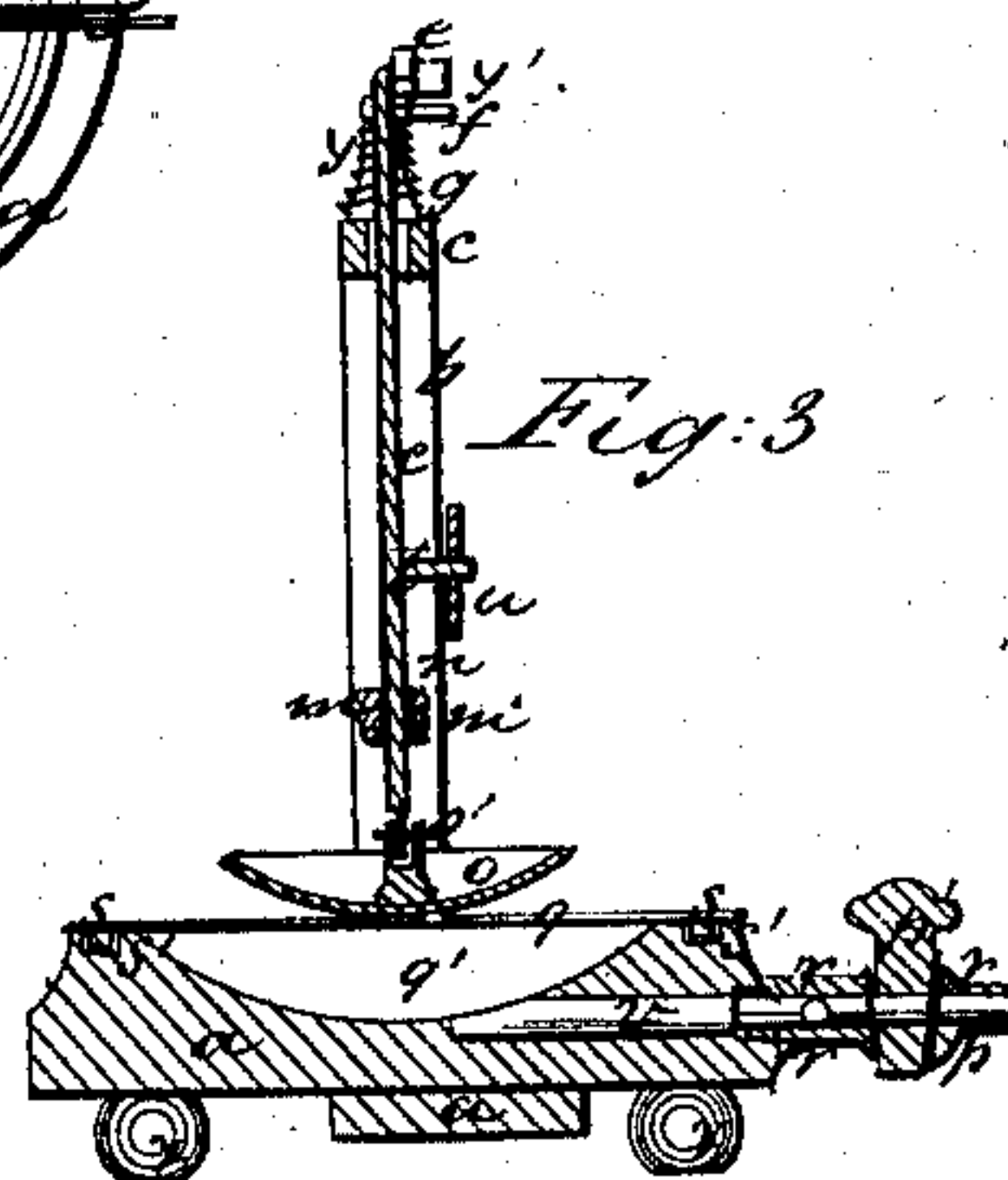
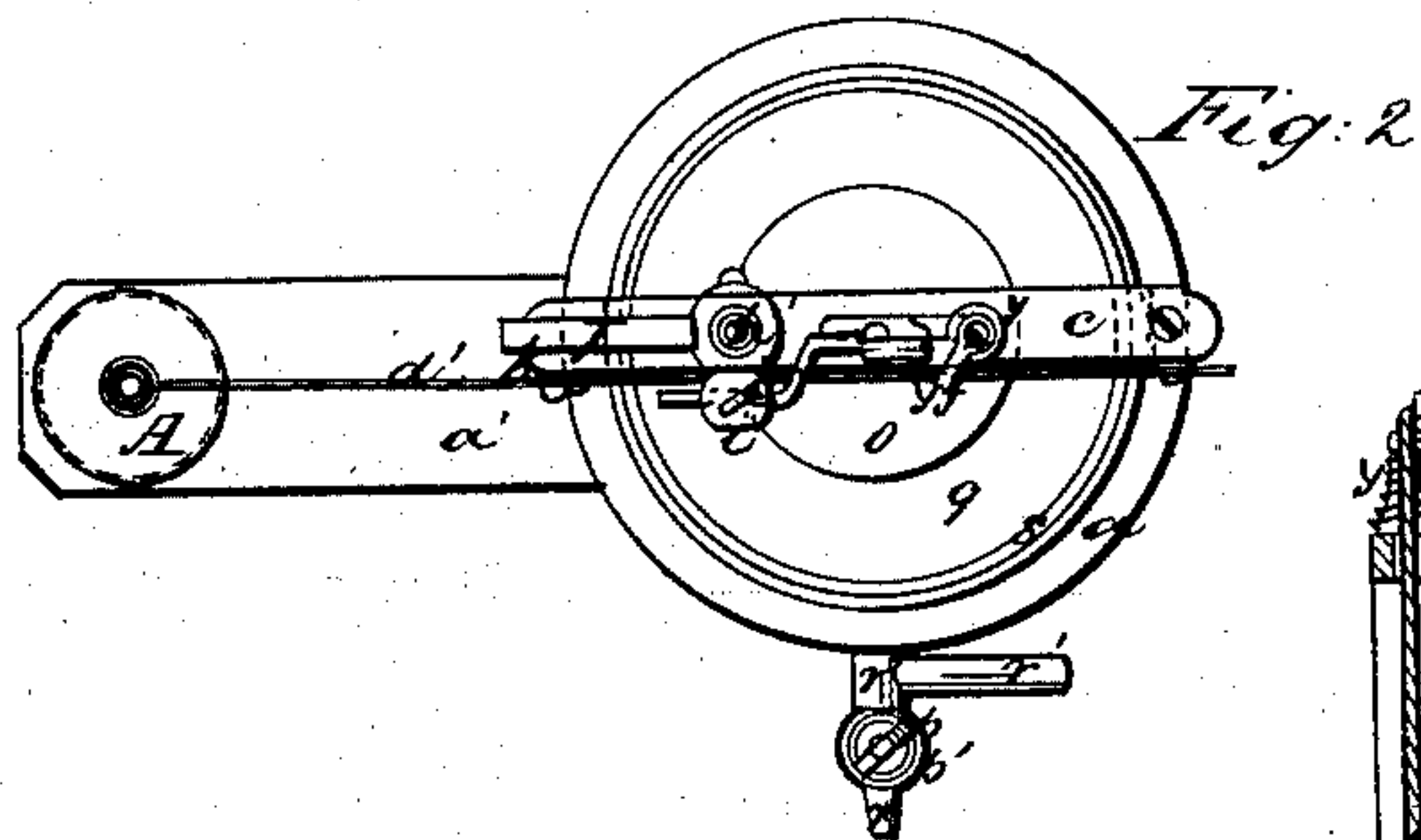
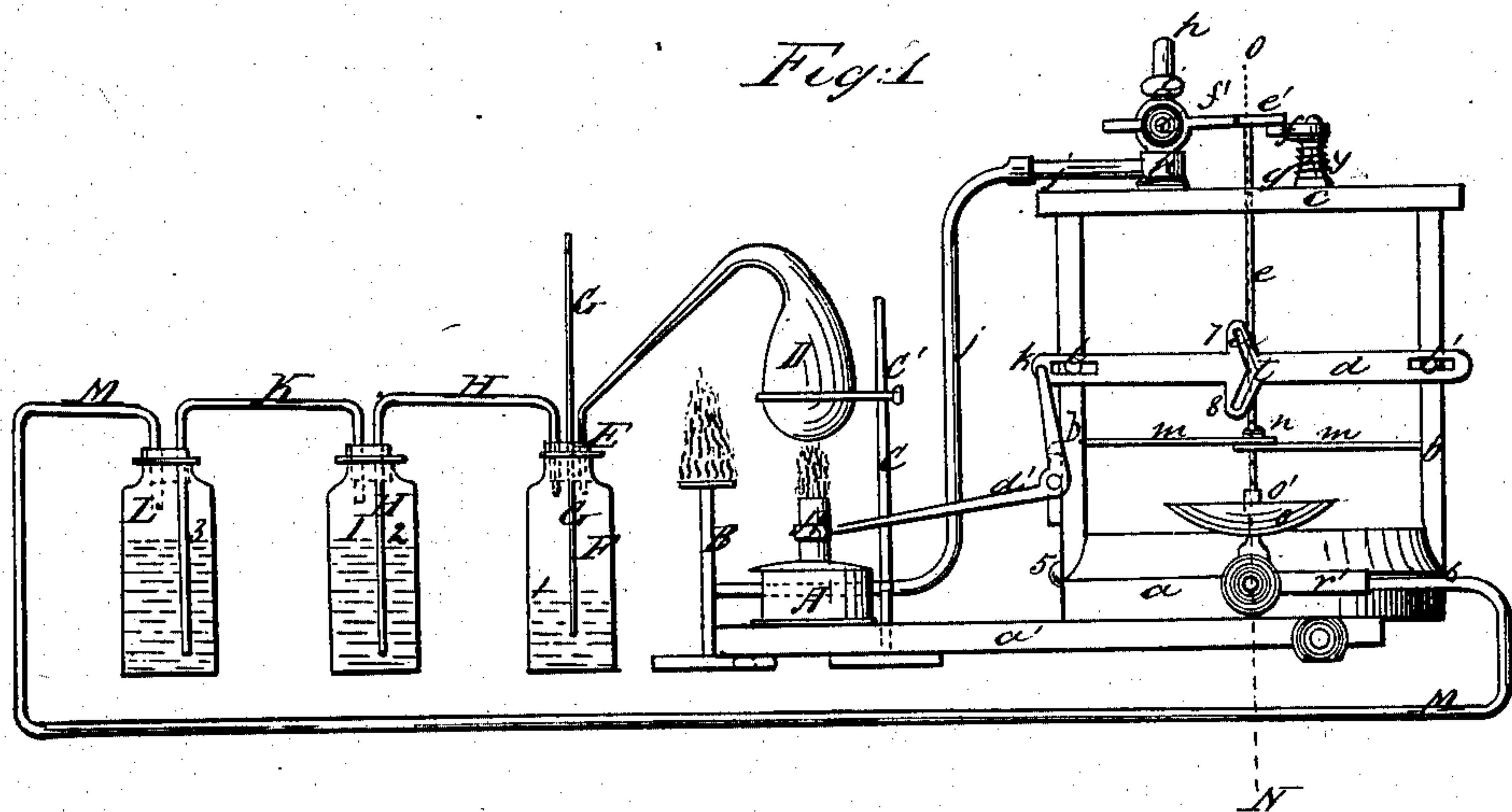


No. 67,907.

Patented Aug. 20, 1867.



Witnesses

F. Aquinas

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Inventor.

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United States Patent Office.

M. B. RENSLOW, OF SPRINGFIELD, MASSACHUSETTS, ASSIGNOR TO HIMSELF
AND FLAVIUS SEARLE, OF SAME PLACE.

Letters Patent No. 67,907, dated August 20, 1867.

IMPROVED APPARATUS FOR MAKING NITROUS OXIDE, &c.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, M. B. RENSLOW, of Springfield, in the county of Hampden, and Commonwealth of Massachusetts, have invented a new and useful Improvement in Apparatus for Making Nitrous Oxide and other Gases; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, and to the letters of reference marked thereon, in which—

Figure 1 represents the apparatus set up for use.

Figure 2 is a plan view of my improved apparatus.

Figure 3 is a vertical section through line N O of fig. 1.

The nature of my invention consists in arranging a receiver or receptacle for nitrous oxide or other gas, with a variable orifice or outlet for the gas from said receiver, so that as it is manufactured the heat employed to manufacture said gas shall be controlled or regulated by the flow of said gas through such orifice, either with or without the assistance of springs or weights.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and mode of operation.

In the drawings, *a* represents the receiver or receptacle for the gas, which may be of any desired form and of any desired capacity, a cylindrical form being perhaps the best adapted, practically, for use. To the sides of the receiver *a* are secured the pieces *b b'* in an upright position, to the top of which is secured the cross-bar *c*, connecting the two pieces *b b'* in a firm manner. The bar *d* is attached to the two pieces *b* and *b'* by means of the two screws *l l'*, passing through the slots near each end of the bar *d* in such manner that the bar *d* may move freely in the direction of its length upon the screws *l l'*. The middle of the bar *d* is made wider than the main portion, in which wide part is made the double inclined slot *u*, commencing near the top of said wide part at 7, and extending downward, at an inclination, to a point near the centre or middle of the bar *d*, whence it proceeds downwards, at a like inclination, in an opposite direction, to the point 8. At one end of the bar *d*, at *k*, is attached the bent lever *d'*, which is pivoted to the piece *b'* by the screw *k'*, the other end of the lever *d'* being attached to the sliding-tube *A'* of the lamp *A*. To the top of the receiver or receptacle *a* is secured the rubber or elastic material, which may be secured in any desirable and convenient manner, so it shall be air-tight at the joint, the following perhaps being the best way to secure it: The groove or channel *s'* is cut around the upper edge of the receiver *a*, and the rubber or elastic material is cut large enough to cover the receiver and channel *s'*. The bead *s*, which fits said channel *s'*, is then crowded down into the channel *s'*, carrying with it the elastic material *q*, and the bead *s* fits so tightly as to hold the elastic material firmly in place. Upon the top of this elastic substance *q* rests the plate *o*, which is attached at *o'* to the rod *e*, this rod *e* passing up through the guide *n*, (which is held firmly in place by the braces *m m'*), said rod *e* being attached at its upper end to the rod *f'* at *e'*. The rod *e* has attached to it the pin *t*, which passes through the double inclined slot *u* in the bar *d*. Secured to the cross-bar *c* is the pipe *h*, having the stop-cock *i*, said cock being operated by the lever *f'*, one end of which passes into the stop-cock *i*, and is secured in by the set-screw *i'*. The entrance pipe *h'* passes down into the pipe *h*, which communicates with the pipe *j*, which may, by means of any suitable pipe connection, communicate with the stand and burner *B*. The standard *g* is secured to the bar *c*, and to the top of the standard *g* is pivoted the piece *f*, which can be moved upon its pivot in a horizontal direction. In the receiver or receptacle *a* is made the aperture *v*, into which is secured the tube *r*, having the tube *r'* attached to it, and also the stop-cock *p'*. The piece *a'* is attached to the base of the receiver *a*, to which said piece *a'* is secured the lamp *A*, having a double tube, or single tube for a wick, over which is the sliding-tube *A'*, which can be moved in a vertical direction, and as it is moved upwards over the wick diminishes the flame. The jar *F* is made tight, and having the two connecting tubes *E H* extending but a short distance into the jar *F*, while the tube *G* extends down into the jar nearly to its bottom, and also upwards, to any height rendered necessary by the pressure of the gas passing through the jar *F* and wash-bottles *L I*.

Having thus described its construction, I will now proceed to describe its mode of operation. I have represented in the drawings the connecting pipe *j'*, with the gas-burner *B*, the retort *D*, its support *C*, the wash-bottles *L I*, and jar *F*, in order that the operation of the apparatus may be more fully understood. To put the apparatus into operation, the plate *o*, being sufficiently heavy in practice to depress the elastic material, is raised, and the piece *f* is turned horizontally, so that its end shall hold up the lever *f'* in a nearly horizontal position, or so that the flame shall give its maximum amount of heat under the retort *D*, and the stop-cock *p* is

set so as to allow the flow through it of the desired quantity of gas per hour. Nitrate of ammonia is placed in the retort D and the wick of the lamp A is lighted, and when a sufficient quantity of the gas is formed and flows through the outlet pipe *r* to cause the elastic material to rise, or to support the plate *o* and rod *e*, the piece *f* is turned to one side so that the lever *f'* is free to fall or move in a vertical direction, both above and below the piece *f*. As the apparatus is now set, a certain quantity of gas will be manufactured per hour, say twenty gallons, and the weight of the plate *o* remaining the same, the size of the orifice in the stop-cock *p'* controls the apparatus, so that no more than that quantity will be manufactured, for if the heat under the retort is sufficient to generate a larger quantity, such larger quantity being free to enter the receiver *a* through the pipe *r'*, a greater quantity is collected in the receiver *a*, and as only twenty gallons per hour can escape through the stop-cock *p'* as now set, the cover *q* of the receiver *a* becomes distended, or rises, and raises the plate *o*, the rod *e*, and, if the lamp A be used, the pin *t* moves upwards in the slot *u*, which being inclined, the action of the pin against one side of said slot *u* moves the bar *d* to one side, and raises the end of the lever *d'*, which is attached to the sliding-tube A', thus diminishing the flame and reducing the heat. If a gas-burner is used to supply the heat under the retort, the raising of the rod *e* raises the end *e'* of the lever *f'*, and as the stop-cock *i* is so arranged that when the lever *f'* is nearly in a horizontal position, as shown in fig. 1, the maximum amount of illuminating gas is permitted to pass down the pipe *h'* into the pipe *j*; the action of the lever *f'* in being raised at the end *e'* cuts off the supply of gas to the burner B, and, as the heat is diminished by the supply of gas being cut off, less gas is generated in the retort D. If a greater quantity of gas is needed, the stop-cock *p'* is opened slightly, so that a greater quantity can escape, the plate *o* falls, the lever *f'* assumes its nearly horizontal position, and the supply of gas is increased; or if the lamp A is used, the pin *t* falls in the slot *u* to the apex, or near the centre, moving the bar *d* to one side and causing the long arm of the lever *d'* to fall, and lowers the sliding-tube A' of the lamp A, thus increasing the heat under the retort D and generating a greater quantity of gas. If it is desirable, a weight or spring may be attached, or used in connection with the plate *o*, to facilitate the operation of the apparatus. If by any means the apparatus should be left in operation for a length of time, so that the nitrate of ammonia should become somewhat exhausted in the retort and the gas should cease to generate, the plate *o* would depress the elastic material *q* somewhat into the receiver *a*, and the action of the rod *e* in falling would extinguish the flame of the lamp A, or cut off the supply of gas to the burner B by the stop-cock *i*. If the flame of the lamp A or the burner B should by any means, after being left, go out or become extinguished, the water in the jar F would not be drawn back into the retort D to fill the partial vacuum occasioned by the sudden condensation therein and burst the retort, as is now oftentimes the case, but in any sudden cooling of the retort the air would pass down the tube G and up through the water into the retort D.

This arrangement may be applied to any form of gasometer now in use, its operation being satisfactory and perfect, if used as a regulator between the retort and a gasometer, so that the gas, in passing from the retort to the gasometer, shall pass through the receiver *a* or through this regulator, a suitable connection being made between the pipe or outlet *r* and the gasometer into which the gas passes for final use; and any vessel might be used having a piston fitting sufficiently tight, and moving sufficiently free to be moved by the pressure of the gas beneath, or the top *q* might be solid, the side of the receiver being made of some thin material, so as to act as a bellows, either of these devices being equivalent in their operation. A spring, *y*, is placed on the standard *g*, and the pin *y'* is set in the piece *f*, which holds said piece *f* in position under the end of the lever *f'*. When the gas in the receiver raises the plate *o* and lever *f'* sufficiently high for the pin *y'* to pass under the end of the lever *f'*, the action of the spring *y* throws the piece *f* to one side, so that it no longer operates to support the end of the lever *f'* or check it in its downward movement. This arrangement of the spring *y* and pin *y'* is applied so as to render it unnecessary to watch the apparatus when first set in operation.

It will thus be seen that my apparatus is wholly and entirely automatic in its operation, as the flow of gas through the orifice of the stop-cock *p'* in the pipe or outlet *r* entirely controls the amount of heat used to generate said gas; is perfectly safe, as it may be started in its operation and left by itself; is simple in its construction and operation, and may be made much cheaper than any apparatus now in use for that purpose.

I am aware that certain devices have been used for regulating the amount of heat in generating nitrous oxide and other gases, as in certain Letters Patent granted to James M. Osgood, dated November 1, 1864, and numbered 44,884, and also in Letters Patent granted to A. W. Sprague, dated June 12, 1866, and numbered 55,548; but my invention differs very materially from said devices, both in construction and operation, and I disclaim any and every part of said devices, irrespective of my construction and arrangement; but having described my invention, what I do claim as new, and desire to secure by Letters Patent, is—

1. Controlling the amount of heat used in generating nitrous oxide or other gases by means of a regulating or changeable outlet, *p'*, applied to a gas-receiver having a variable capacity, when used in combination with a device for regulating the flame beneath the generating retort, substantially as described and herein set forth.
2. I claim the variable receiver *a*, having a changeable outlet, *p'*, in combination with the rod *e* and the lever *f'*, all constructed and operating substantially as described and for the purposes herein set forth.
3. I claim the variable receiver *a*, having a changeable outlet, *p'*, in combination with the rod *e*, the bar *d*, and lever *d'*, all constructed and operating substantially as described and for the purpose specified.
4. I claim, in combination with the lever *f'*, the spring *y* and piece *f*, having the pin *y'*, all constructed and operating substantially as described and for the purpose herein specified.

M. B. RENSLOW.

Witnesses:

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SARAH HOLLIS.