

No. 749,623.

PATENTED JAN. 12, 1904.

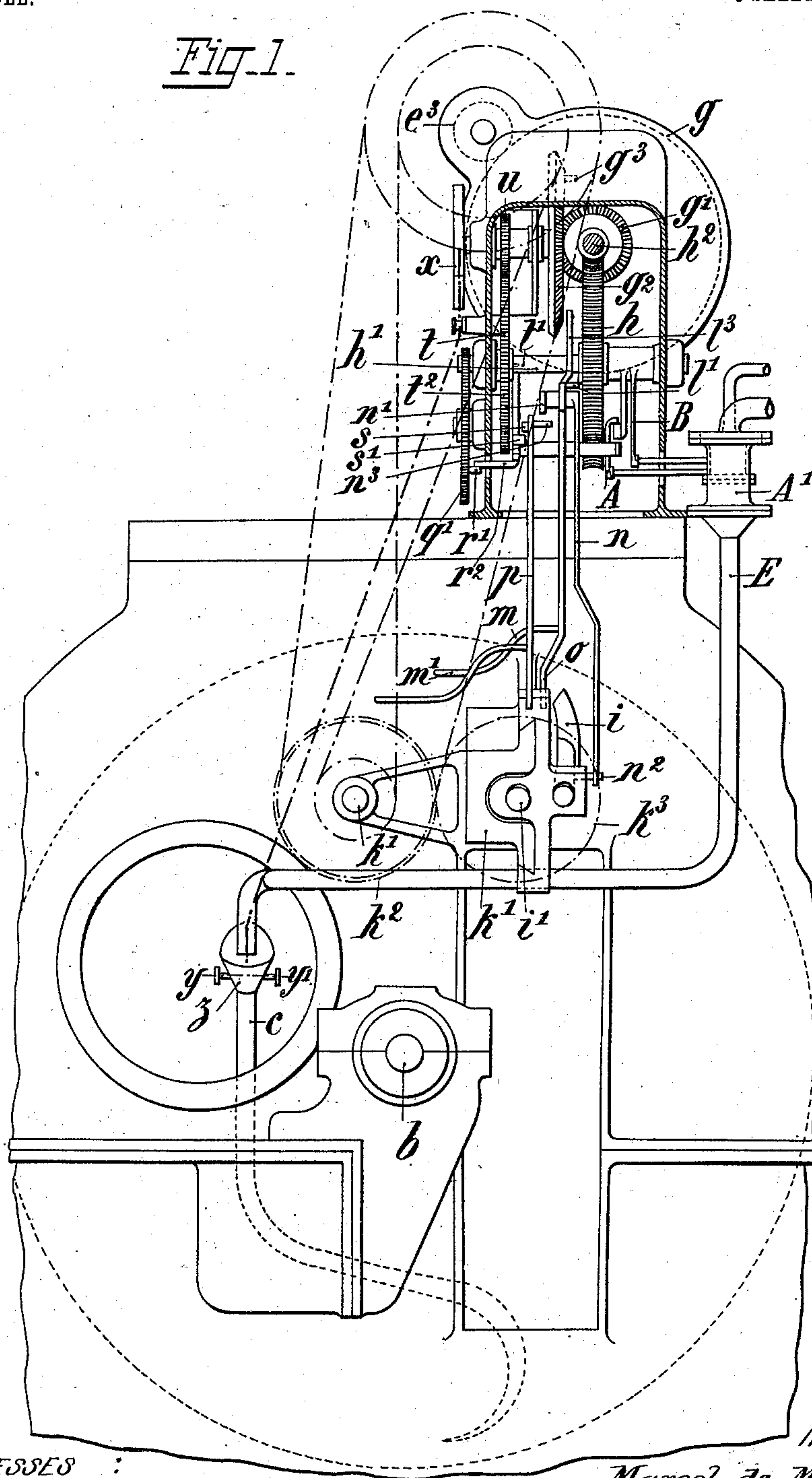
M. DE MARCHÉVILLE.
CENTRIFUGAL MACHINE.

APPLICATION FILED MAY 13, 1903.

NO MODEL.

5 SHEETS—SHEET 1.

Fig-1



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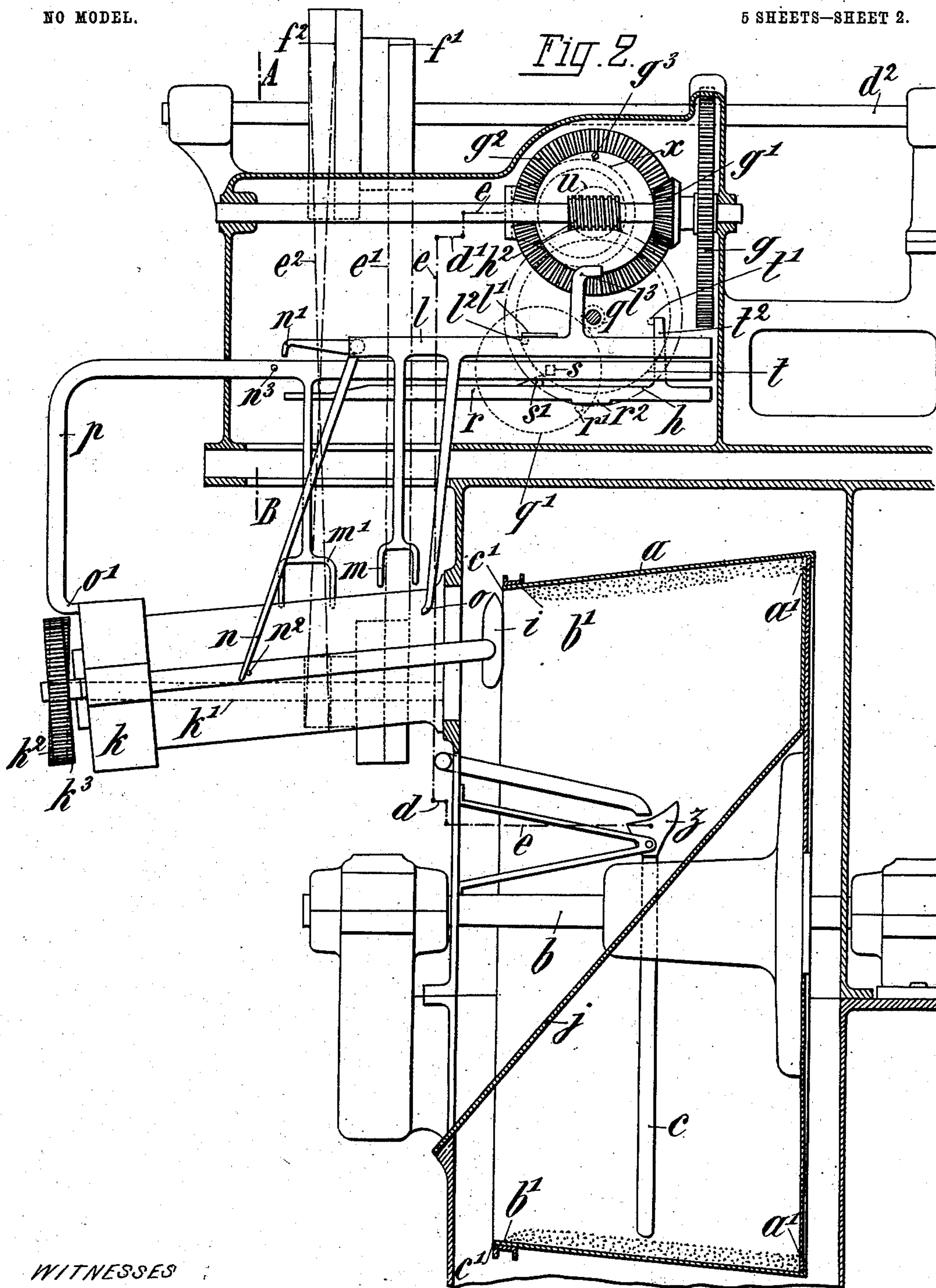
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5 SHEETS—SHEET 2.



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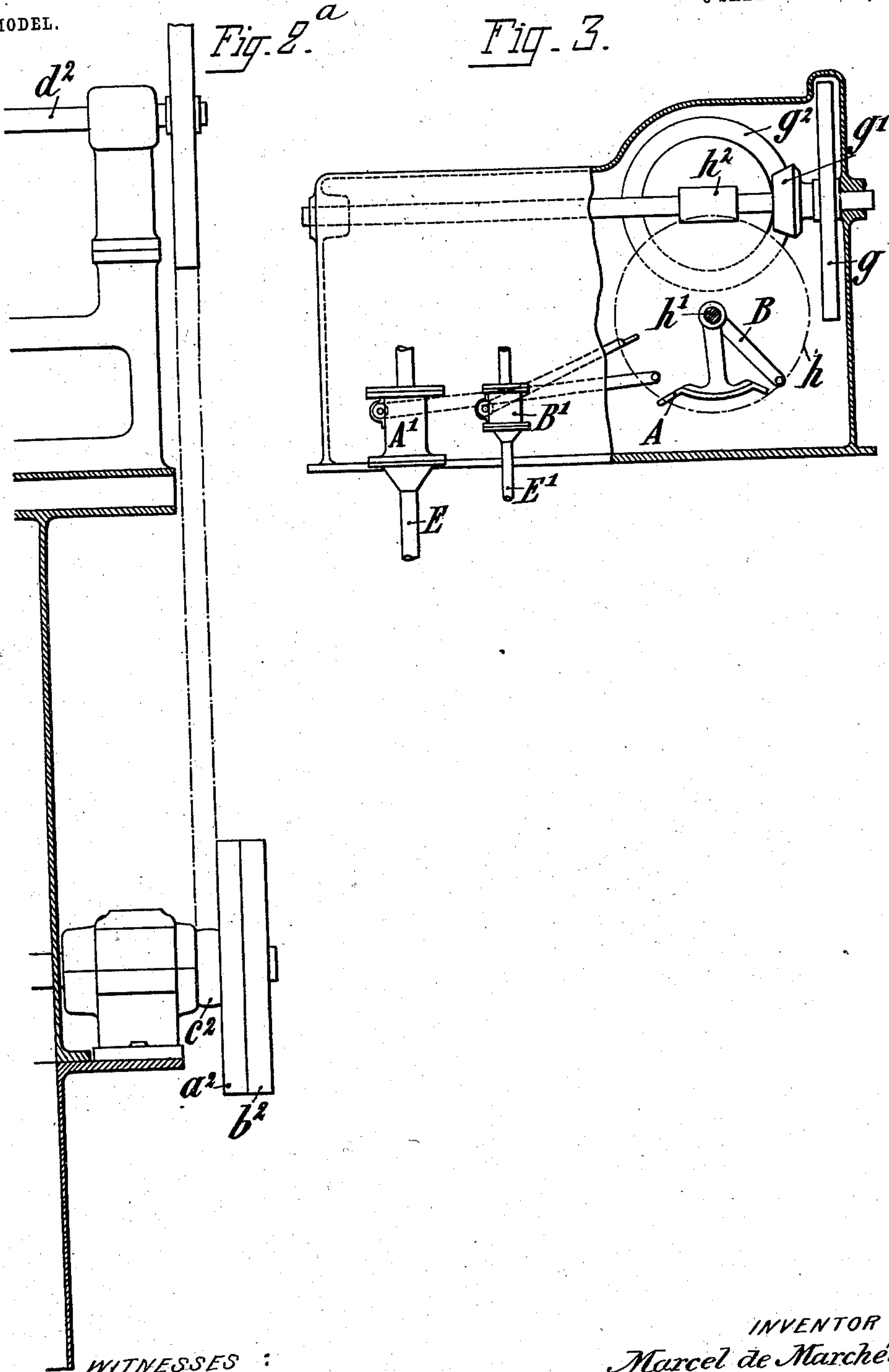
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5 SHEETS—SHEET 3.

NO MODEL.



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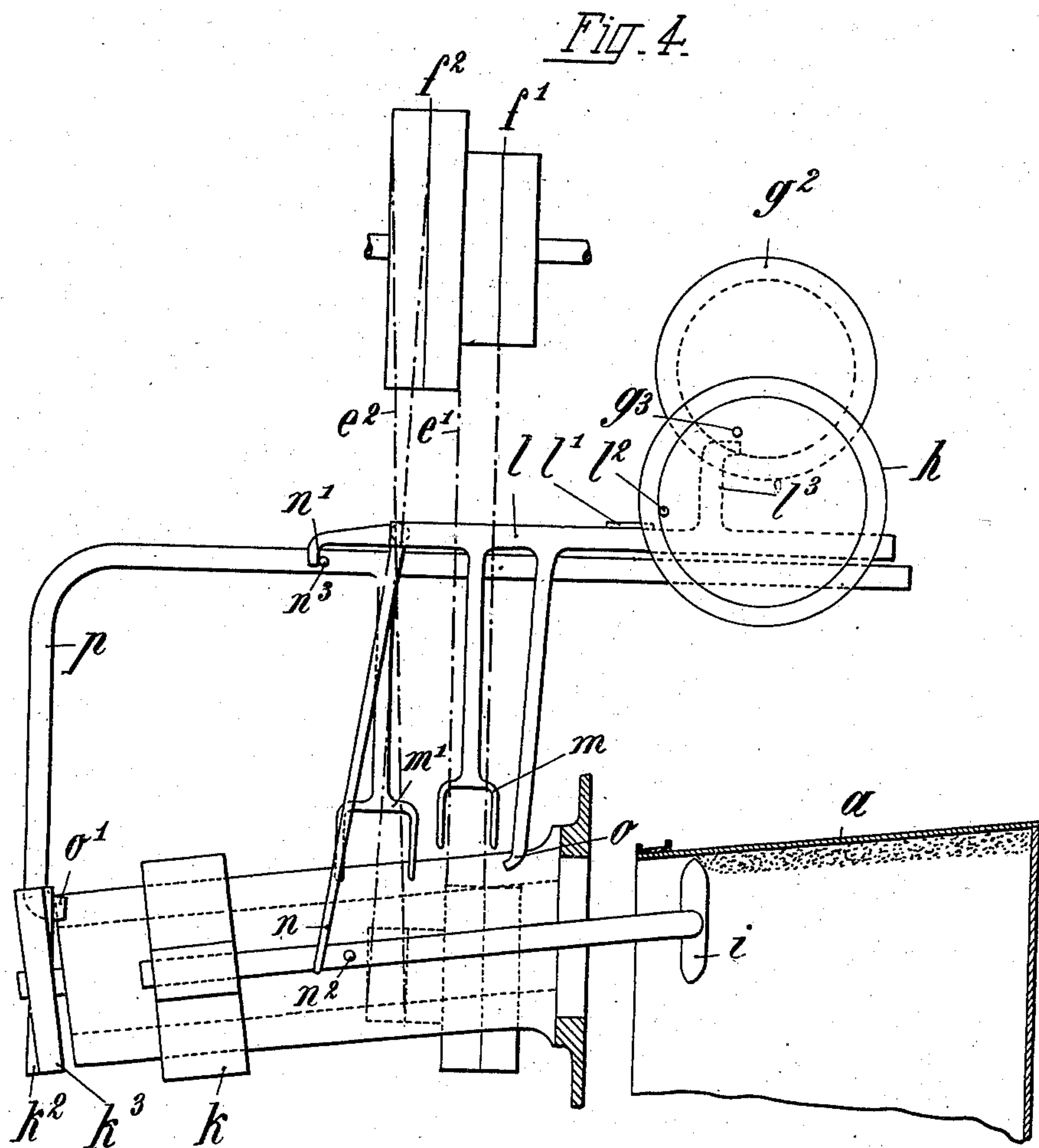
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5 SHEETS—SHEET 4.



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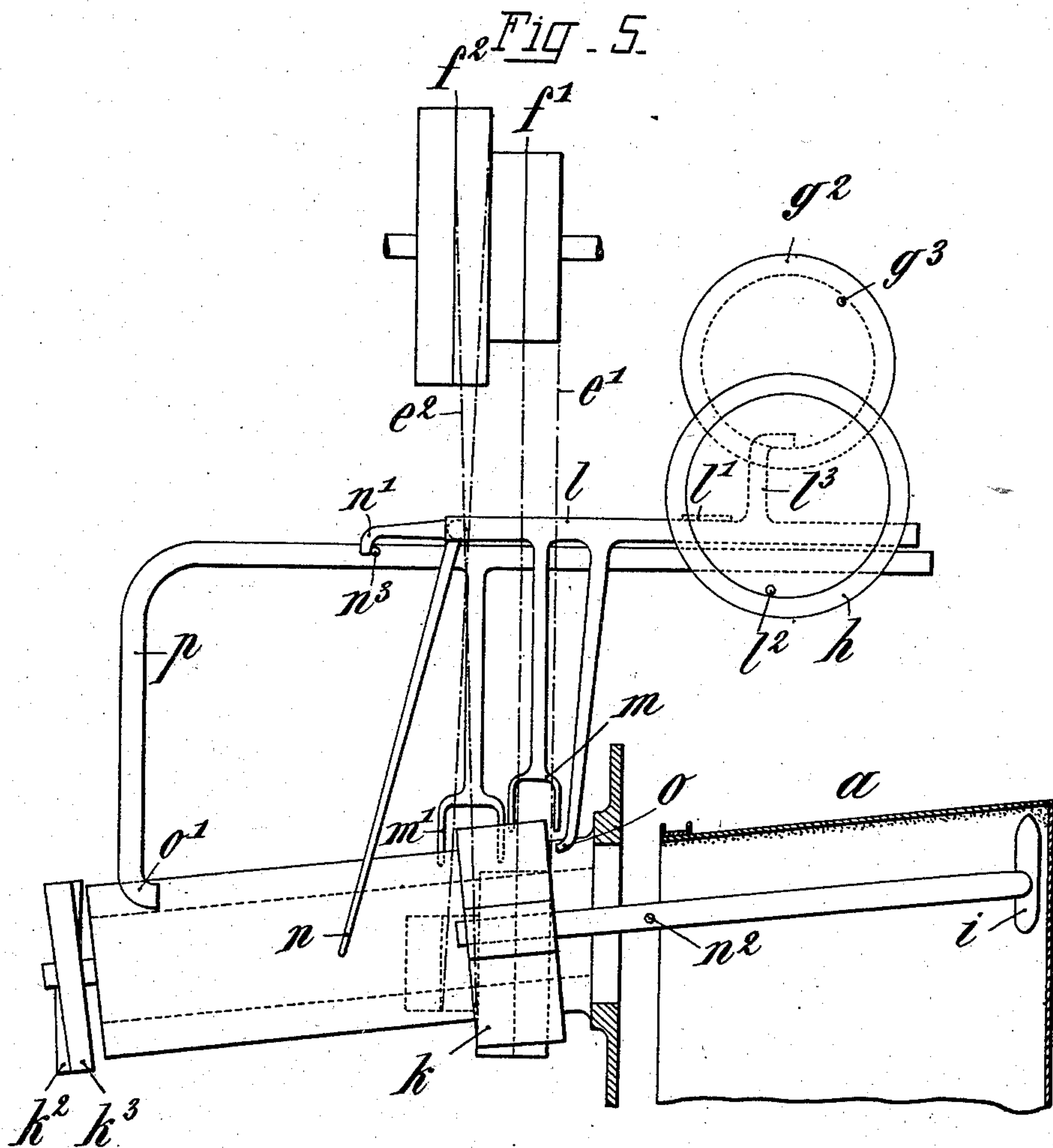
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5 SHEETS—SHEET 5.



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UNITED STATES PATENT OFFICE.

MARCEL DE MARCHÉVILLE, OF PARIS, FRANCE.

CENTRIFUGAL MACHINE.

SPECIFICATION forming part of Letters Patent No. 749,623, dated January 12, 1904.

Application filed May 13, 1903. Serial No. 156,947. (No model.)

To all whom it may concern:

Be it known that I, MARCEL DE MARCHÉVILLE, engineer, of 44 Rue de Château Landon, in the city of Paris, Republic of France, have invented Improvements in Hydro-Extractors, of which the following is a full, clear, and exact description.

This invention relates to a centrifugal hydro-extractor whereof the basket or drum is in the form of a truncated cone, the bottom being at the larger base, while the smaller base is entirely open and, unlike the usual form, devoid of any internal flange, thus permitting the employment of an extractor having simply an alternating rectilinear movement and capable of passing completely out of the drum, which in consequence of its truncated conical form will retain the material under treatment, notwithstanding the absence of any internal flange.

The invention is illustrated by way of example in the accompanying drawings, which show the various positions of the parts of the improved hydro-extractor.

Figure 1 is a front elevation, partly in section, on line A B, Fig. 2. Fig. 2 is a partial sectional side elevation of the same. Fig. 3 is a detail of the cams for controlling the admission-valves for the liquids. Figs. 4 and 5 show different positions of the parts represented in Fig. 2.

The same letters of reference denote like parts in all the figures.

The centrifugal machine proper consists of a truncated conical drum or basket a , which rotates upon a shaft b , the drum shown in the present example being intended for draining small crystals held in suspension in a liquid. The crystals after each draining are washed in a pure liquid to carry off the mother-liquor by which the crystals were primarily moistened. The liquid holding in suspension the pulverulent or finely-crystallized matter which it is desired to drain and eventually to wash is supplied to the centrifugal machine while in motion by means of an oscillating distributor c , which delivers the liquid and solid matters onto the parts $a' b'$ of the drum, leaving a zone $b' c'$ near the edge uncovered, so as to serve as a guard. This limitation of

the charge deposited to the zone $a' b'$ is permitted by the coned form of the drum, as it is evident that notwithstanding the most carefully limited movement of the oscillating distributor the material would spread over the entire surface on an ordinary cylindrical drum and that were the latter unprovided with internal flanges the liquid and solid matters would escape from the drum as soon as it is lightly charged.

The extractor hereinafter described is only adapted for use with a drum devoid of internal flanges and is not applicable for use in connection with a cylindrical drum.

Owing to the rapid rotation of the apparatus, the liquid alone drains through by the effect of the centrifugal force, and the solid substance, which in consequence of the conicity of the drum is prevented from escaping, accumulates against the interior and gradually increases in thickness until the charging is completed, which is limited only by the conicity of the drum and dimensions of the apparatus. The successive deposits of material form an even layer, which is sensibly parallel to the sides of the drum as far as zone b' , where it rapidly diminishes to nothing.

The shaft b is driven from the shaft by fast and loose pulleys $a^2 b^2$, which transmit the motion by means of pulley c^2 to the upper shaft d^2 , which by means of the bands $e' e^2$ passing around the two groups of fast and loose pulleys $f' f^2$ actuate the extractor mechanism and also drives by means of pinion e^3 a wheel g , by which the automatic charging, discharging, and washing operations are produced. Said wheel g also actuates through a bevel-pinion g' a wheel g^2 , for a purpose to be presently described.

The coned drum a is shown as carried by a horizontal shaft b ; but it may, however, be arranged to revolve about a vertical axis.

The distributor consists of a pipe c , bent to an S form and provided at its upper end with a funnel z to receive the matters to be separated. This funnel is provided with gudgeons, whereof $y y'$ indicate the axis, and it is capable of receiving a slow oscillatory movement about the axis $y y'$ by means of levers $d d'$ and connecting-rods e , operated by a cam

a , keyed on the shaft of wheel g^2 . The funnel z in its oscillatory movement causes the end of the distributing-pipe c to traverse the zone $a' b'$ within the drum at a distance of a few centimeters from the filtering-surface, the liquids supplied to funnel z being thereby evenly distributed during the rotation of the turbine over the whole filtering-surface $a' b'$. The charging having been completed, the separated product is then washed, if desired, by means of the same distributor, whereby the washing liquid is delivered over the whole area of the solid layer with the same regularity as in the distribution of the matters from which the deposit was formed, this washing serving to insure the thorough removal of the mother-liquor. These different stages of the operation are performed by means of a mechanical device operated from the shaft of the machine and consisting, essentially, of two cams A B, mounted on the shaft h' , and a worm-wheel h , driven by a worm h^2 , keyed on the shaft of wheels $g g'$. These cams, whose approximate form is shown in Fig. 3, have for their respective functions, first, to effect the opening and closing of a stop-valve A' for permitting of the admission of the product to be separated for the necessary period; second, to effect the opening and closing of the valve B' for controlling the supply of washing liquid, said valves A' B' being mounted on the pipes E E', through which the respective liquids are supplied. After the washing is complete and the separating terminated the contents of the drum are removed by means of a scraper which is mounted upon a slide movable along an arm of the machine-frame. The rake i , which is in the form of a curved gouge, receives a movement of translation parallel to the walls of the drum and sufficiently close to the filtering-surface to leave but a very thin layer of product, limited only by the more or less perfect centering of the machine. The separated product detached by the gradually-advancing movement of the scraper falls onto a discharge-chute j . After the discharge the scraper is returned rapidly to its normal position out of the drum, which is then ready for a fresh operation of charging, separating, washing, and extraction.

The scraper-operating mechanism comprises the slide k , supporting the scraper i , which is normally situated during the different stages of the separating outside the drum, as shown in Fig. 2. The slide k is moved by a leading-screw i' to the right or left, according as it is desired to extract the material or to return the scraper backward to the position of rest, these two movements being obtained by throwing into gear either the open driving-belt e' or the crossed belt e^2 with a counter-shaft k' , which gears by wheels $k^2 k^3$ with the leading-screw i' of the slide. The belts are shifted in or out of gear at the desired times in the fol-

lowing manner: The wheel h makes one revolution at each operation, and upon its shaft h' , as before mentioned, are mounted the cams controlling the charging and washing operations. At the moment when the discharge is to take place the tappet l^2 on wheel h lifts the lug l' on the belt-shipper rod l , whereby rod l is raised to a sufficient extent to enable a pin g^3 on a bevel-wheel g^2 to strike against the arm l^3 on the belt-shipper rod l and push the belt-shipper rod forward. On the lug l' escaping from tappet l^2 the rod l is allowed to drop at the advanced position to which it has been moved. By this movement of the rod the fork m is caused to ship belt e' onto the corresponding fast pulley, and thus throw the slide into action, whereby the slide is moved to the right and the extraction of the separated matter is effected. In its position of rest, Fig. 2, the slide-arm n of bent lever n' was held raised by a pin n^2 on the scraper-rod n , which in its forward movement allows of said arm being gradually lowered until its hooked end n' engages with pin n^3 , as shown in Fig. 4. On reaching the end of its inward stroke the slide abuts against the bent end of an arm o , as shown in Fig. 5, thereby moving the belt-shipper rod l backward and throwing the scraper-actuating mechanism out of gear, at same time causing the hooked end n' of rod l , which is engaged with pin n^3 , to move the belt-shipper rod p , carrying the fork m' , so as to throw the crossed belt e^2 onto the fast pulley, and so produce the return movement of the slide. The slide in its retrograde movement lifts lever n , so as to disengage hook n' from pin n^3 , and abuts near the end of its stroke against the bent end o' of the arm on rod p , which is thereby returned to its original position, thus automatically throwing the backward driving motion out of gear and effect the complete stoppage of the scraper-operating mechanism.

In order to preserve the perfect permeability of the filtering medium the mechanism is arranged to effect a washing of the filtering fabric at intervals of about an hour immediately after the product has been extracted. To this end a wheel g' , driven by a pinion g , keyed on shaft h' of wheel h , is caused to make one revolution per hour, said wheel g' carrying a pin r' , which lifts the projection r^2 , formed on bar r . At the moment when part n' in its backward movement acts through pin n^3 upon the belt-shipper rod p for effecting the backward movement of the slide the stop s' comes in contact with stud s , so that when the slide moves rod p forward for throwing the backward gear out of action it also carries the bar r with it until the moment when projection r^2 escapes from the pin r' . This forward movement of part p being produced once an hour and exactly at the termination of the automatic discharge of the previous corresponding operation is util-

ized for provisionally locking the charging-valve and opening that controlling the admission of the washing-water. The charging operation which should normally be effected is momentarily suspended and replaced by a washing which ceases when the pin t' of wheel t , driven by pinion u , formed on bevel-wheel g^2 , forces back the arm t^2 on bar p , thus closing the washing-valve B' and allowing of the opening of the charging-valve A' by the operation of the cam A . The bar p is drawn back about fifteen seconds after the pin t' has moved it forward and resumes its original position, which it retains until the time when wheel g' has made another revolution—that is to say, during another hour.

By the action of the mechanism a series of operations are performed, which comprise charging, washing, separating, and extraction of the drained matters and in addition about once an hour at the end of a discharge a provisional suspension of the charging and a washing of the filtering-surfaces, after which the apparatus resumes its normal course of operations, as described.

I claim—

1. A centrifugal machine having a revoluble conical drum which is devoid of an internal flange, a distributor operable to deposit matter over the inner surface of the drum within a definite zone, and means for imparting a traversing movement to the distributor relative to that surface of the drum designed to receive the deposit of matter.

2. A centrifugal machine having a revoluble conical drum which is devoid of an internal flange, an oscillatory distributor hung to vibrate within the drum and effective in depositing matter on the inner surface of the drum within a definite zone, means for imparting a traversing movement to the distributor, and means for supplying matter to the distributor during the operation thereof.

3. A centrifugal machine having a revolu-

ble drum, means for depositing matter on the inner surface of the drum within a definite zone, and a scraper having traversing movement relative to the drum for scraping accumulated matter from the inner surface of the drum.

4. A centrifugal machine having a revoluble drum, means for depositing matter on the inner surface of the drum within a definite area, a scraper movable in a path across the surface of the drum, and automatic devices for imparting a to-and-fro movement to the scraper.

5. A centrifugal machine having a revoluble drum, a distributor operable to deposit matter over the inner surface of the drum within a definite zone, a valved pipe for supplying matter to the distributor, another valved pipe for supplying a washing liquid to the distributor, and means for temporarily closing the valve in the first pipe and opening the valve in the second pipe.

6. A centrifugal machine having a revoluble drum, means for depositing matter on the surface of the drum within a definite zone, means for cutting off the supply of matter, and means for supplying a washing liquid to the coated surface of the drum when the supply of matter to be separated is cut off.

7. A centrifugal machine having a revoluble member, valve-controlled means for depositing matter on the drum within a definite zone, a reciprocatory scraper for traversing said zone, means for periodically cutting off the supply of matter, and means for actuating the scraper during the period of cessation of supply to the member.

The foregoing specification of my improvements in hydro-extractors signed by me this 1st day of May, 1903.

MARCEL DE MARCHÉVILLE.

Witnesses:

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MAURICE H. PIGNET.