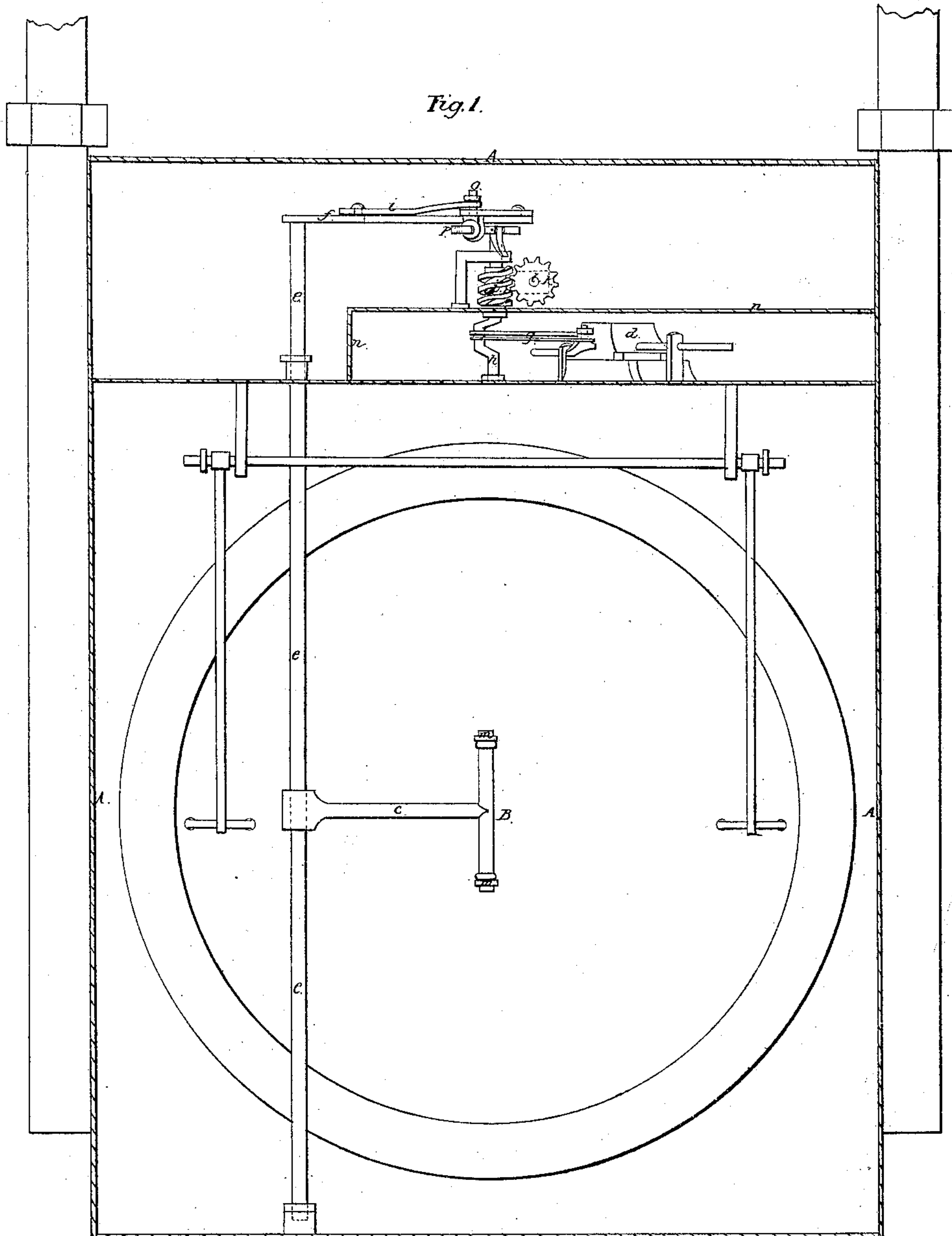


A. A. Croll,
Gas Meter.

No. 591.

Patented Feb. 22, 1853.



A.A. Croll,

Sheet 2 - 4 Sheets.

Gas Meter.

No 9,591.

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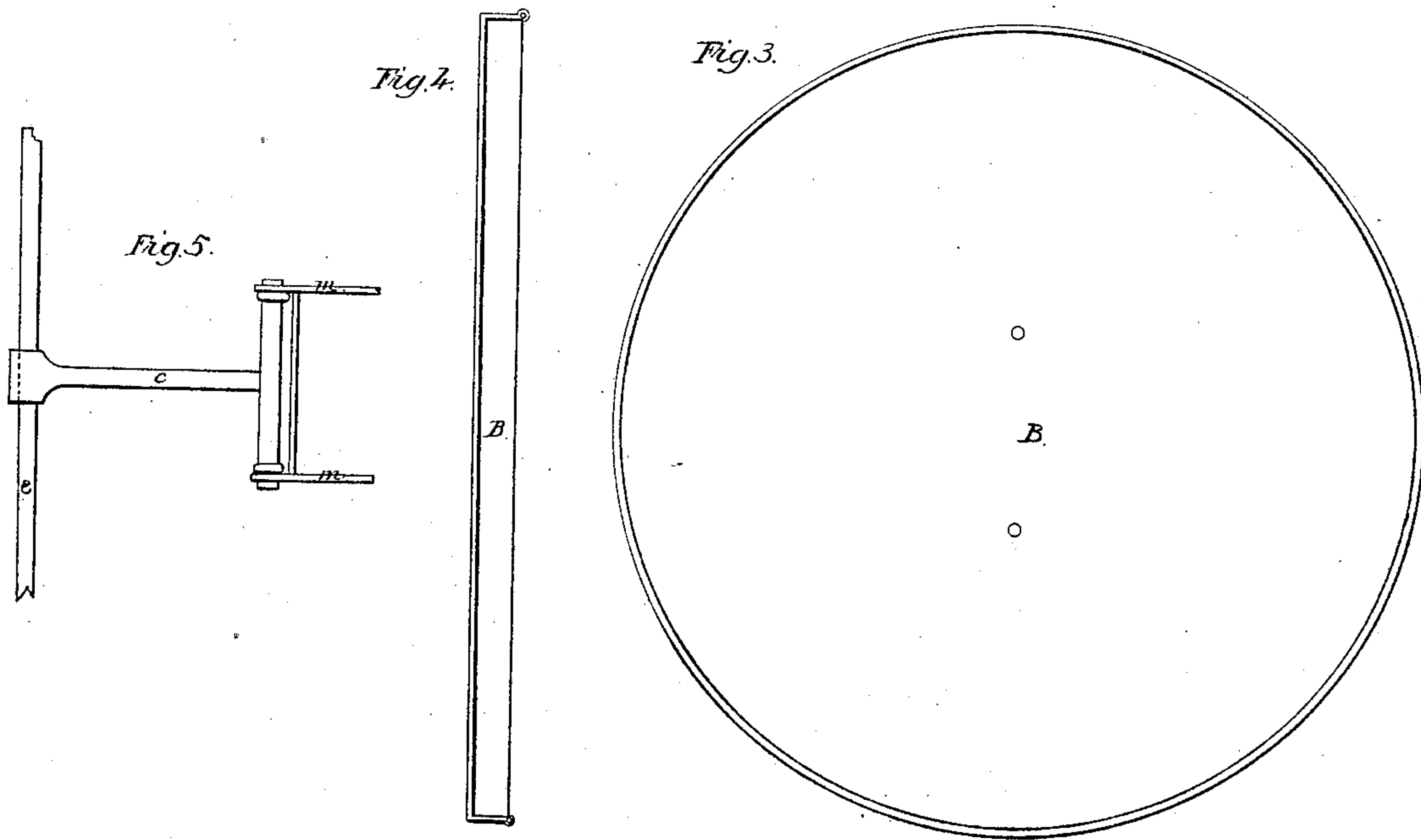
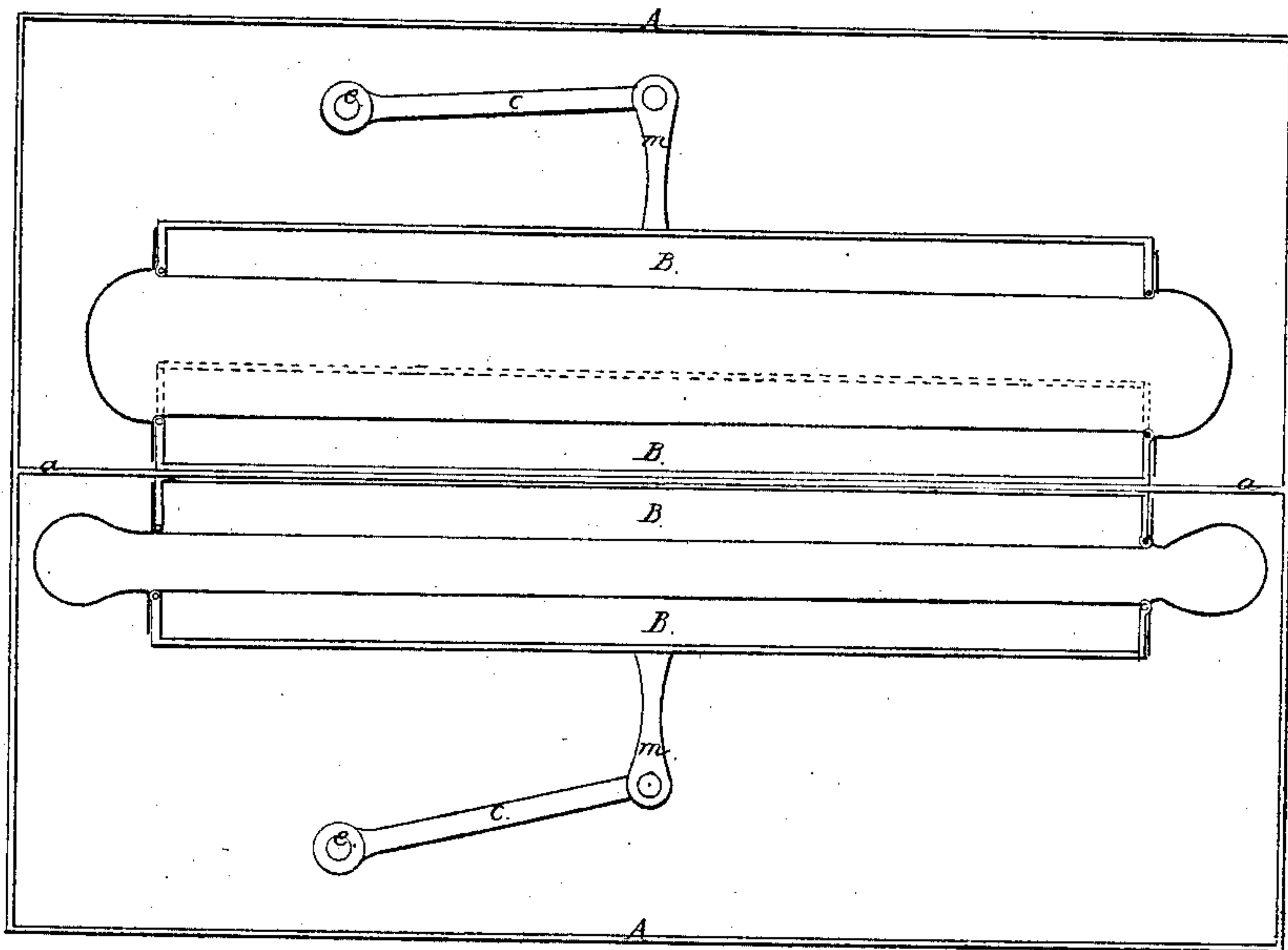


Fig. 2.



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Fig. 6.

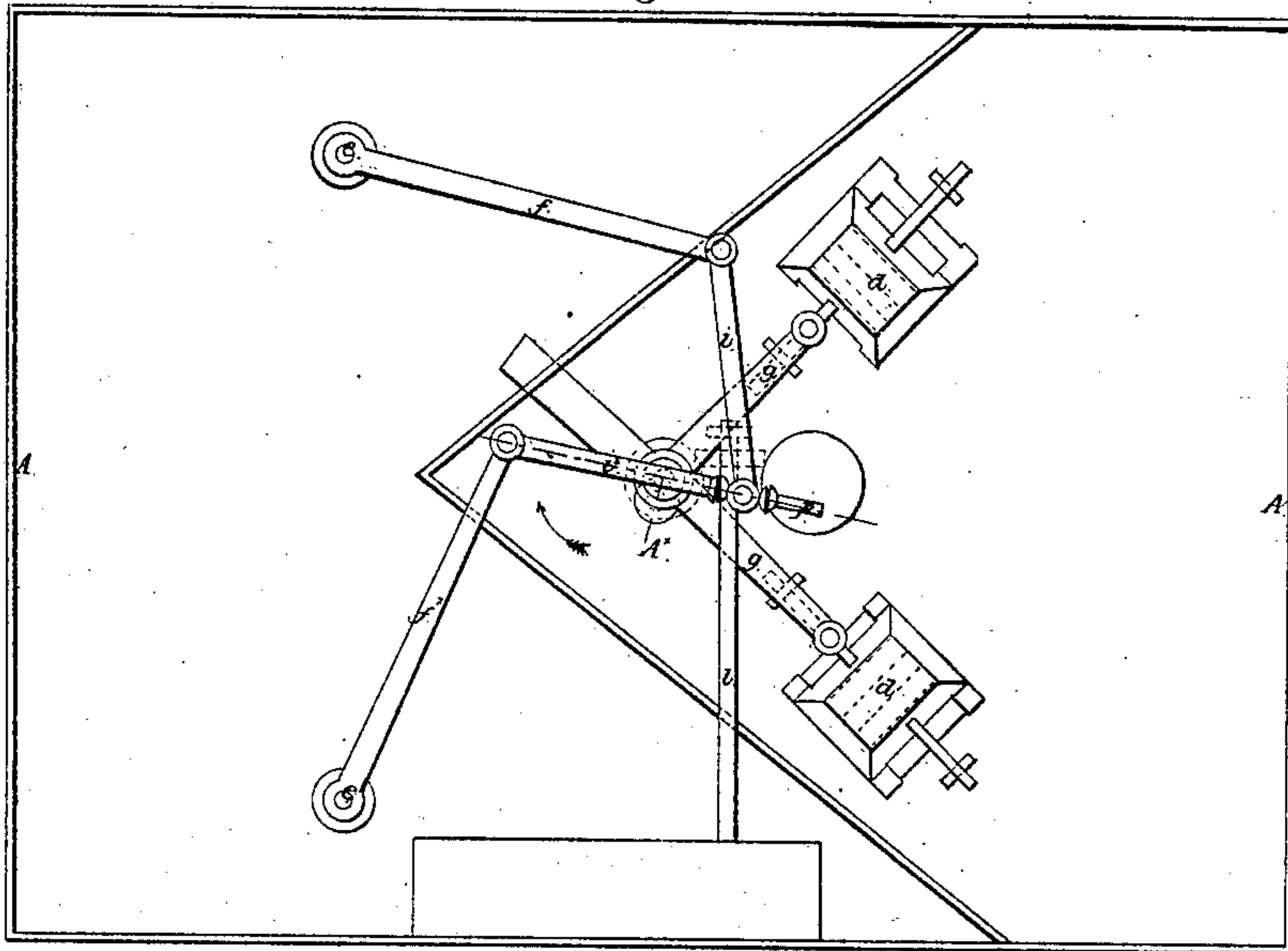
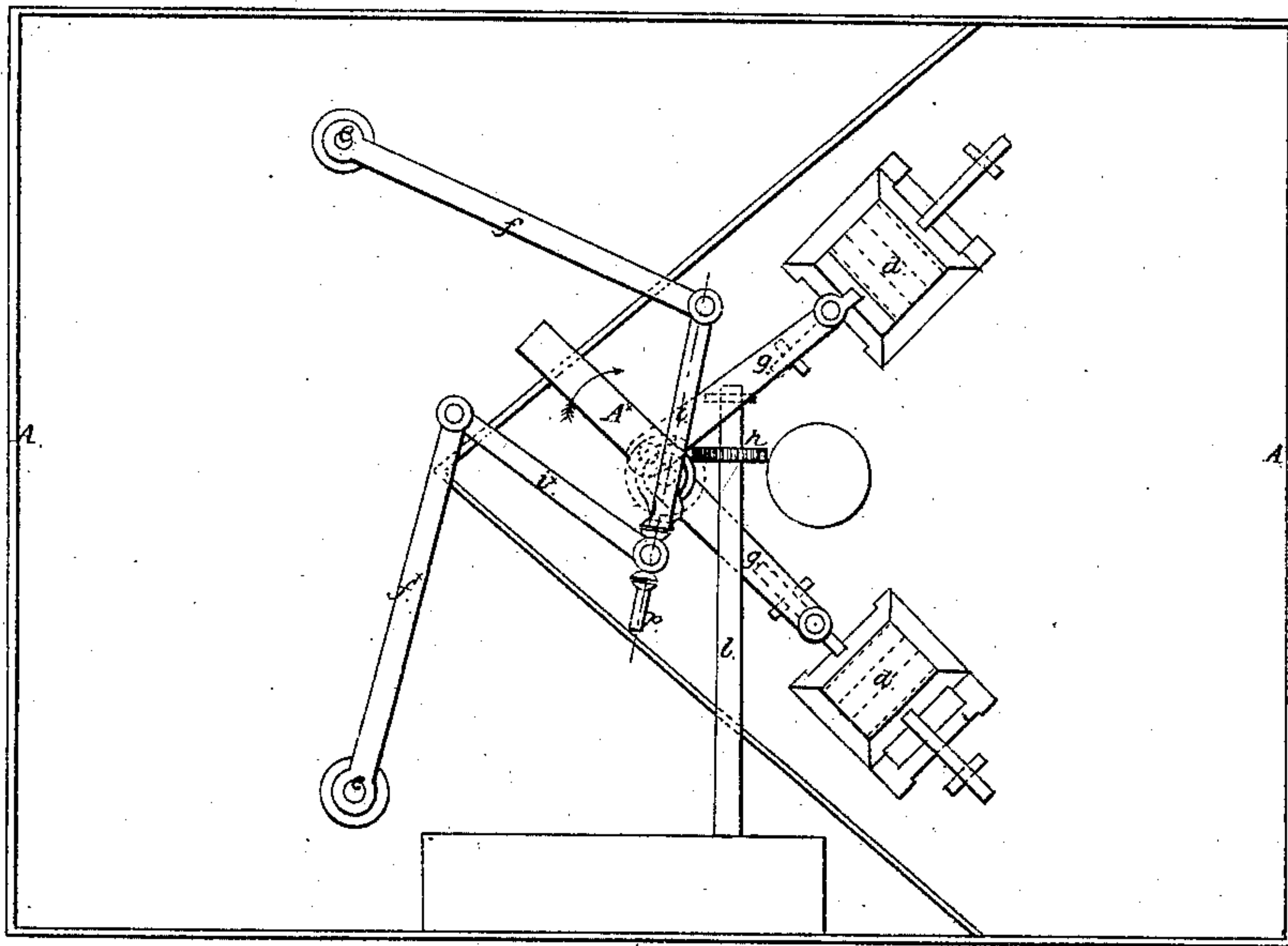


Fig. 7.

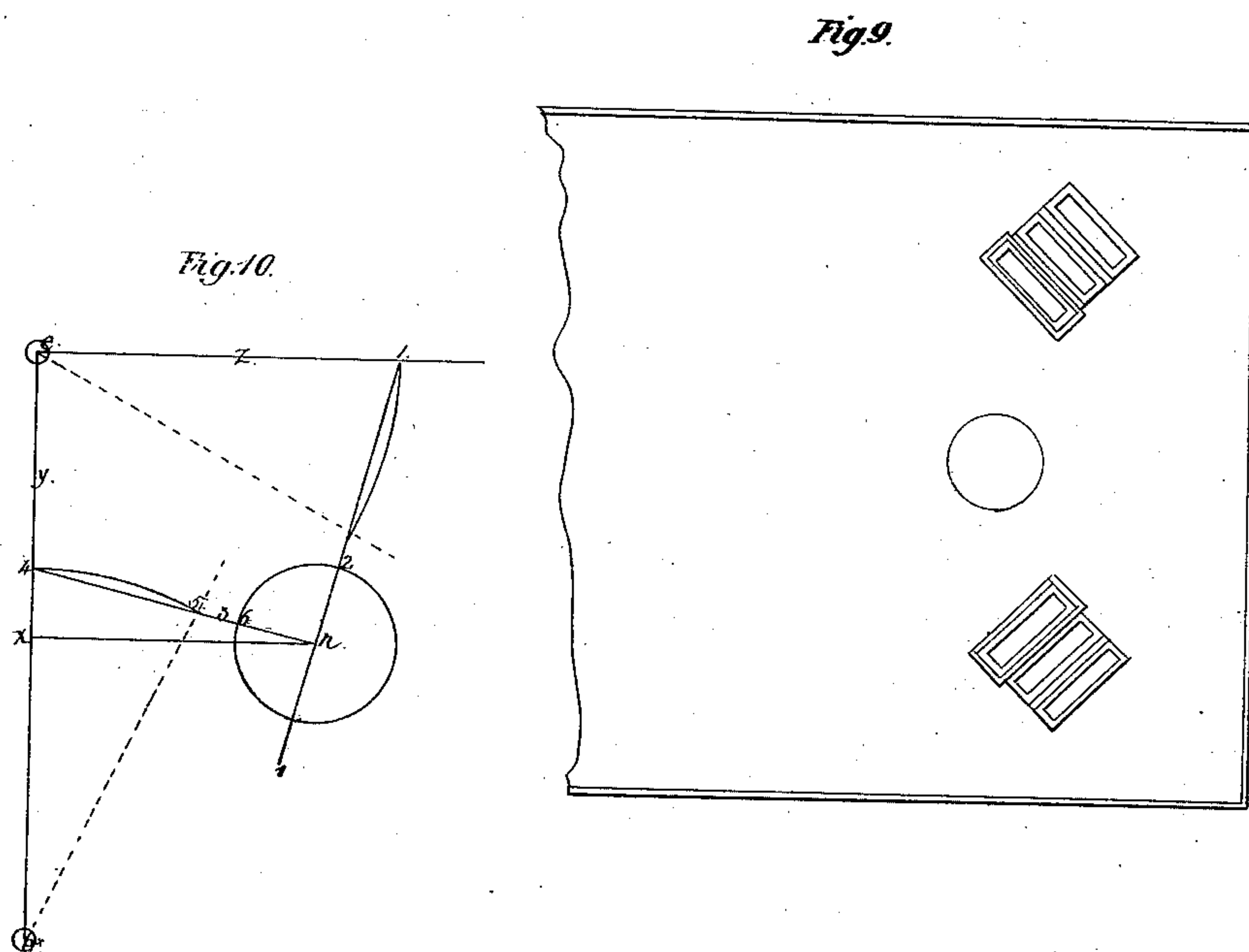
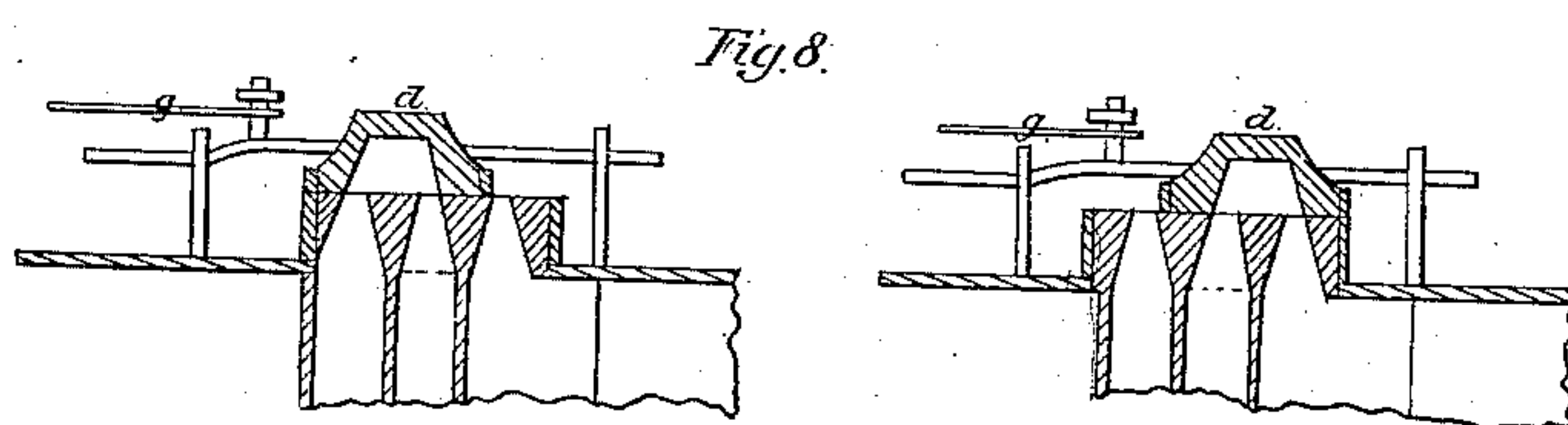


A. A. Croll

Gas Meter,

Nº 9.591.

Patented Feb. 22, 1853



UNITED STATES PATENT OFFICE.

ALEXANDER ANGUS CROLL, OF LONDON, ENGLAND.

IMPROVEMENT IN GAS-METERS.

Specification forming part of Letters Patent No. 9,591, dated February 22, 1853.

To all whom it may concern:

Be it known that I, ALEXANDER ANGUS CROLL, of the city of London, in the Kingdom of England, consulting gas engineer, have invented certain Improvements in Gas-Meters; and I do hereby declare that the following is a full and exact description, reference being had to the accompanying drawings.

The object of my improvements in gas-meters known as "dry gas-meters" is to prevent that flickering of the light, so commonly resulting from the use of this kind of meter, and the production of an accurately-registering apparatus which may be depended upon by consumers of gas.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation; and to this end I will describe the drawings annexed.

Figure 1, Sheet A, shows a vertical section of a gas-meter having two partitions moving on flexible connections; Fig. 2, a horizontal section thereof. Figs. 3 and 4 are a plan and edge view of the dished metal plate to which the flexible material employed is applied, and Fig. 5 shows the form of the arm affixed to the metal plates B B. Figs. 6 and 7, Sheet B, show two plans of the upper part of the meter, by which the arrangement of valves and parts working the same may readily be traced, the parts being shown in different positions. Fig. 8 shows two sections of the valves in their two positions. Fig. 9 shows a plan of the under side of the valve's seats; and Fig. 10 shows a diagram, in order to explain that part of my invention which relates to so arranging the arms and connecting-rods which give rotatory motion to the crank axis from the to-and-fro movement of the two moving partitions that no pulsation or difference shall be indicated in the burning of the gas, which pulsation and change or flickering of the lights have been so objectionable when using gas-meters with two moving partitions or flexible diaphragms.

A A A is the outer casing of the gas-meter, having two partitions, B B, with moving flexible edges, which, by means of the arms *c c* and parts hereinafter explained, give motion to the slide-valves *d d* and to the wheel-work for registering the quantity of gas which has passed through the meter.

On the axis *e e* of the arms *c c* are affixed arms *f f**—one to each axis *e e*—such arms being connected to the axis *h* by means of the connecting-rods *i i*, which are connected by pin-joints at one end to the arms *f f**, and to the crank-pins *o* of the crank *p*, affixed on the crank-axis *h*. The slides *d d* receive motion by means of connecting-rods *g g* on the crank in the axis *h*, there being a screw or worm, *j*, affixed on the axis *h*, which gives motion to the worm-wheel *k* on the axis *l*, such axis giving motion to the requisite train of wheels for registering the quantity of gas which has been transmitted through the meter. I have not thought it necessary to show the train of wheels for that purpose, as the same is well understood. The two partitions are placed and work in separate compartments of the meter, as is shown at *a*, Fig. 2. Thus the flexible partition divides each of the compartments into two parts, the valve being so arranged as alternately to admit the gas to and from either side of each flexible partition.

In making gas-meters with what are called "flexible" partitions, as heretofore constructed, it has been usual so to arrange the same that the partition should pass the point of its fixture on either side, by which the flexible material used has been liable to crack and become quickly injured. It therefore became desirable to avoid such crossing and bending of the flexible material first on one surface then on the other, and the object of part of my invention is to obtain accuracy in measuring gas in dry meters by employing as large a disk of metal and surrounded by as narrow a margin of flexible material as possible, and so arranging the flexible material used that it shall only be bent or folded in one direction, and this is accomplished by using a plate, B, which shall move to and from the point of junction of the flexible material used, and thus avoid passing, so as to fold the flexible material in the opposite direction.

The dotted lines in Fig. 2 show the range of the movement of the plates B, and the drawings show the parts so arranged that the flexible material can only be bent in one direction. The arms *c c* are attached to the plates B B by the short arms *m m*, projecting from the face of the plates B, in order to give motion to the valves and wheel-works for registering the gas.

Upon reference to the drawings it will be seen that that portion of the meter containing the valves and their connecting rods is inclosed by a partition, *n n*.

It is of great importance in constructing gas-meters with two movable partitions giving motion to two axes—such as *e e*—whatever may be the construction and arrangement of the partitions, that there should be an equality of delivery of the gas, so as not to produce a flickering of the light, and one part of my invention consists in forming the arms *f* and the connecting-rods *i*, by which motion is communicated to the axis working the valves and the train-wheels, according to the following rule, which will readily be understood by the diagram, Fig. 8, and the following observations thereon: The distance apart of the axes *e e*, receiving motion, being determined for any gas-meter, the mode of ascertaining the throw of the crank being determined, the mode of obtaining the lengths of the arms *f* and the connecting-rods *i* in order that they may be arranged and constructed according to this part of my invention, I proceed first to determine where the axis *h* shall be placed, and I prefer that it should be on a line, *x*, Fig. 10, raised perpendicular to the line *y*, drawn from *e e*, and that the center of the axis *h* should be at a distance from the line *y* equal to one-half the length of the line *y*—that is, equal to the line *x e*; but this distance of the axis *h* from the line *y* is not absolute, but preferable, as by such means the arms *f* and rods *i* become equal or nearly equal, describe a circle about *h* equal to the motion of the crank-pin *o*; then raise a line, *z*, on the line *y* from *e*; then, having marked on a straight-edge the diameter of the circle about the center *h*, place that straight-edge on the paper and move it so that the outer marked point may be retained on the line *z*, while the edge of the straight-edge rests against the point *h*, as is indicated by the line 1 1, till an arc of a circle the center of which is *e* is obtained on the line 1 1 equal to the diameter of

the circle about *h*, and the length of the line *e (1)* will be the length of the arm *f*, and the length of the line 1 to 2 will be the length of the connecting-rod *i*; and having thus obtained the length of the parts *f i* for the one axis, *e*, the length of the parts *f^{*}* and *i^{*}* is obtained as follows: Draw a line, 3, perpendicular to the line 1 1, and then upon that line place the edge of a straight-edge, upon which is marked the diameter of the circle about the axis *h*, (indicated by 4 and 5,) and move the same along the line 3 until an arc of a circle will be obtained from the axis *e^{*}*, which arc will intersect the points 4 5. Then the distance from the axis *e^{*}* to the point 4 will be the length of the arm *f^{*}*, and the distance from the point 4 to the point 6 will be the length of the connecting-rod *i^{*}*.

It should be stated I prefer that the crank on the axis *h*, which moves the rods *g g*, be so arranged that when the central line of a rod, *i^{*}*, is coincident with the line of the crank the valve *d* of that rod will not be quite closed, and the same state of circumstances will occur in respect to the other rod, *i*, and its valve, as is indicated by the red line *A^{*}* in Figs. 6 and 7, where the center of the crank moving the rods *g* is shown a little behind the red line *A^{*}*.

What I claim as my invention, and desire to secure by these Letters Patent, is—

1. The mode of arranging movable partitions or plates B so that the flexible material at the circumference of the plates B shall not be bent but in one direction, substantially as set forth in the specification and accompanying drawings.

2. The arrangement and combination of the arms *f f^{*}* and *i i^{*}* with the valves and movable plates B of a dry meter, as set forth.

A. ANGUS CROLL.

Witnesses:

JOSEPH MARQUETT,
CHARLES BARLOW.