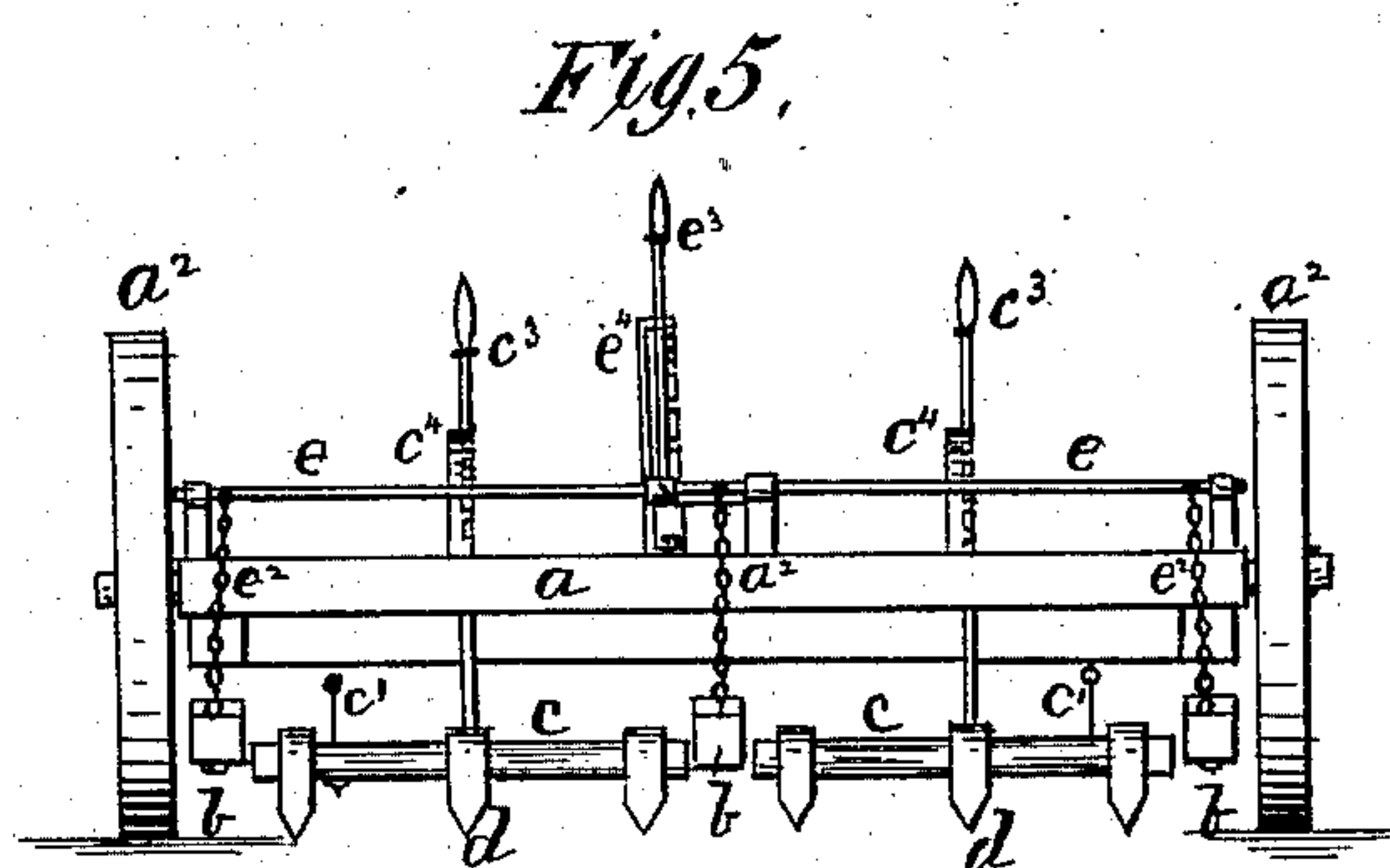
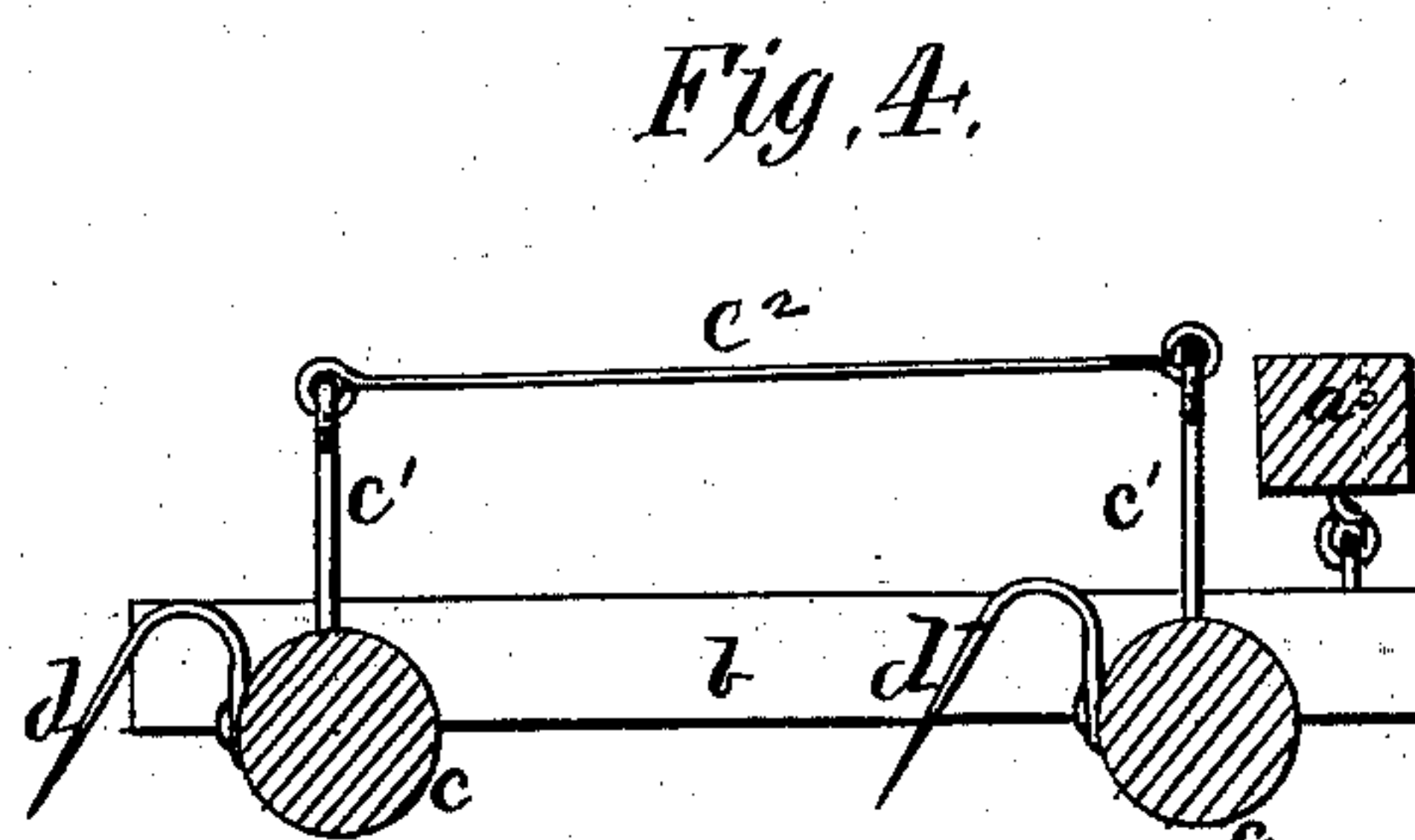
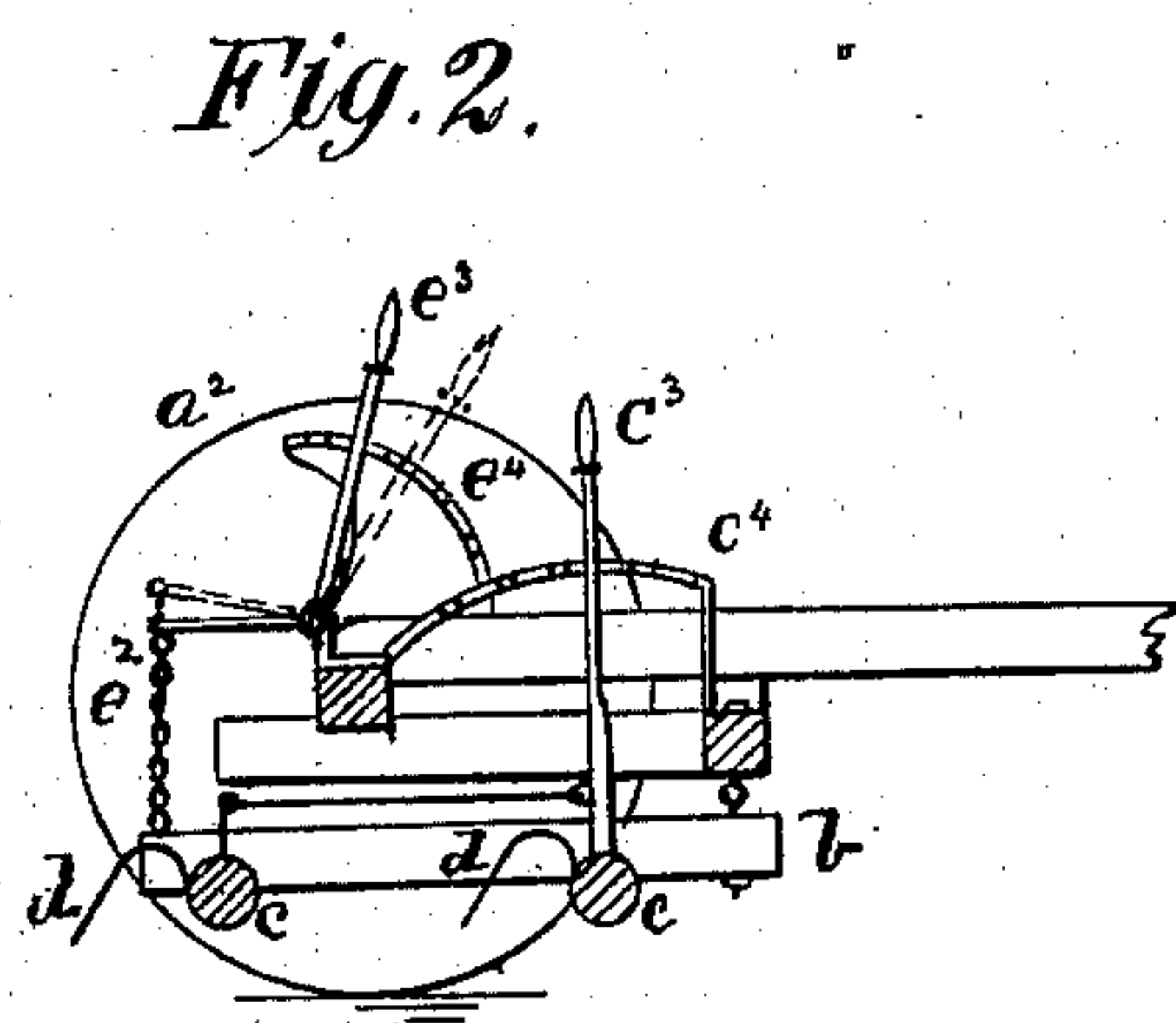
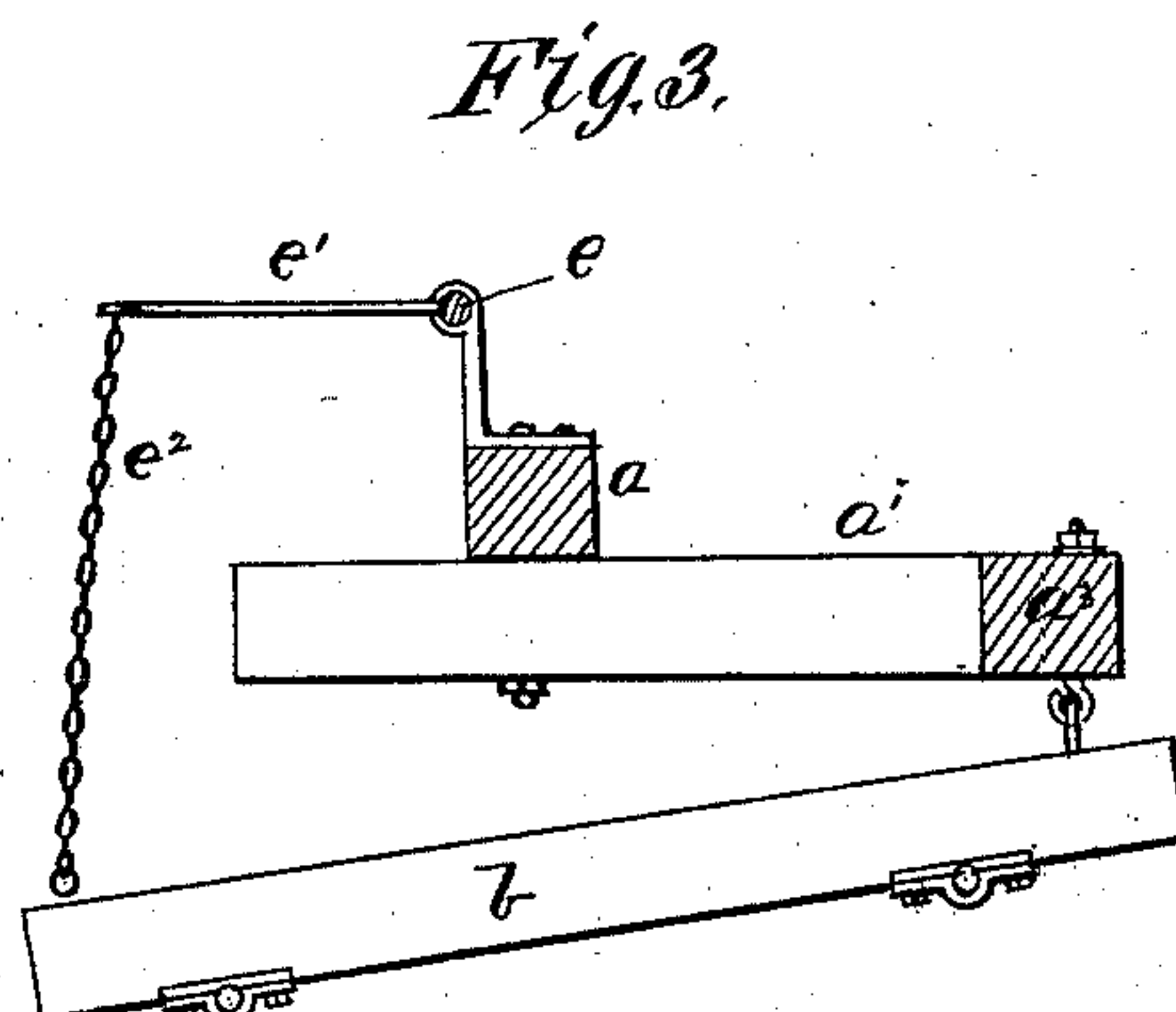
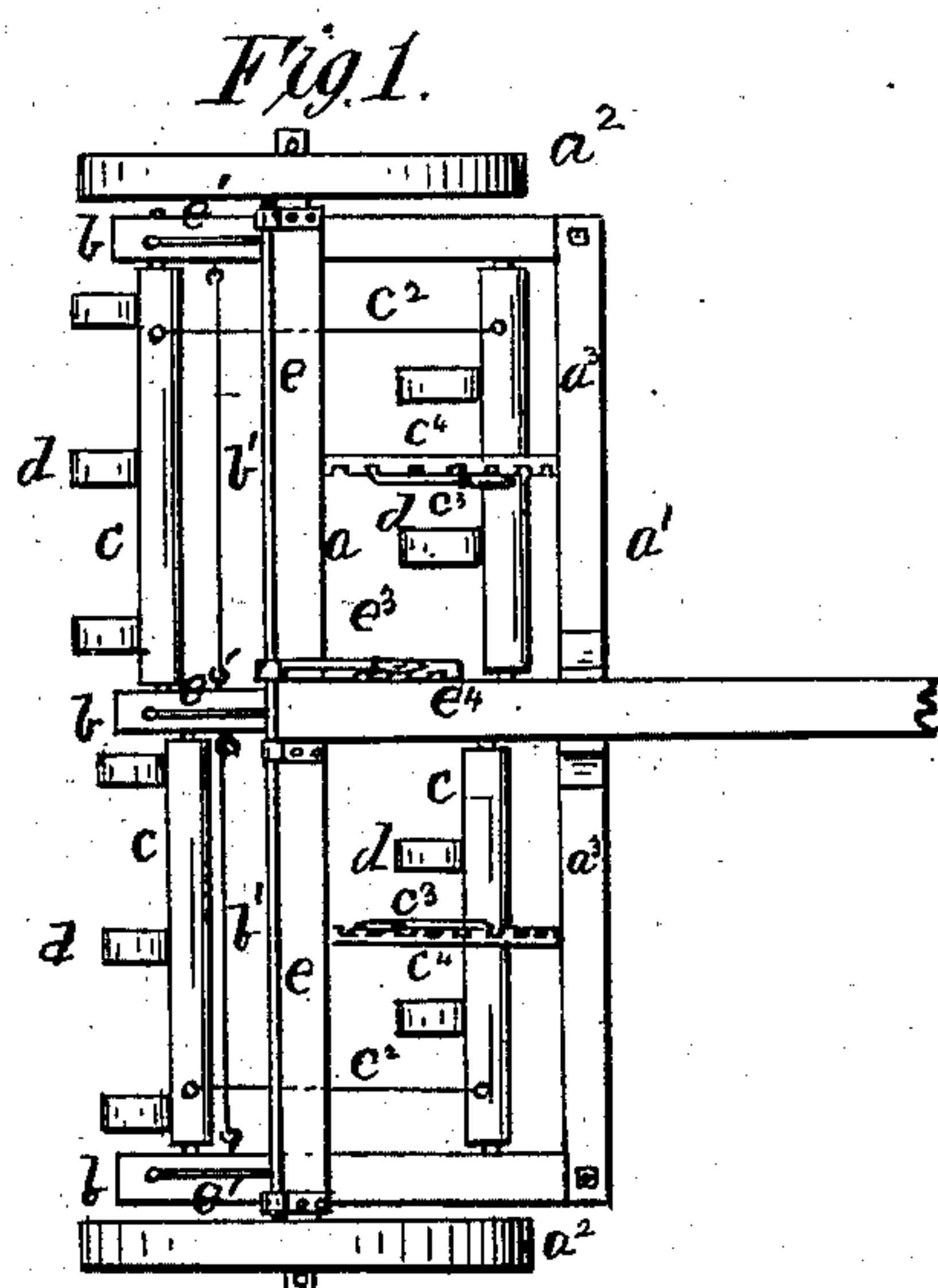


(No Model.)

J. P. BRADFORD.  
Harrow.

No. 239,712.

Patented April 5, 1881.



Witnesses:

Benj. B. Lurpin

Wm. Lacey

Inventor:

Joseph P. Bradford

By R. B. & A. Lacey, Attys.

# UNITED STATES PATENT OFFICE.

JOSEPH P. BRADFORD, OF MONROE, MICHIGAN.

## HARROW.

SPECIFICATION forming part of Letters Patent No. 239,712, dated April 5, 1881.

Application filed January 22, 1881. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH P. BRADFORD, a citizen of the United States, residing at Monroe, in the county of Monroe and State of Michigan, have invented certain new and useful Improvements in Harrows; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

This invention has for its object to furnish an improved sulky or wheel harrow; and it consists in the construction and arrangement hereinafter described, and pointed out in the claim.

In the drawings, Figure 1 is a plan; Fig. 2, a vertical longitudinal section. Figs. 3 and 4 are detail views, and Fig. 5 is an elevation of the rear of my harrow.

The axle *a* has affixed to it and extended in front of it a frame, *a'*, and it is supported by the wheels *a<sup>2</sup> a<sup>2</sup>*, as shown.

*b b b* are three bars, which have their forward ends pivoted to the front cross-bar, *a<sup>3</sup>*, of the frame *a'*, so that their rear ends will have a free vertical movement. These bars are arranged two at the ends and one at the center of the frame, and are made long enough to give the necessary depth to the harrow. The rear ends of the bars *b* are held together by rods *b' b'*, fixed loosely in eyebolts, as shown. Between the bars *b* there are fixed two or more rollers, *c c*, which are held loosely in their bearings, so that the bars *b* can rise or fall. The set of rollers arranged between any two given bars *b* are provided with short vertical arms *c'*, which are connected at their upper ends by a horizontal rod, *c<sup>2</sup>*, so connected that by it the simultaneous turning of the entire set of rollers can be effected. There is also connected to the front roller of each set a

hand-lever, *c<sup>3</sup>*, by which the set of rollers may be turned. The lever is held by a ratchet-bar, *c<sup>4</sup>*.

To the rollers *c* there are affixed the curved harrow-teeth *d*, so arranged that by turning the rollers *c* they may be set to cut any desired depth into the ground.

*e* is a shaft extended across above the harrow-sections, and held in suitable bearings fixed on the axle or frame of the sulky.

Projecting from the shaft *e* to the rear, and immediately over the bars *b*, are three short arms, *e'*, to the ends of which are fastened connecting-chains *e<sup>2</sup>*, which are fastened to the rear ends of the bars *b*, as shown. The shaft *e* is operated and controlled by a lever, *e<sup>3</sup>*, and ratchet-bar *e<sup>4</sup>*. The entire harrow is lifted by turning the shaft *e* forward, as indicated.

In running over the surface this harrow will have an undulatory motion by reason of the loose manner in which its parts are connected together.

The teeth can be set to cut deep into the earth or to just scrape the surface, and they may be set to incline forward or rearward, as may be desired.

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

In a sulky-harrow, the bars *b*, hinged at their forward ends to the frame *a'*, and held together at their rear ends by the rods *b'*, so that they have a free and independent vertical movement, and the sets of rollers *c*, provided with harrow-teeth and journaled loosely in the bars *b*, and connected together by rods *c<sup>2</sup>*, and controlled by a suitable lever, substantially as herein set forth.

In testimony whereof I affix my signature in presence of two witnesses.

J. P. BRADFORD.

Witnesses:

H. SHAW NOBLE,  
FRANK GRINOR.