F. A. HILL.
Harrow.

No. 198,512. Patented Dec. 25, 1877.

Fig. 1

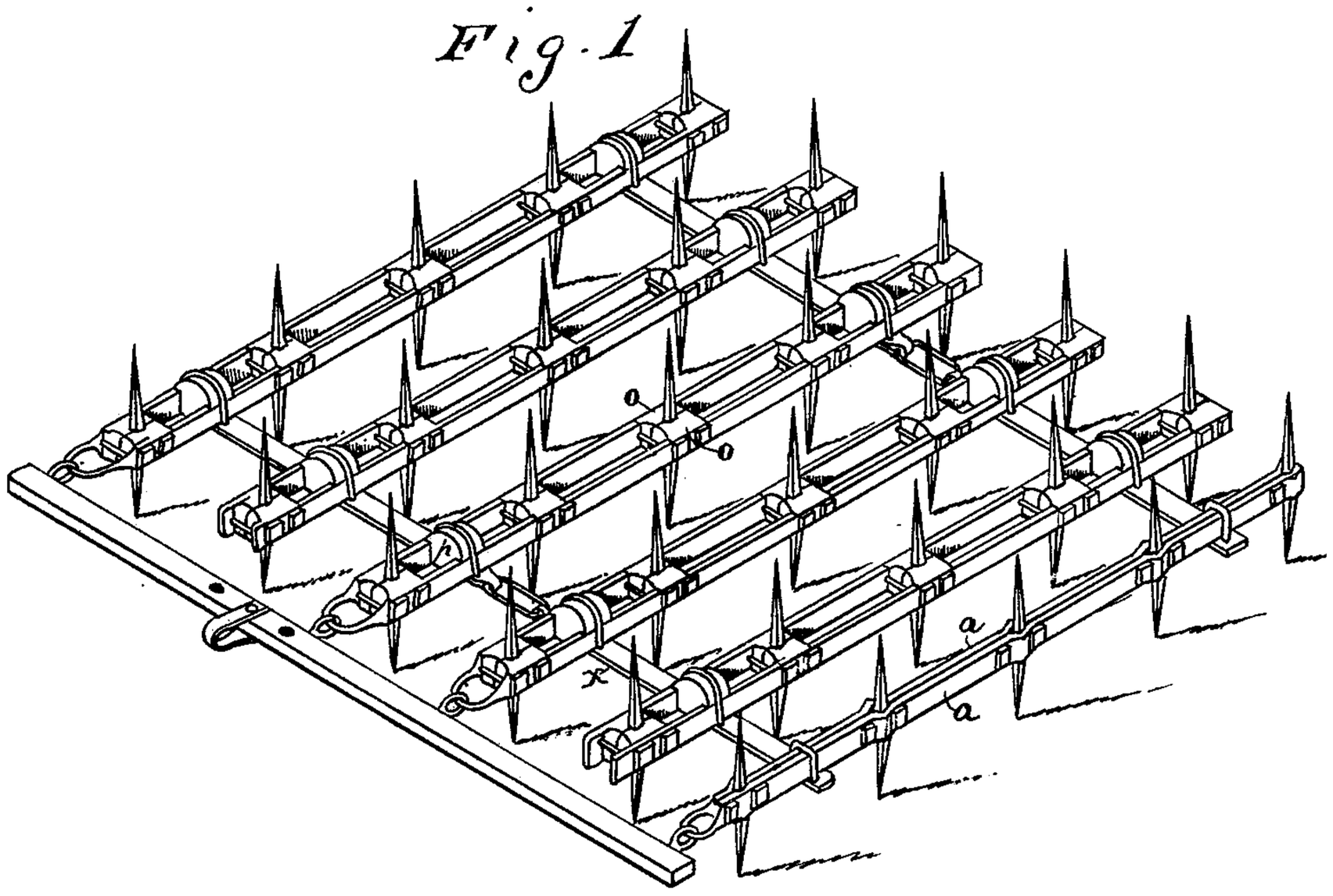


Fig. 3.

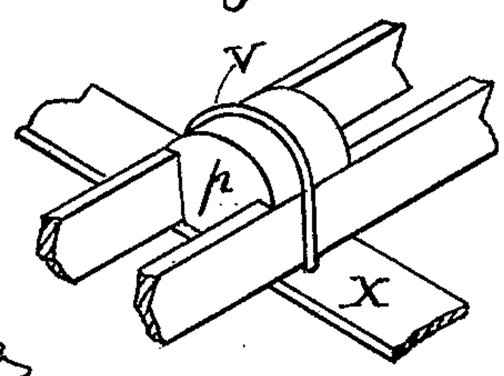


Fig. 2

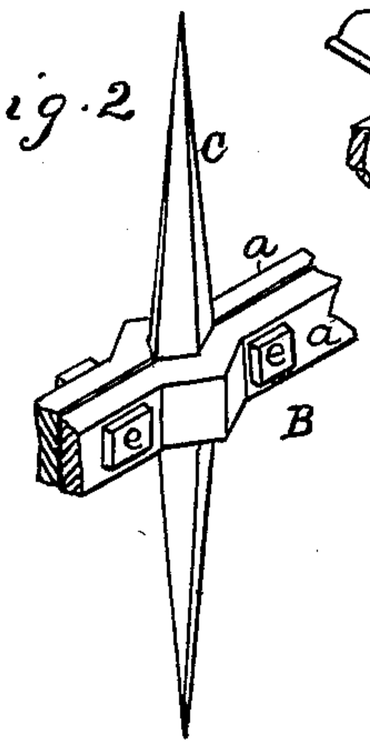
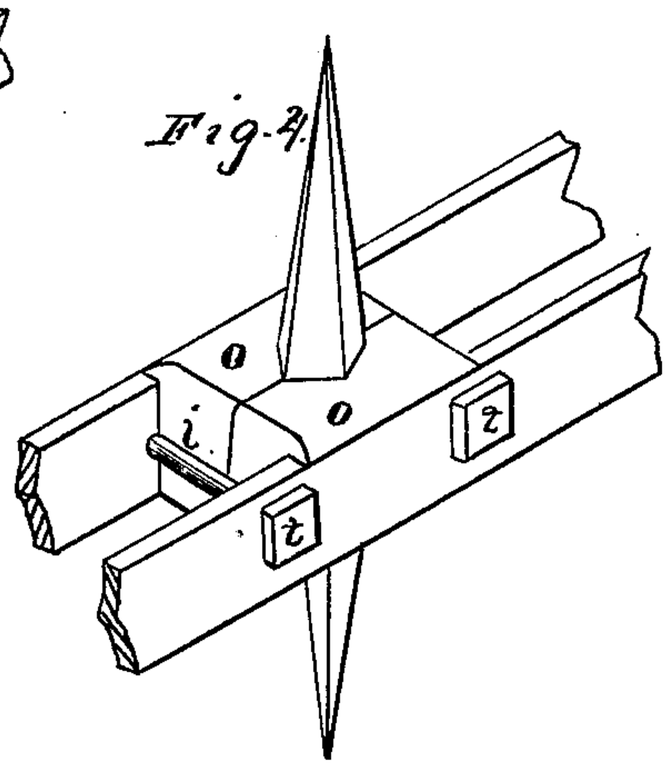


Fig. 4.



Witnesses
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Frank A. Brooks

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UNITED STATES PATENT OFFICE.

FRANK A. HILL, OF SAN LEANDRO, CALIFORNIA.

IMPROVEMENT IN HARROWS.

Specification forming part of Letters Patent No. **198,512,** dated December 25, 1877; application filed September 27, 1877.

To all whom it may concern:

Be it known that I, FRANK A. HILL, of the town of San Leandro, county of Alameda, and State of California, have invented an Improved Harrow; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings.

My invention relates to an improved metallic harrow; and the invention consists in the construction and combination of parts, all as hereinafter fully described.

Referring to the accompanying drawings, Figure 1 is a perspective view of my harrow. Figs. 2, 3, and 4 are details of the same.

To form each of the metallic rails of the harrow I employ two parallel metal strips, *a a*, which can either be fastened close together by means of rivets or bolts, as shown at B, or spaced by means of blocks, as hereinafter described, and bolted together on each side of or through the blocks.

When the metal strips are to be fastened close together, I make a crimp or bend in each strip at the point where each tooth is to be fastened, so that when the two strips are placed together the crimps or bends will come opposite each other.

In the recesses formed by these crimps I then place the teeth C, and clamp the two parts or strips firmly together by means of bolts *e e*, applied on each side of each tooth. This clamps the plates upon the teeth so that they are immovable. If the strips are to be spaced I employ two metal blocks, *o o*, to form each spacing-block. These two blocks should be of the same size, and the meeting face of each is provided with a vertical recess, corresponding to one side of the harrow-tooth employed. The opposite or outer end of each block is grooved, or otherwise fitted or secured, to one of the plates *a*.

The tooth having been placed in position between the blocks, I draw the plates together by bolts *i* and nuts *t*, as above specified, for fastening the united plates, thus clamping the blocks upon the teeth, and binding the plates against the blocks. To connect the rails thus formed into a harrow, I employ a solid spacing-block, *p*, near each end of each rail, the under side of which is flat, while the top is rounded. I then place a plate, X, against the under sides of these blocks, so as to connect all of the rails, and secure it by clips or straps V, which pass over the blocks and plates *a*, and through the plate X, on the under side of which their ends are secured by nuts. I usually make the teeth twice as long as an ordinary harrow-tooth, and secure them between the plates at about their middles, so that one half will project above and the other half below the harrow. When the teeth on one side become dull, the harrow can be turned over and the opposite side used. The teeth can be removed from the rails for sharpening, when desired, by loosening the nuts *t*, so as to release them.

By this arrangement I am able to make a light but strong metallic harrow, and at the same time avoid the difficulty heretofore experienced in retaining harrow-teeth in metallic harrows.

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

The compound harrow-rails *a a*, provided with the intervening rounded and recessed blocks *p*, in combination with the connecting-plate X and clips or straps V, substantially as and for the purpose described.

In witness whereof I have hereunto set my hand and seal.

FRANK A. HILL. [L. S.]

Witnesses:

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J. COLLINGRIDGE.