

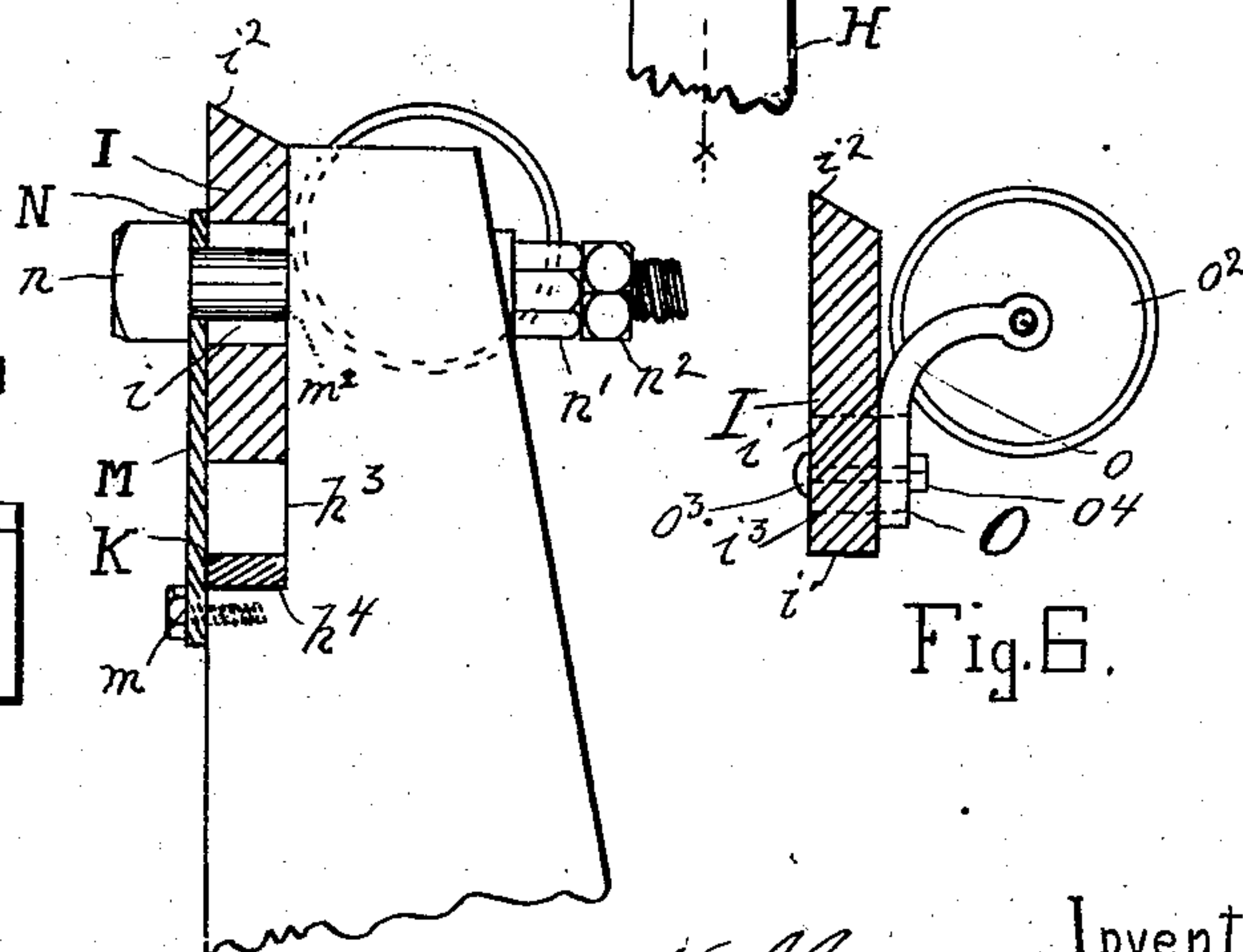
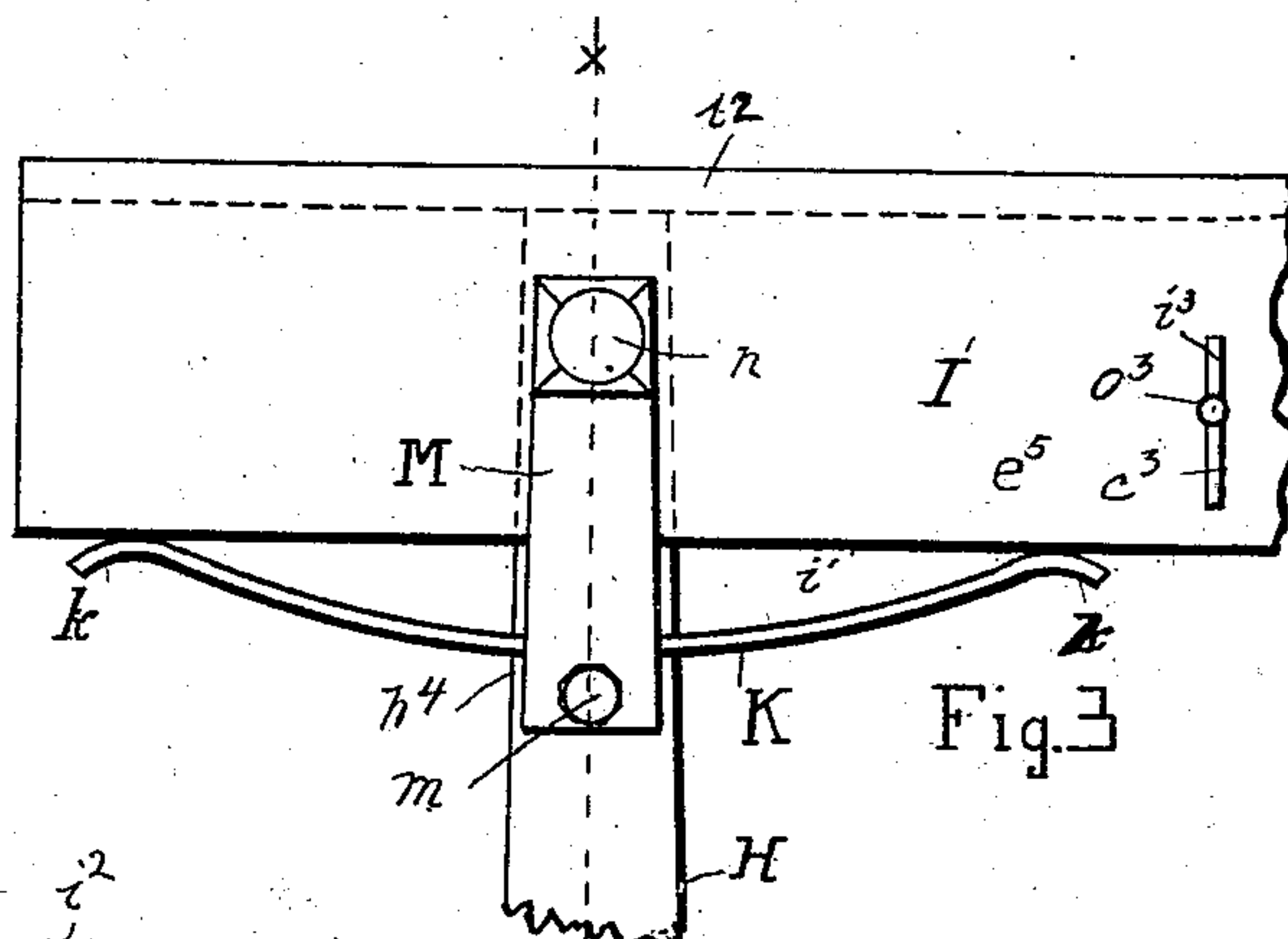
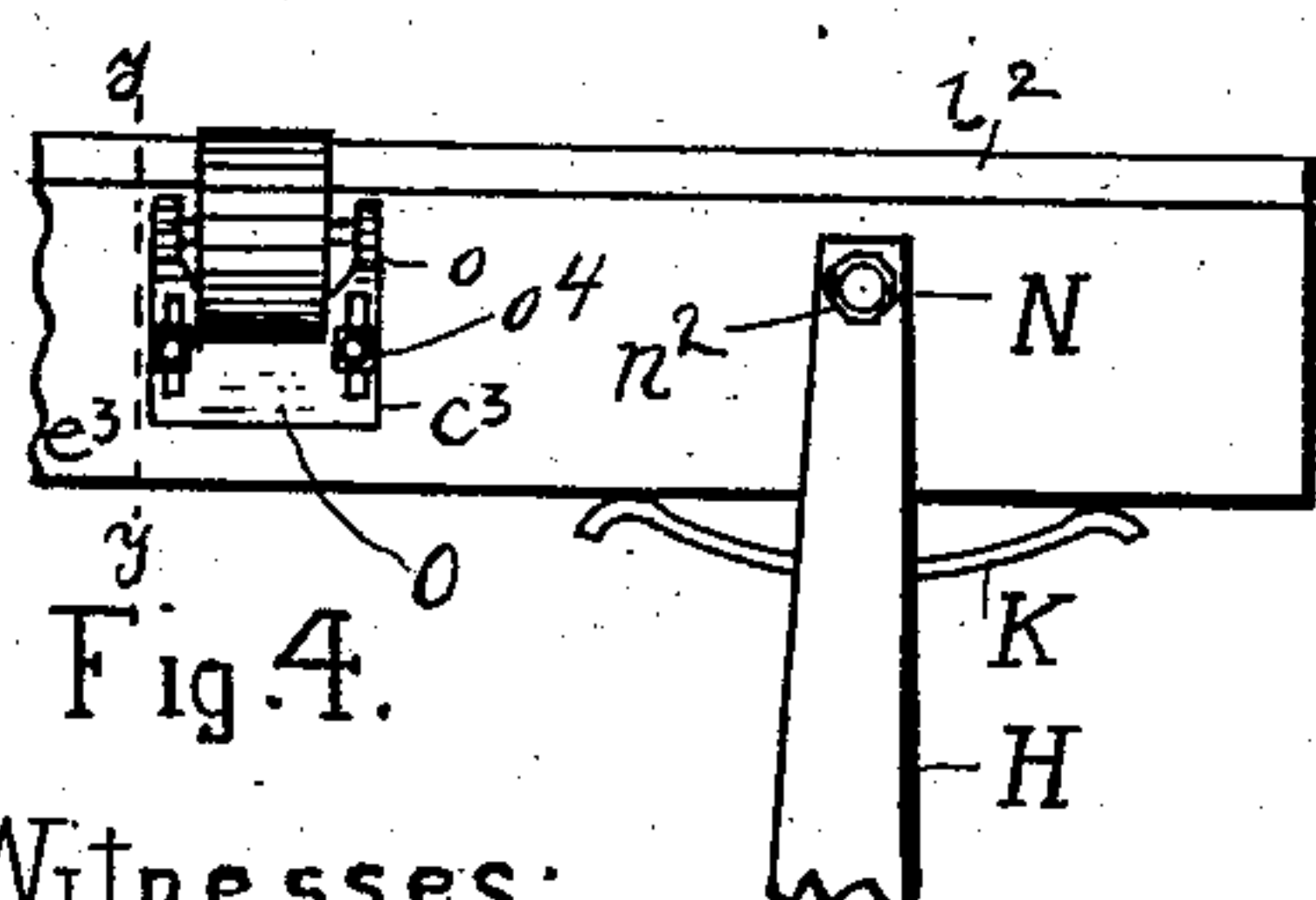
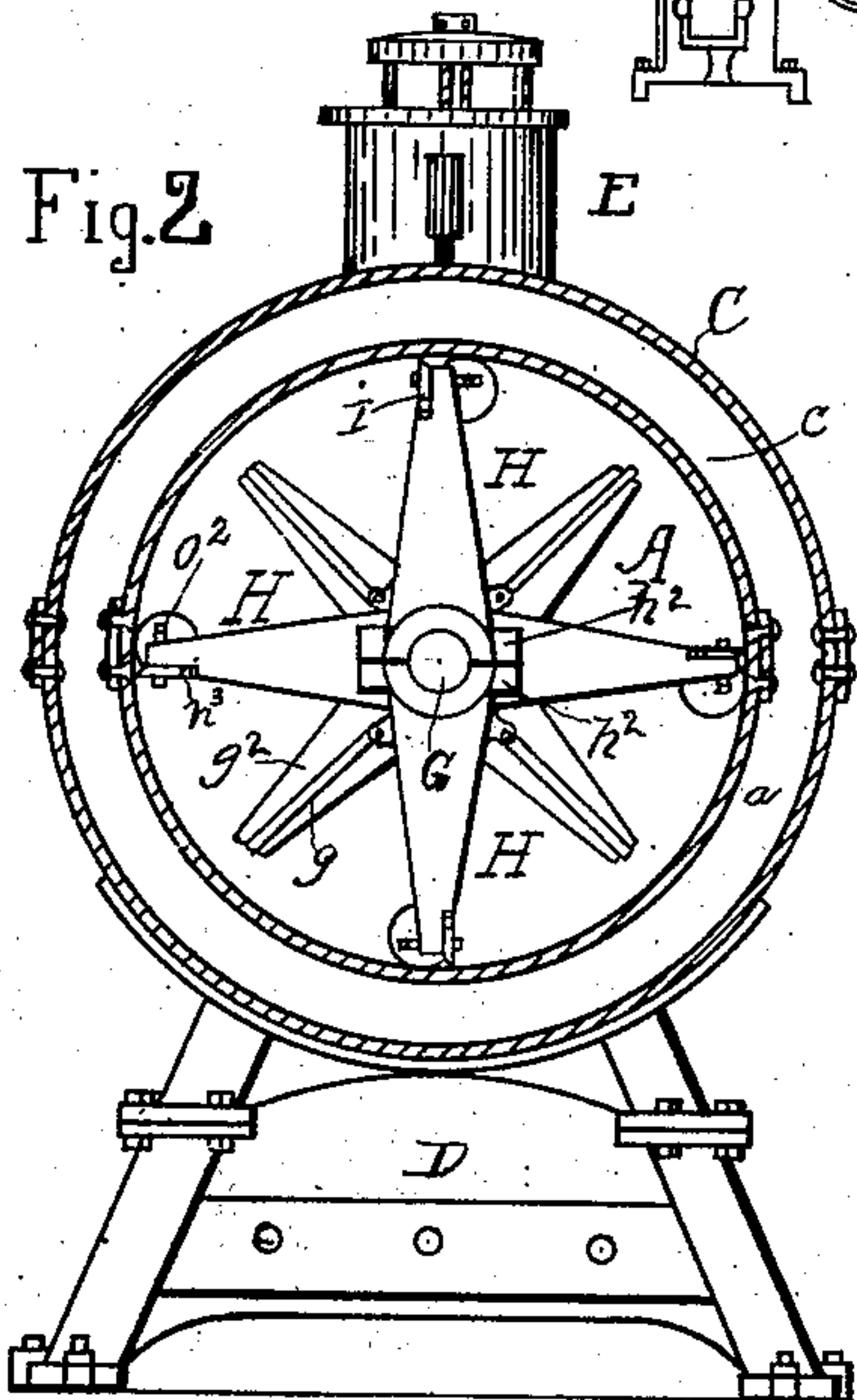
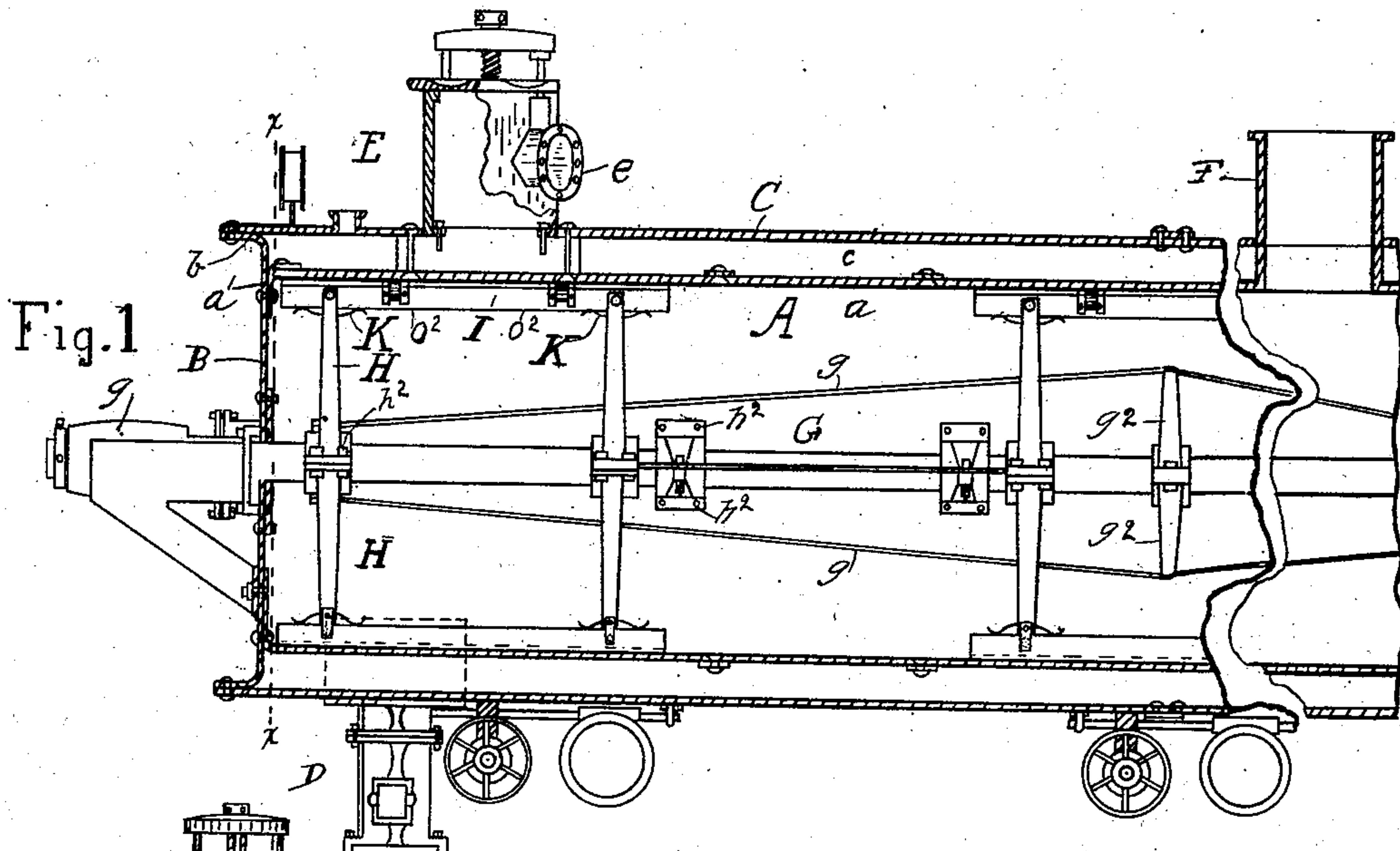
No. 726,120.

PATENTED APR. 21, 1903.

W. T. URIE.
FERTILIZER DRYING MACHINE.

APPLICATION FILED AUG. 11, 1902.

NO MODEL.



Witnesses:
Theodore C. Sparks,
Francis St. Leach

Fig. 5. William T. Urie
By Richard Manning Atty.

UNITED STATES PATENT OFFICE.

WILLIAM T. URIE, OF KANSAS CITY, MISSOURI.

FERTILIZER-DRYING MACHINE.

SPECIFICATION forming part of Letters Patent No. 726,120, dated April 21, 1903.

Application filed August 11, 1902. Serial No. 119,286. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM T. URIE, a citizen of the United States of America, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Fertilizer-Drying Machines; and I do hereby declare that the following is a full, clear, and exact description of the invention, such as will enable others to make and use the same, reference being had to the accompanying drawings, forming a part of this specification.

The object of my invention primarily is to remove thoroughly and cleanly the adhering substance—such as grease, slime, &c.—of the fertilizing material which collects upon the inner surface of the drying-chamber and prevents the transmission of heat to the mass to be dried; second, to gage the position of the knife-edge in passing over the inner surface of the drying-chamber; third, to impart a steadiness to the driving-shaft.

The invention consists in the novel construction and combination of parts, such as will be first fully described, and specifically pointed out in the claims.

In the drawings, Figure 1 is a longitudinal sectional view of a steam fertilizer-drying machine, a portion of one end of the chambers being broken away, showing the driving-shaft, the radial arms, and the cleaning-knives, and showing the invention applied to the arms and knives. Fig. 2 is a sectional view of the fertilizer-machine, taken upon the line $x x$ of Fig. 1, showing the driving-shaft, the radial arms, and the invention applied thereto. Fig. 3 is a detail front view, enlarged, of the upper end portion of one of the radial arms, showing a portion of the adjustable slotted knife-blade, the spring, the retaining-plate, the slot for the adjustable roller-carrying arms, and the bolt-head. Fig. 4 is a detail rear view of the upper end of the radial arm and a portion of the knife-blade opposite to that seen in Fig. 3, showing the spring and adjustable rollers. Fig. 5 is a detail side view of the upper end portion of the radial arm, showing the knife-blade and spring in section upon the line $x x$ of Fig. 3, also showing the adjustable roller. Fig. 6 is a detail sectional view of the knife-blade,

taken on the line $y y$ of Fig. 4, showing the roller and the adjusting roller-carrying arms or brackets.

Similar letters of reference indicate corresponding parts in all the figures of the drawings.

Referring to the drawings, A represents a cylindrical shell or case of suitable dimensions arranged horizontally in position and which forms the receptacle for the fertilizer material. Upon the end of the cylindrical sides a of the shell A are flanges a' , bolted thereto upon the outer surface of the ends and thence bent inwardly and bolted to the circular end plate B. The outer ends of the plate B extend a short distance beyond the lines of the outer surface of the side a of case A and are bent at right angles and extended a short distance in an outward direction, forming an annular flange b , to which are bolted the ends of a cylindrical shell C concentric with the shell A, and between which shells is formed a steam-circulating space or chamber c . The shells A and C are supported by the braced upwardly-extending benches D at each end.

Connected with the outer shell C is a steam-supply chamber E, which communicates with the chamber c and which is provided with a steam-supply opening e .

F represents the hopper, leading to the shell A, within which the material to be dried is supplied.

Extending longitudinally through the shell A and the end B of the said shell is a rotary shaft G, upon the outer end of which is a belt-pulley g . Upon the shaft G, within the receptacle A, are radial arms H H, extending in an opposite direction to each other and in pairs, said pairs being arranged a short distance apart. The outer ends of the arms H H extend to a position a short distance from the inner side of the shell A, the inner ends of each arm H being curved inwardly to extend over one-half the circumference of the shaft G and provided with lateral flanges h^2 h^2 , which are bolted to like flanges upon the inner end of an oppositely-extended arm. In the upper end of each arm H and forward edge is a notch h^3 , extending inwardly an equal distance to the thickness of the knife-

blade I, which is employed to remove the adhering substance from the shell, and downwardly about one-third the distance greater than the width of said blade is a shoulder h^4 .

- 5 Within the said notches upon the ends of two of the radial arms, extending in the same direction, is arranged the blade I, which extends a short distance in length beyond the lines of the outer sides of said arms and in
10 which blade opposite the arms H are slots i . Within the slot h^3 , upon each arm and bearing upon the shoulder h^4 , is an elliptical spring K, the ends of which are extended outwardly in opposite directions from the arm H and
15 curved upwardly and at k are slightly curved downwardly and bear upon the lower edge i' of the blade I. The cleaning part of the blade I is beveled or inclined to an edge i^2 , extending from a position near the line of the end of
20 the arm H forwardly and upwardly. Upon the outer surface of the blade I is a narrow guide-plate M, the lower end of which plate is secured to the forward side of the arm H by the screw m at a point a short distance below the shoulder h^4 . The upper end of the
25 plate M extends a short distance above the slot i in the knife-blade I, and in which blade opposite the slot is an opening m^2 , through which extends one end of a bolt N, upon one
30 end of which is a head n , the other end of which bolt is screw-threaded and is extended through the arm H and a short distance beyond the rear side of said arm, and upon said end is a nut n' and a jam-nut n^2 , the plate M
35 being held by the screw m and bolt N in such a position as to permit the blade I to move adjustably in the guides.

In the blade I, at a point a short distance inwardly from each arm, are the vertical slots
40 i^3 , arranged a short distance apart and parallel with each other. Upon the rear side of the blade is a movable plate O, narrow in width, and upon each end and extending from the line of the upper edge are the outwardly-
45 extending curved arms o , in the outer ends of which arms is journaled a guide-roller o^2 . Through the plate O extend the adjusting-bolts o^3 , which are screw-threaded and said ends extended through the slots i^3 in the blade
50 I, and upon the ends of said bolts are the nuts o^4 . These rollers are arranged in pairs upon each blade, and the periphery of each roller extends beyond the ends of the arms H H and bears upon the inner surface of the shell A of
55 the machine.

The series of arms H H are arranged upon the shaft G and carry the blades I, so as to extend at different angles from the shaft, the shaft being strengthened by truss-rods g , extending through the ends of radial arms g^2 .

In operation the waste animal matter, such as is known as "refuse" in packing-houses, and also bones are placed within the shell A and dry steam supplied to the chamber c
65 through the steam-chamber E, and this heat extracts the moisture from the mass and also

reduces the same to a granular condition, a certain per cent. adhering to the inner side of the shell A. Power being applied to the shaft G through the band-pulley g , the arms
70 H H are caused to rotate, the edges i^2 of the blades coming yieldingly in contact with the accumulation in the inner side of the shell A and removes the same, which falls to the bottom of the shell. During the passage of the
75 blades I I in their circle of rotation the rollers n^2 bear against the shell, and the degree of contact is made greater or less as the plate o is adjusted to or from the direction of the shell. The position of the rollers n^2 in such
80 adjustment also fixes adjustably the position of the edge i^2 of the blade I and enables the edge to take the matter cleanly from the shell without contact therewith, and this adjustment may be in degrees as the occasion re-
85 quires. The rollers also act to impart steadiness to the shaft G, which from the necessary length is somewhat flexible and keeps the blades I I in a parallel position with the inner surface of the shell. 90

The invention is applicable to all stirring-receptacles and for such as are used in congealing fluids.

Such modifications of the invention may be employed as are within the scope of the invention. 95

Having fully described my invention, what I now claim as new, and desire to secure by Letters Patent, is—

1. A device for removing adhesions to receptacles, comprising suitable supporting-
100 arms, guides upon said arms, a yielding blade within said guides, and an antifriction-gage located upon the side and extending beyond the outer edge of the said blade. 105

2. A device for removing adhesions to cylindrical vessels, comprising a longitudinal shaft, arms upon said shaft, guide-blades upon the outer ends of said arms, and suitably-supported guide-rollers located upon the
110 side and extending beyond the outer edge of the said blade.

3. A device for removing adhesions from cylindrical vessels, comprising a longitudinal shaft, arms upon said shaft, guide-plates upon
115 the outer ends of said arms, yielding blades within said guide-plates, and antifriction-rollers upon said plates having their periphery extending beyond the outer edge of said blades. 120

4. A device for removing adhesions from cylindrical vessels, comprising a longitudinal shaft, arms upon said shaft, guide-plates upon the outer ends of said arms, yielding blades within said guide-plates, and antifriction-
125 rollers upon said plates, and adjustable supports therefor upon said blades.

5. The combination with a cylindrical shell, of a longitudinal, rotary shaft within said shell, and radial arms on said shaft, guide-
130 plates upon the outer ends of said arms, and blades within said guide-plates having ver-

tical slots thereon, and yielding supports for
said blades within said guide-plates, antifric-
tion-rollers adapted to contact with the inner
surface of the shell, and a roller-supporting
5 plate upon said blade and having arms for
said rollers, and adjusting-bolts extending
through said plates, and slots in the said
blade, and suitable adjusting-nuts on said
bolts.

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Witnesses:

THEODORE C. SPARKS,
GEORGE W. DAY.