

No. 614,210.

Patented Nov. 15, 1898.

O. M. MORSE.
DUST COLLECTOR.

(Application filed Feb. 23, 1898.)

(No Model.)

3 Sheets—Sheet 1.

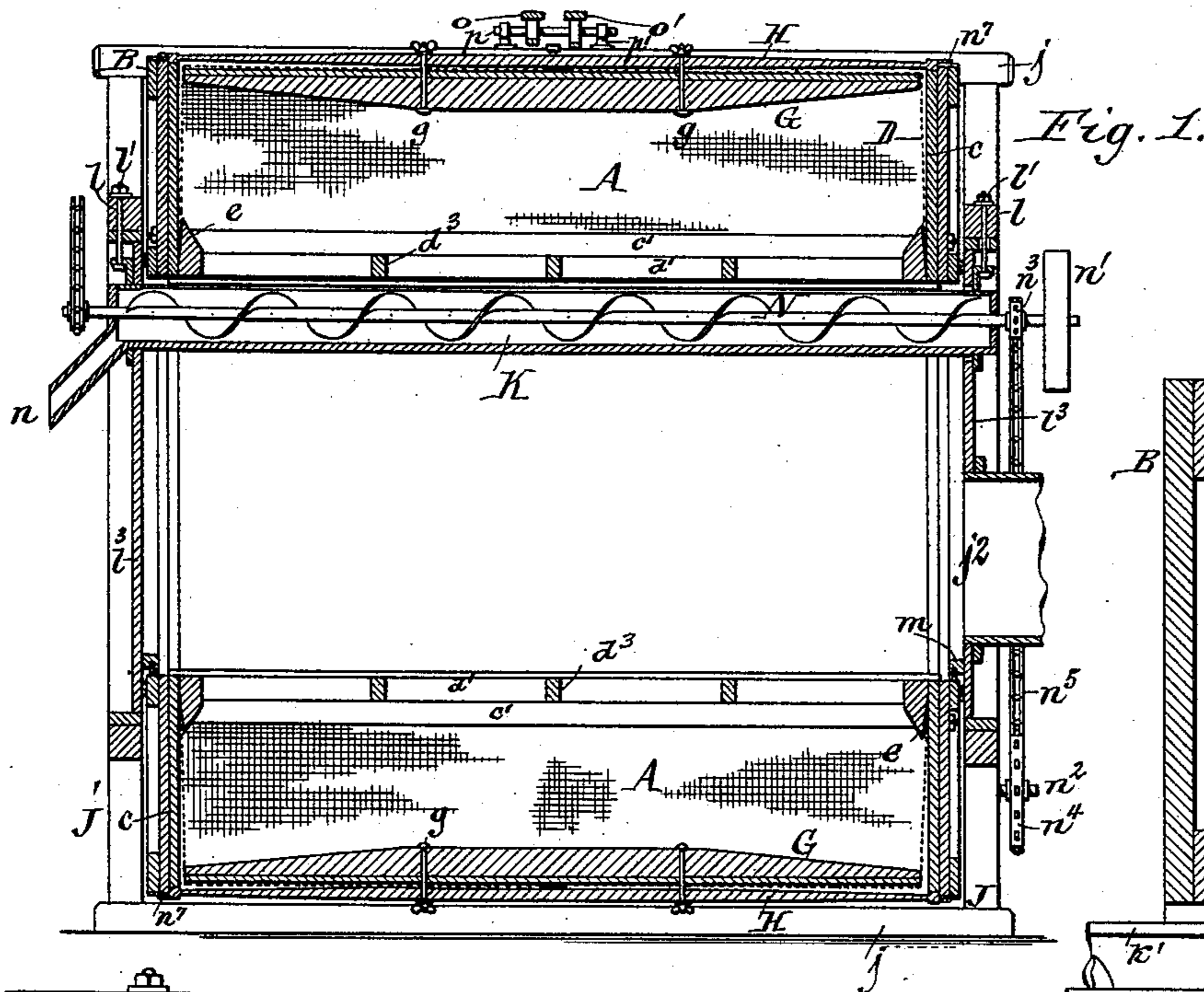


Fig. 3.

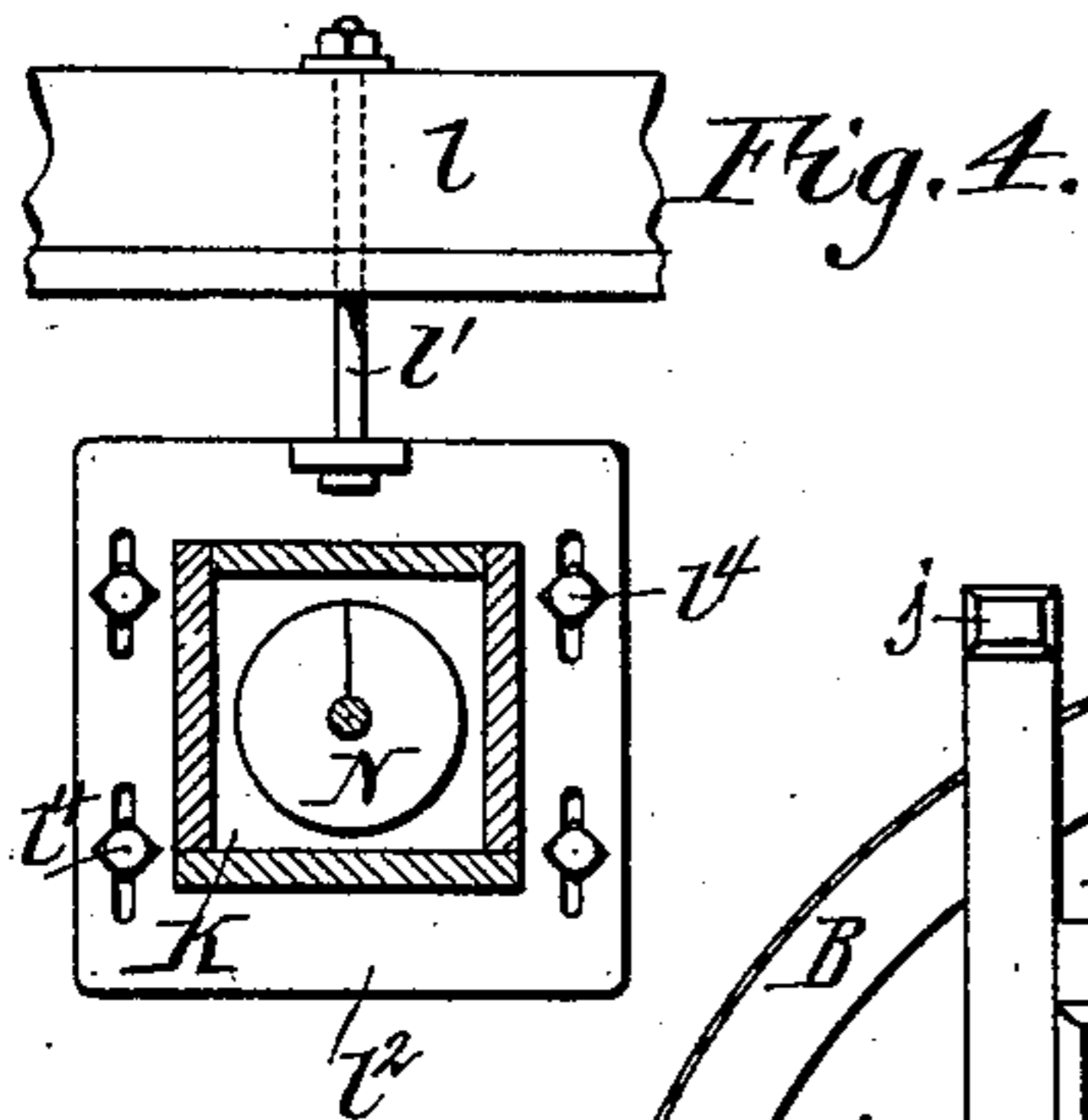
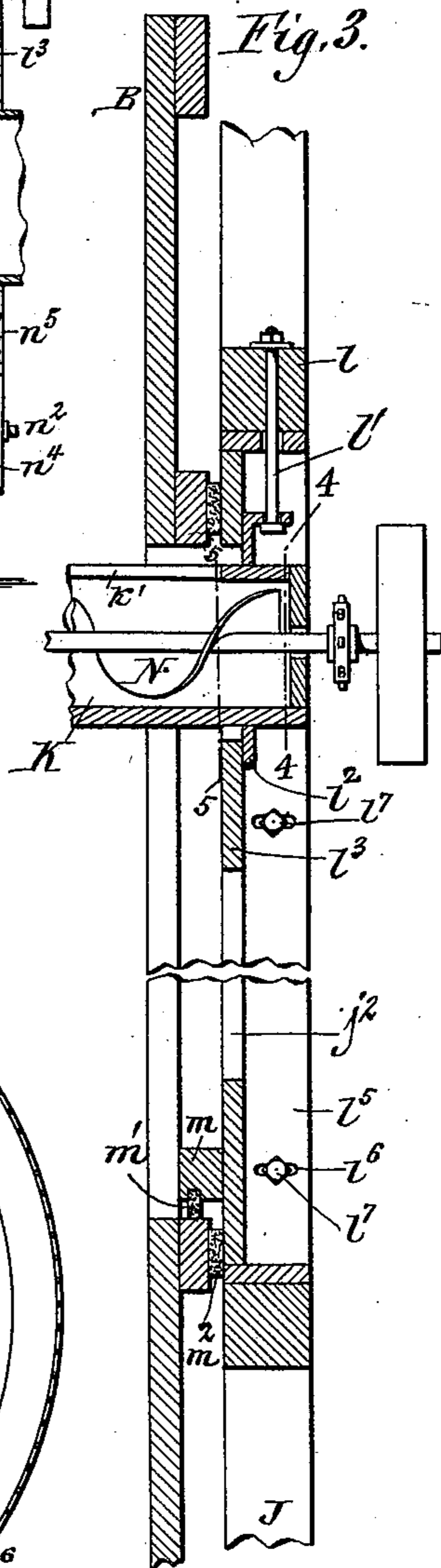
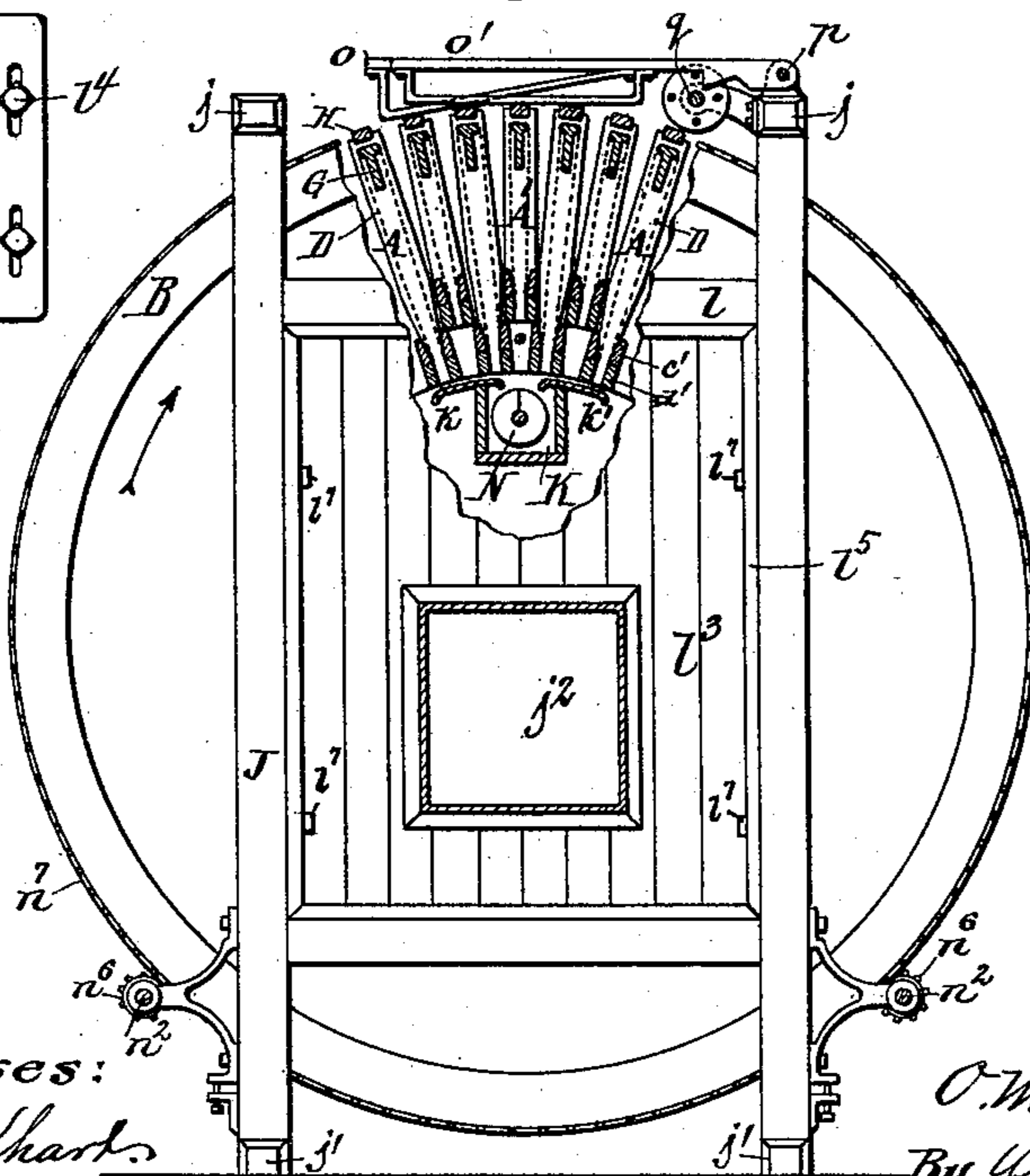


Fig. 2.



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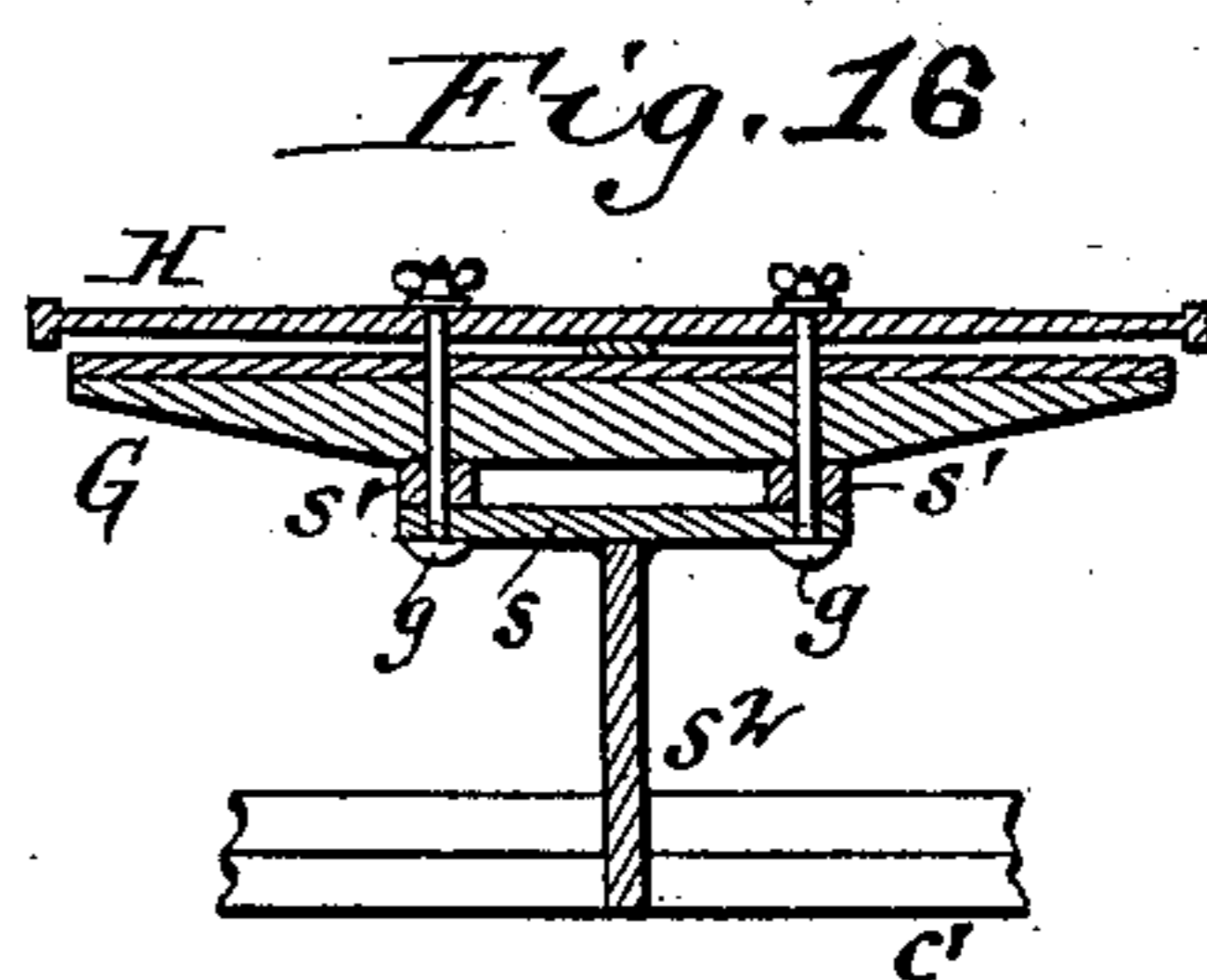
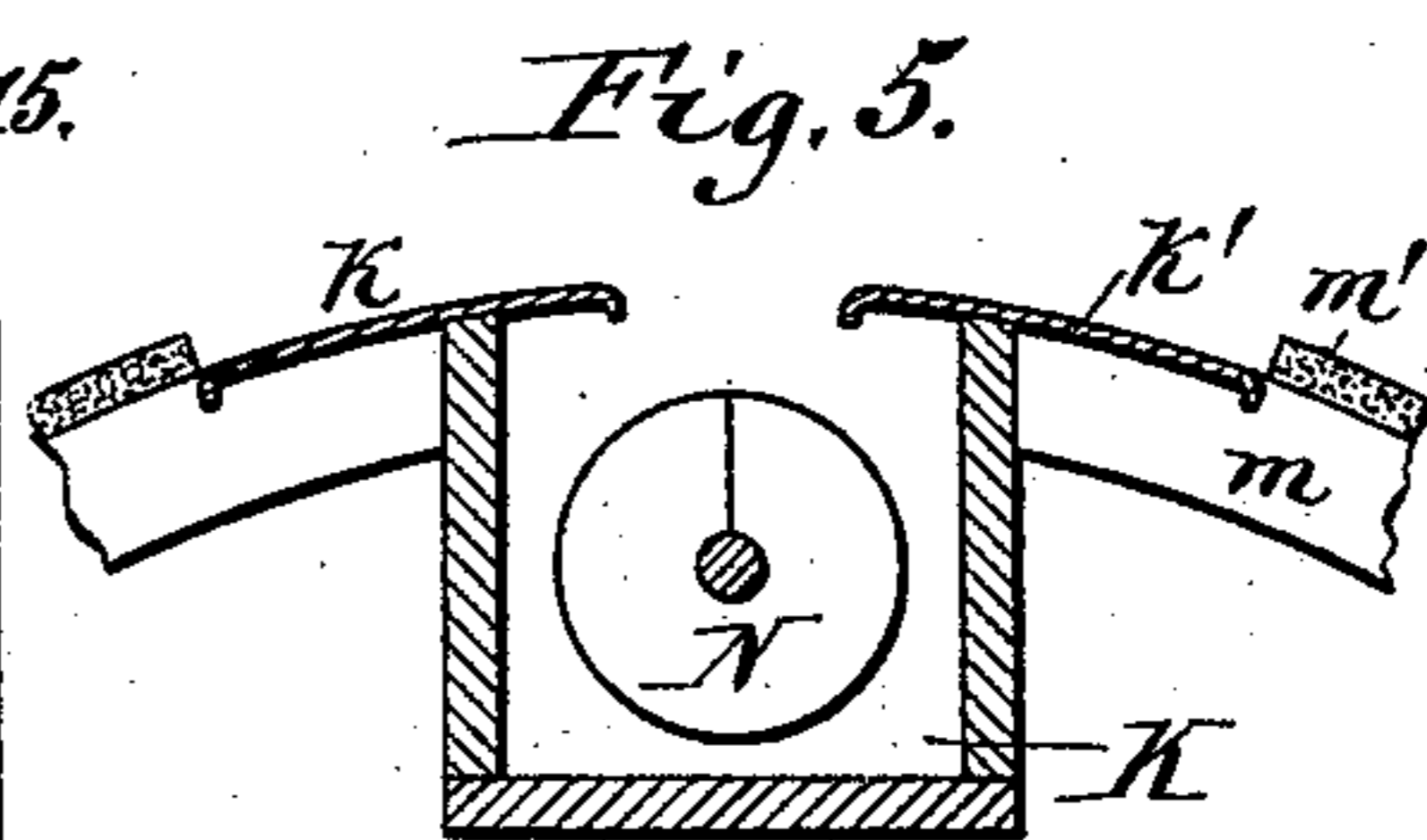
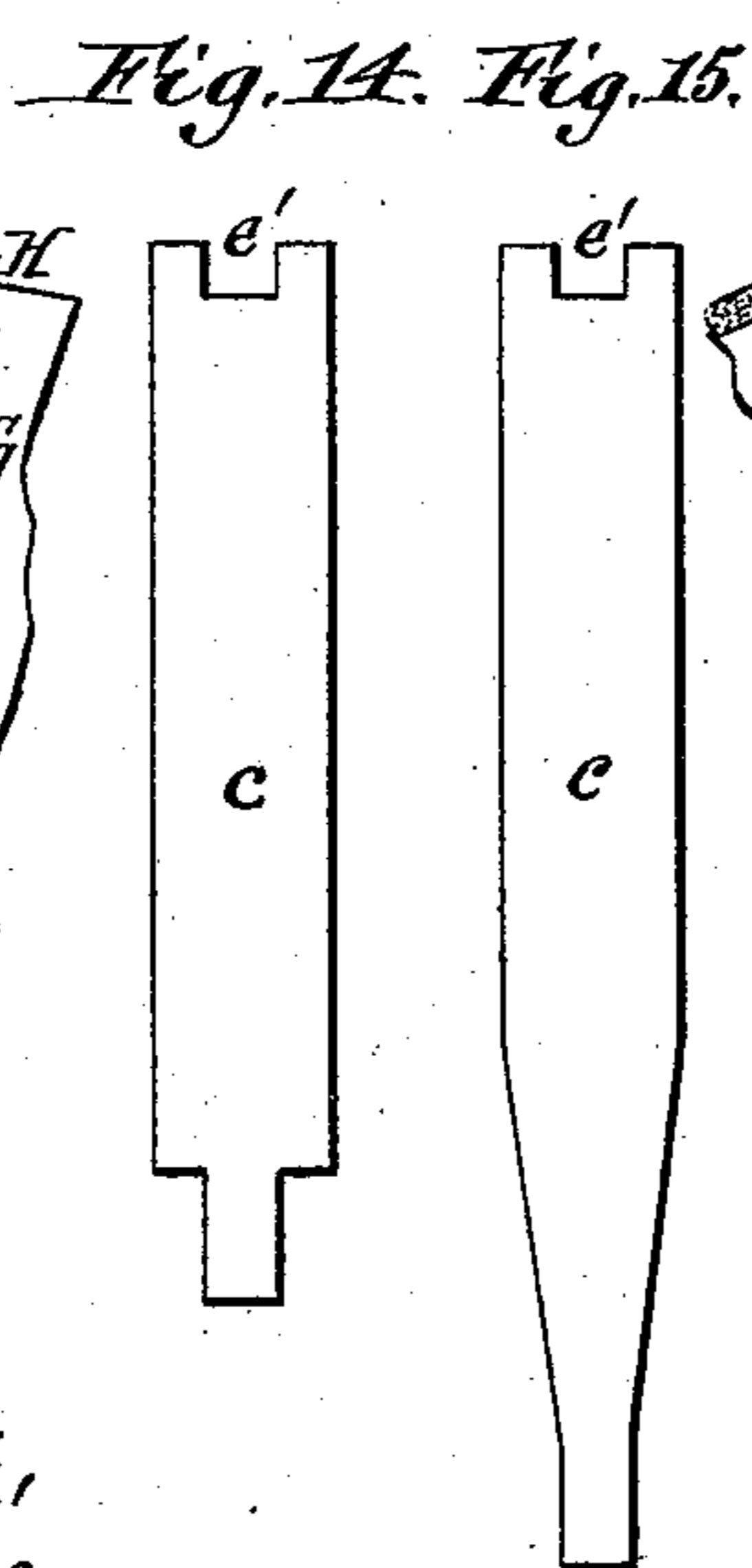
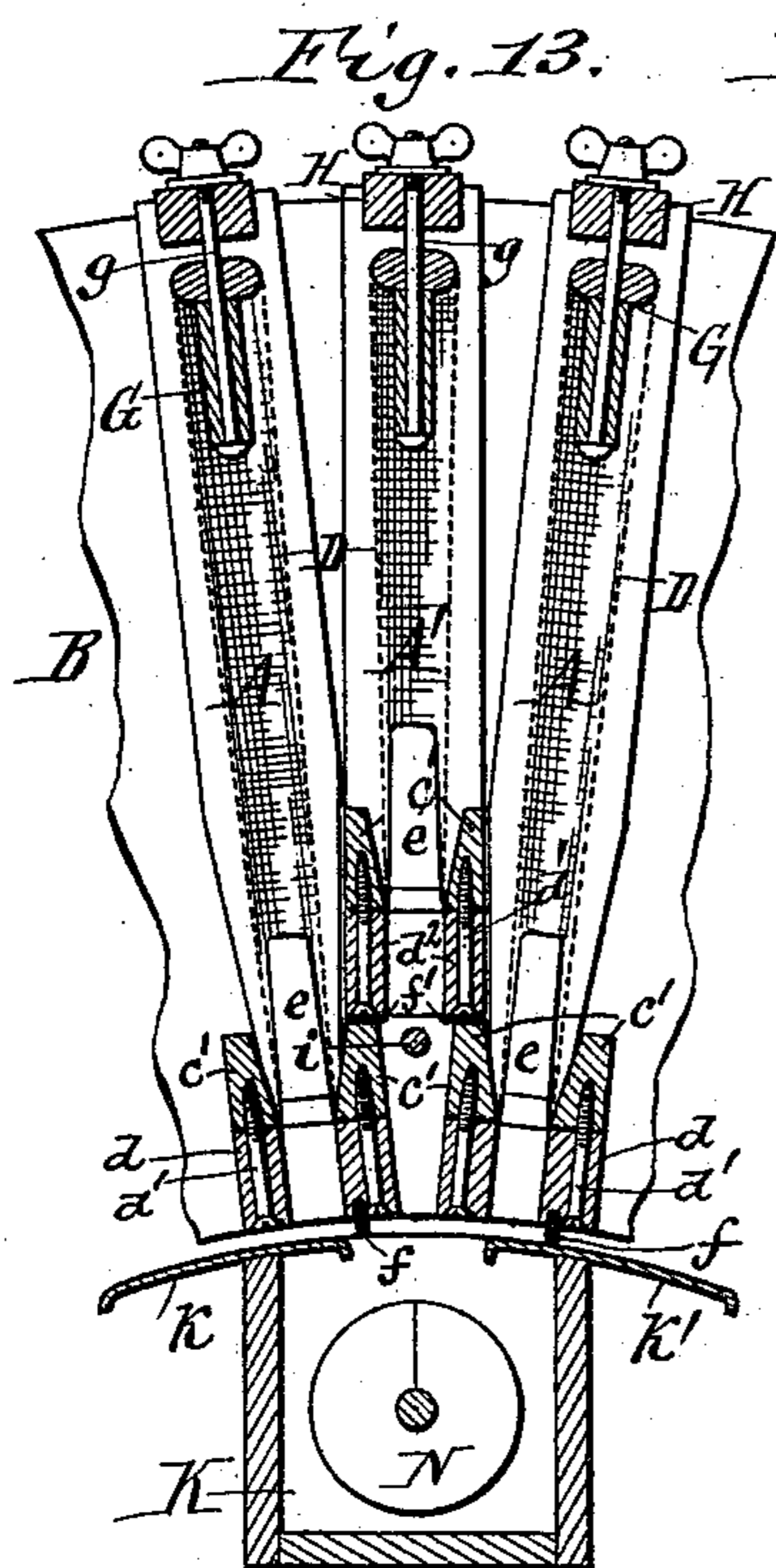
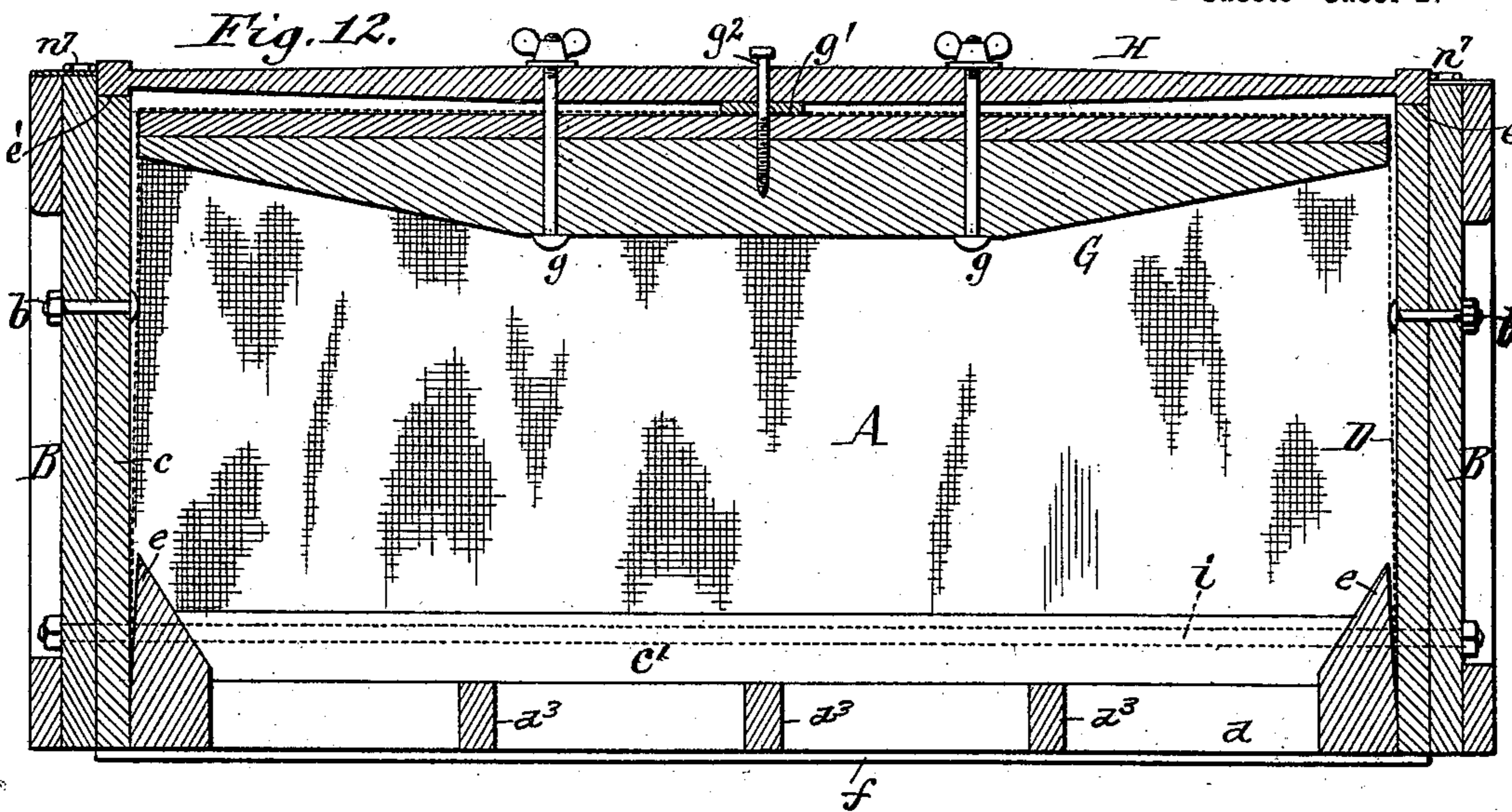
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3 Sheets—Sheet 2.



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UNITED STATES PATENT OFFICE.

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DUST-COLLECTOR.

SPECIFICATION forming part of Letters Patent No. 614,210, dated November 15, 1898.

Application filed February 23, 1898. Serial No. 671,234. (No model.)

To all whom it may concern:

Be it known that I, ORVILLE M. MORSE, a citizen of the United States, residing at Jackson, in the county of Jackson and State of Michigan, have invented a new and useful Improvement in Dust-Collectors, of which the following is a specification.

This invention relates to that class of dust-collectors which consist of a rotatory stellated balloon composed of filtering compartments or sections, a still-air chamber, and a knocking or jarring device by which the compartments or sections which have arrived over the still-air chamber are jarred for dislodging the dust from the filter-cloth and causing it to drop into the still-air chamber, from which it is discharged by a conveyer or other suitable means.

The objects of my invention are to improve the construction of the compartments or sections with a view of perfecting the jarring or cleaning action, so that all parts of the filter-cloth are thoroughly cleaned and maintained in good working condition, to so construct the sections or compartments that each can be readily removed from the rotatory supporting-frame when necessary for replacing the filter-cloth or other purposes, and to improve the construction of the machine in other respects.

In the accompanying drawings, consisting of three sheets, Figure 1 is a longitudinal sectional elevation of my improved dust-collector. Fig. 2 is an end elevation, partly in section. Fig. 3 is a longitudinal vertical section, on an enlarged scale, through one end of the still-air chamber and adjacent parts. Fig. 4 is a vertical section, at right angles to Fig. 3, in line 4 4, Fig. 3. Fig. 5 is a vertical section in line 5 5, Fig. 3, looking outwardly. Fig. 6 is a fragmentary longitudinal section showing the knocker-shaft and its driving-gear. Figs. 7 and 8 are side elevations of the two knockers. Fig. 9 is a top plan view of the same. Fig. 10 is an outside plan view of several of the filtering-sections on an enlarged scale. Fig. 11 is an inside plan view thereof. Fig. 12 is a longitudinal radial section of one of the filtering-sections. Fig. 13 is a cross-section of several of the sections and the still-air chamber. Fig. 14 is a detached view of one of the end boards of

one of the short sections. Fig. 15 is a detached view of one of the end boards of one of the long sections. Fig. 16 is a longitudinal sectional elevation, on a reduced scale, showing a device for connecting the strainer-bar of each section with the inner portion thereof.

Like letters of reference refer to like parts in the several figures.

The stellated balloon consists of filtering compartments or sections A and A', Figs. 1 to 6, which are arranged radially about a common center and secured at both ends to annular supporting-frames B by bolts b, Fig. 12, or other suitable means. In order to increase the number of sections in a balloon of a certain diameter, the sections are alternately long and short in the radial direction, the long sections A extending from the inner to the outer circles of the supporting-frames B and the short sections A' being arranged between the long sections and extending from the outer circle inwardly as far as possible. The compartments are closed at their peripheral ends and open at their inner ends, so as to receive the dust-laden air and discharge the accumulated dust at their inner ends. Each section contains a rigid frame composed of end boards c and longitudinal bars c', arranged parallel with the axis of the balloon and connecting the end boards near the inner ends thereof.

D represents the filter-cloth of each section, which has the form of a flat bag open at its inner end. The open end of the cloth is secured to the rigid section-frame by wooden strips or bars d, which are fastened against the inner faces of the frame-bars c' by screws. The longitudinal edges of the filter-cloth are turned outward and laid against the inner faces of the frame-bars c' and are clamped against the same by the strips d. The end portions of the cloth are drawn tightly into converging spaces formed at the ends of each section between an outwardly-tapering cleat e and the adjacent end board c. These cleats are secured with their inner large ends to the inner sides of the end boards c. Each of the cloth-fastening strips d is provided on its inner face with a projecting longitudinal packing-strip f, formed of a frayed cotton wick or other suitable material and secured in a

groove formed in the strip. The cloth-fastening strips d^2 of the short sections A' are not provided with such projecting packing-strips, but with flat packings f' , Fig. 13, by which they bear tightly against the backs of the frame-bars c' of the long sections, so as to form practically dust-proof joints between the short and long sections. The cloth-fastening strips d of each section may be braced by interposed blocks d^3 .

Each filter-cloth is stretched by the following devices: G represents a wooden strainer-bar which is arranged lengthwise within the closed outer end of the filter-bag, and H is a wooden spring which is arranged lengthwise at a short distance beyond the outer end of the bag. This spring rests with its ends in recesses e' , formed in the outer ends of the end boards c of the section-frame and is connected with the internal strainer-bar G by radial bolts g and an interposed abutment-piece g' , Fig. 12. The latter is arranged midway between the ends of the springs and between the latter and the strainer-bar and is secured to both by a screw g^2 or other suitable means. The connecting-bolts g are arranged on both sides of the abutment g' and at a suitable distance therefrom to cause the spring to be strained on each side of the abutment. This enables the tension of the spring to be regulated and transmits the vibrations of the jarring-spring H to the strainer-bar and by the latter to the cloth from end to end. The spring is preferably tapered on both sides at each end, so that it can be reversed if it should take a set by long-continued use. The inner portion of the strainer-bar is preferably reduced in thickness, as shown in Fig. 13, to afford access for the dust-laden air to the cloth on the greater portion of both sides of the bar.

The annular supporting-frames B of the balloon are preferably connected by longitudinal rods i , which are for convenience arranged in the spaces between the inner ends of some of the short sections A' and the inner circle of the supporting-frames, as shown in Figs. 11 and 12. This stellated balloon is rotatively mounted in a stationary frame which consists of upright end frames $J J'$, upper longitudinal connecting-bars j , and lower longitudinal connecting-bars j' , Figs. 1 and 2. The end frame J is arranged at the front end of the machine and provided with in the inner circle of the stellated balloon with an opening j^2 , to which the spout is connected by which the dust-laden air is supplied to the dust-collector.

K represents the still-air chamber, which is arranged longitudinally within the inner circle of the balloon and in the upper portion of said circle and which is attached to the end frames $J J'$. The still-air chamber has the form of a trough and is provided on its longitudinal sides with shields $k k'$, which extend from the upper edges of the trough concentric with the balloon, so that the packing-

strips f , which project from the inner faces of the long balloon-sections, bear on these shields in passing over the same and form practically tight joints on both sides of the trough, whereby the dust-laden blast is prevented from entering the still-air chamber. The latter is preferably connected with the upper horizontal members l of the end frames $J J'$ by vertical adjusting-screws l' , so that it can be adjusted toward and from the inner faces of the sections to insure a tight joint with the same. The screws l' are attached at their lower ends to frames l^2 , which embrace each end of the chamber, and these frames may be secured to the outer sides of the panels l^3 of the end frames $J J'$ by screws l^4 , which pass through vertical slots in the frames l^2 . These panels l^3 are movably fitted into the timbers of the end frames and are provided with flanges l^5 , having longitudinally-elongated openings l^6 , through which pass the screws l' , by which these panels are secured to the frame-timbers. Each panel has on its rear side a ring m , which is arranged within the inner circle of the adjacent annular frame B of the balloon with sufficient clearance to permit of the interposition of an annular packing m' , which is secured in a groove in the outer side of the ring. A packing m^2 , of sheepskin or other suitable material, is also secured on the outer side of each annular balloon-frame B , so as to bear against the rear side of the adjacent panel of the stationary frame. The upper portion of each ring is cut away to make room for the still-air chamber, as shown in Fig. 5. The above-described capacity of each panel for horizontal adjustment permits each panel to be nicely adjusted with reference to the adjacent side of the balloon to produce a dust-proof joint between the parts.

N represents the screw conveyer, which is arranged in the still-air chamber and which conveys the dust in the same to the discharge-spout n . This conveyer is driven by a pulley n' , and motion is transmitted from this conveyer to two shafts n^2 , which are arranged lengthwise in the lower portion of the stationary frame and geared with the balloon for slowly rotating the same. The transmitting devices consist of a sprocket-pinion n^3 , secured to the conveyer-shaft, sprocket-wheels n^4 , secured to the shafts n^2 , and a drive-chain n^5 . The shafts n^2 are provided with sprocket-pinions n^6 , which mesh with annular chains n^7 , secured to the outer peripheral faces of the annular frames B of the balloon or with gear-rims.

$O O'$, Figs. 1, 2, 6, 7, 8, and 9, represent two knockers, which are arranged side by side above the balloon, so as to strike the compartments or sections over the still-air chamber. The knocker O has an inclined lower side, so as to strike the sections as they move upwardly over the shield k toward the still-air chamber in the direction of the arrow, Fig. 2. The knocker O' has a substantially horizontal

lower side, so as to strike the sections which have arrived over the still-air chamber. These knockers are hung upon a rod p , which is secured in lugs p' on the stationary frame and are actuated by a shaft q , which is provided with disks Q , carrying two sets of pins q' q'' , which engage against the under sides of the knockers. The latter are provided with shoulders q^3 , which allow the knocker to drop after each pin has cleared the shoulder. The shaft q may be driven by a chain q^4 from the conveyer-shaft or by other suitable means. By striking the sections as they move over the shield k toward the still-air chamber a considerable quantity of dust is detached from the cloth before the section reaches the still-air chamber. This detached dust drops upon the shield k and is swept by the packing-strips f at the inner ends of the long sections into the still-air chamber. The cleaning action is in this manner extended over a greater period of time, and a more thorough cleaning of the cloth is effected. The knocker strikes the spring at the outer or peripheral end of each section and vibrates the spring. These vibrations are transmitted to the strainer-bar and by the latter to all parts of the cloth, as the bar extends from end to end of the bag of filter-cloth. This jarring of the cloth cleans each cloth thoroughly and completely in passing over the still-air chamber and places the cloth in good condition for again filtering the dust from the air, thereby increasing the efficiency of the cloth and reducing the cloth area which is required for doing a certain amount of work.

Upon withdrawing the connecting-bolts at the ends of a short compartment or section such compartment can be removed from between the annular balloon-frames B without disturbing any other section. Any one of the long sections can be removed in like manner by first removing one of the adjacent short sections.

The dust-laden air enters the inner space of the balloon, which is surrounded by the compartments or sections, and enters the cloth bags through the open inner ends thereof. The purified air escapes through the meshes of the cloth, while the dust adheres to the inner side of the bags and is periodically jarred off, so as to drop into the still-air chamber.

If desired, the vibrations of the strainer-bar may be transmitted to the inner bars c' of each section-frame by a longitudinal bar s , connected with the strainer-bar by the bolts g and intervening blocks s' and an inwardly-extending bar s^2 , which connects the middle

portion of the bar s with both frame-bars c' , as shown in Fig. 16.

I claim as my invention--

1. A dust-collecting balloon composed of a rotary frame and a circular system of independent filtering-sections which are removably secured thereto and surround the space into which the dust-laden air enters and in which the still-air chamber is arranged, each section extending from end to end of the balloon and comprising a section-frame, a cloth bag secured at its open inner end to said section-frame, a strainer-bar arranged at the closed outer end of said bag, and a jarring-spring which connects the strainer-bar with the section-frame, substantially as set forth.

2. The combination with the annular balloon-frames, of independent dust-collecting compartments or sections removably attached to said frames and each composed of a section-frame, a cloth bag secured at its open inner end to said section-frame, a strainer-bar arranged at the closed outer end of said bag, and a jarring-spring supported with its ends on said section-frame and connected with said strainer-bar, substantially as set forth.

3. The combination with the section-frame and the cloth bag secured at its open inner end to said frame, of a strainer-bar arranged at the closed outer end of said bag, a jarring-spring supported with its ends on said section-frame, an abutment arranged between the middle portions of said spring and strainer-bar, and bolts connecting said spring and bar on both sides of said abutment, substantially as set forth.

4. The combination with the annular balloon-frames, of independent alternate long and short radial filtering-sections which are open at their inner ends, the long sections extending farther inward than the short sections and the inner portions of the sections being fitted tightly against each other, substantially as set forth.

5. The combination with a balloon having filtering-sections which are provided with jarring-springs at their peripheral ends and an internal still-air chamber, of a knocker having an inclined lower face and a knocker having a horizontal lower face, substantially as set forth.

Witness my hand this 19th day of February, 1898.

ORVILLE M. MORSE.

Witnesses:

JNO. L. BENTLEY,
JNO. G. MUNDY.