sunk into the wood *d* so as to be flush with the inner or back surface thereof; or the back of the segment or lag may be grooved to receive the bends *e<sup>2</sup>* of the pins.

It is to be remarked that the advantages of my invention may be to a considerable extent realized by the use of half-staples or pins with curved ends, or by cutting the staples in the line A B, or making them in the form of portions of staples, as shown, to the respective sides of said line A B, so as to produce a curved part, *e<sup>2</sup>*, which will bear, rest, or bed against the surfaces of or between the cylinder-body and the case, cover, or lagging, substantially as and for the purpose specified.

What I claim is—

1. As a new article of manufacture, a rag-engine-cylinder pin ground or tapered at the ends or end *e<sup>1</sup>*, and made with a round part, bent or curved, substantially as described, and shown at *e<sup>2</sup>*, for the purpose specified.

2. The combination, with a rag-engine-cylinder body, *a*, and a metallic or other case, cover, or lagging, *d*, of steel pins *e*, ground or

tapered at the ends or end  $e^1$ , and made with round parts, bent or curved, substantially as described, and shown at  $e^2$ , the whole constructed, combined, and arranged substantially in manner specified—that is to say, with the ground or tapered ends  $e^1$  of said pins protruding through said case, cover, or lagging  $d$ , and their round, bent, or curved parts  $e^2$  bearing, resting, or bedding against the

surfaces of or between the cylinder-body  $a$  and the case, cover, or lagging  $d$ , all substantially as hereinbefore explained and illustrated.

T. WALTER HARDING.

Witnesses:

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