

No. 707,531.

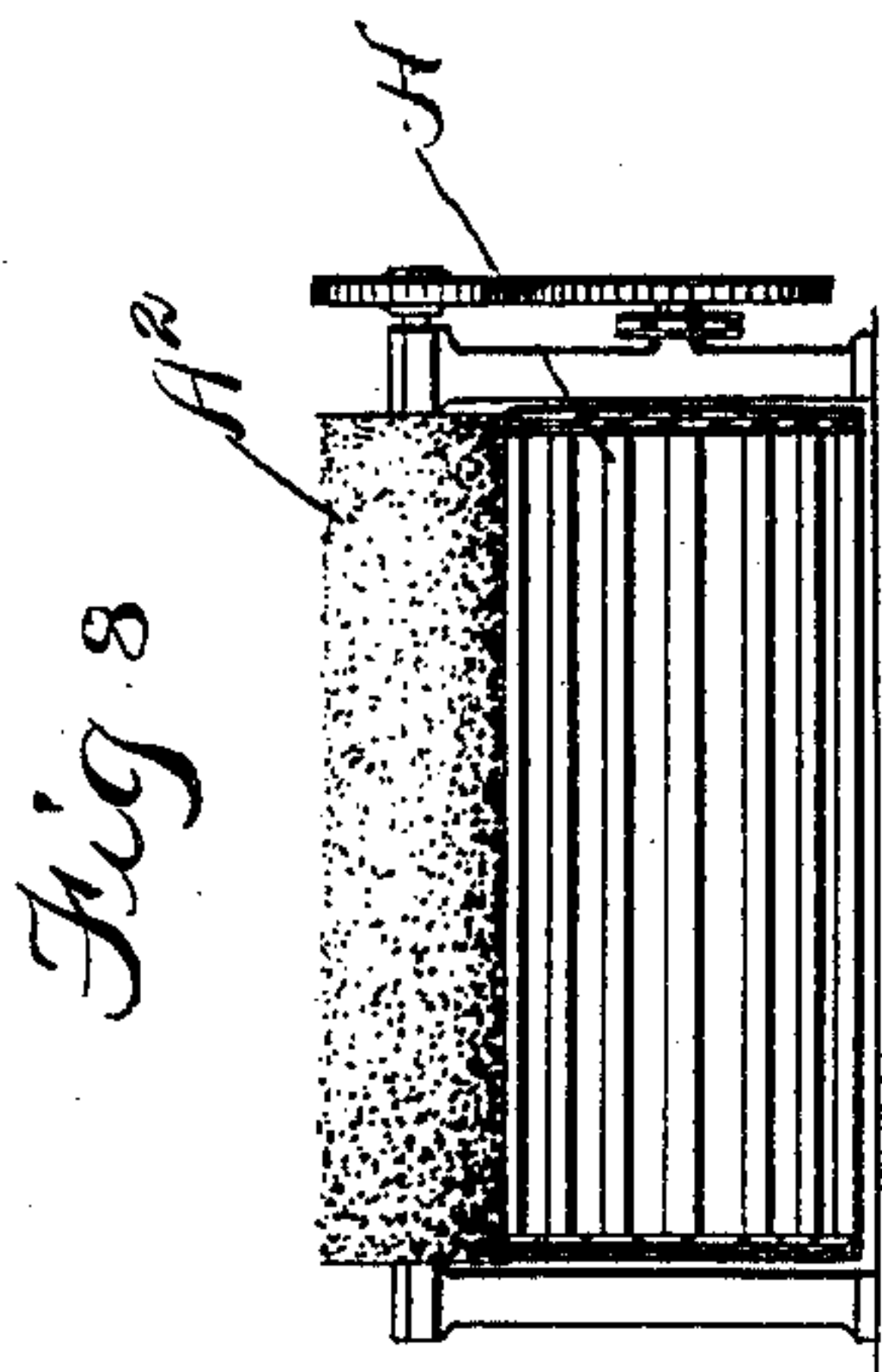
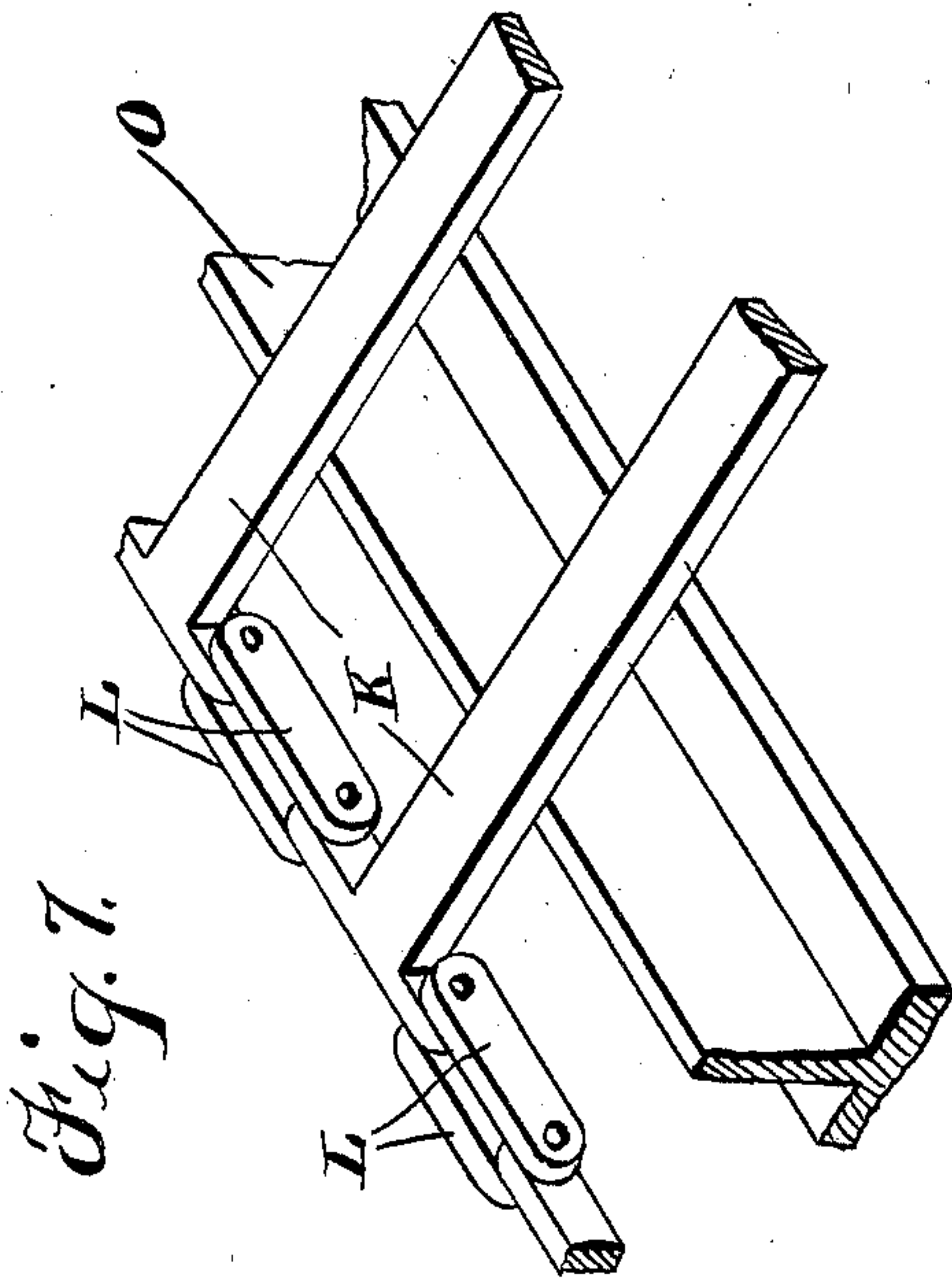
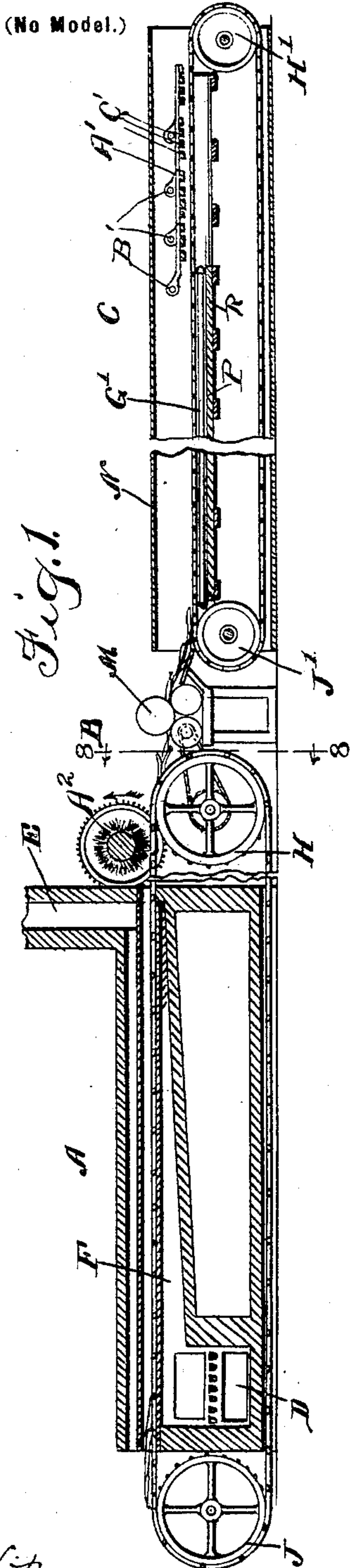
Patented Aug. 26, 1902.

A. J. ADAMSON.

APPARATUS FOR SEPARATING THE PITH OR CORE FROM THE RIND PORTION  
OF FIBROUS MATERIAL.

(Application filed July 19, 1901.)

3 Sheets—Sheet 1.



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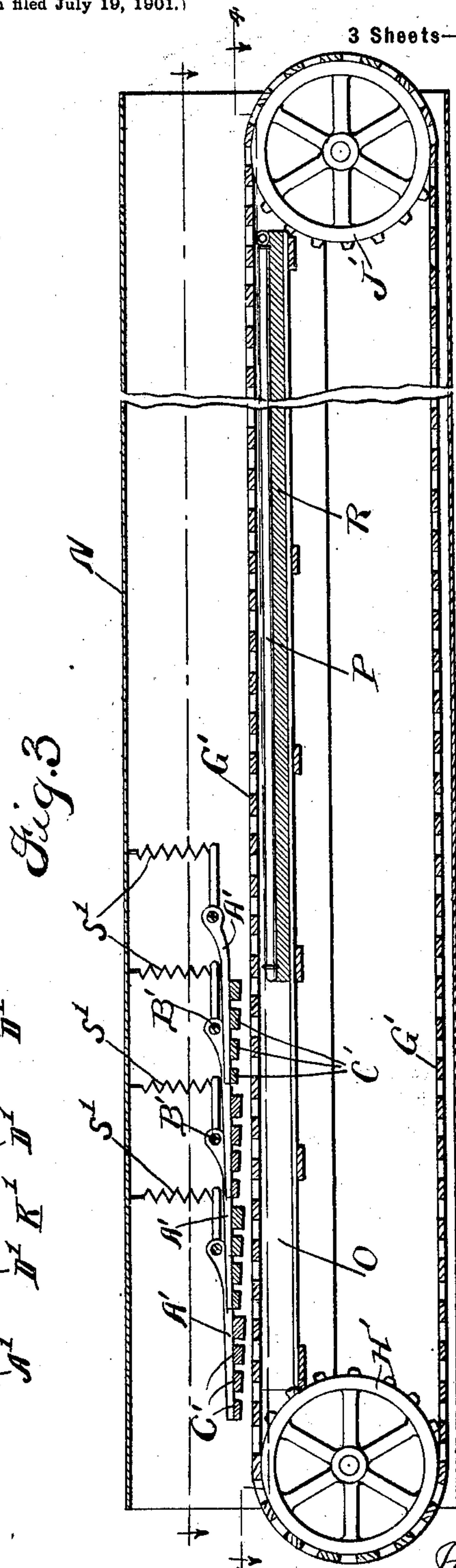
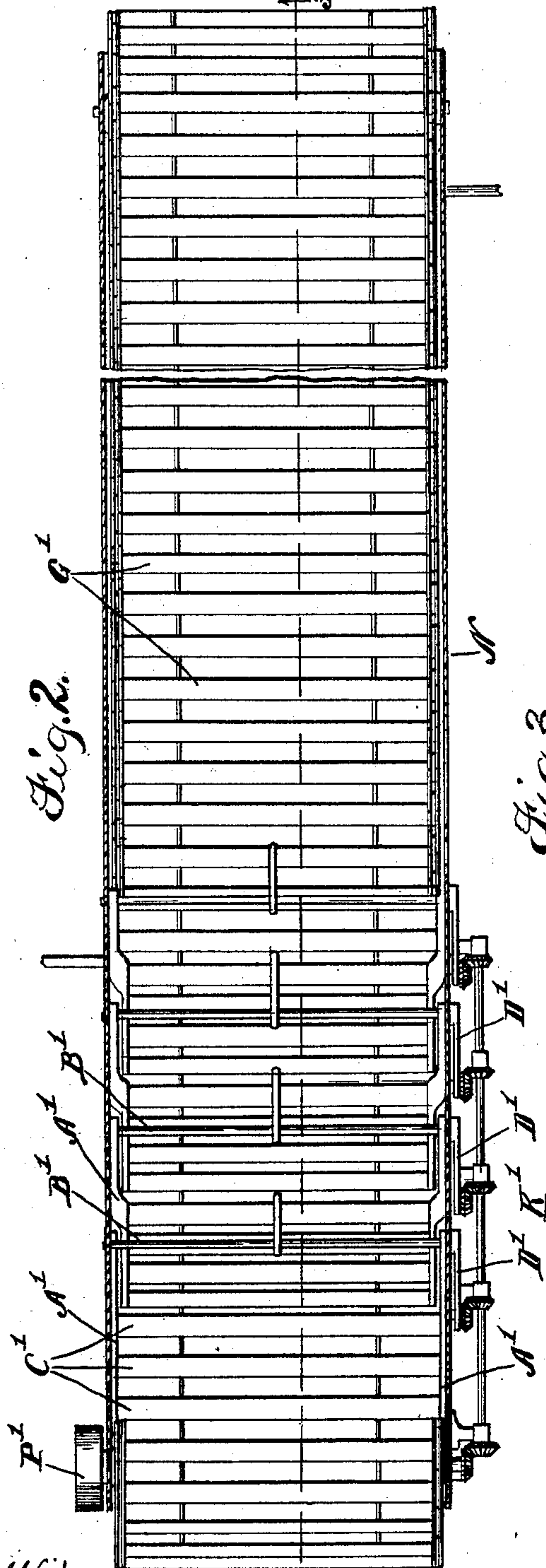
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3 Sheets—Sheet 2.



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3 Sheets—Sheet 3.

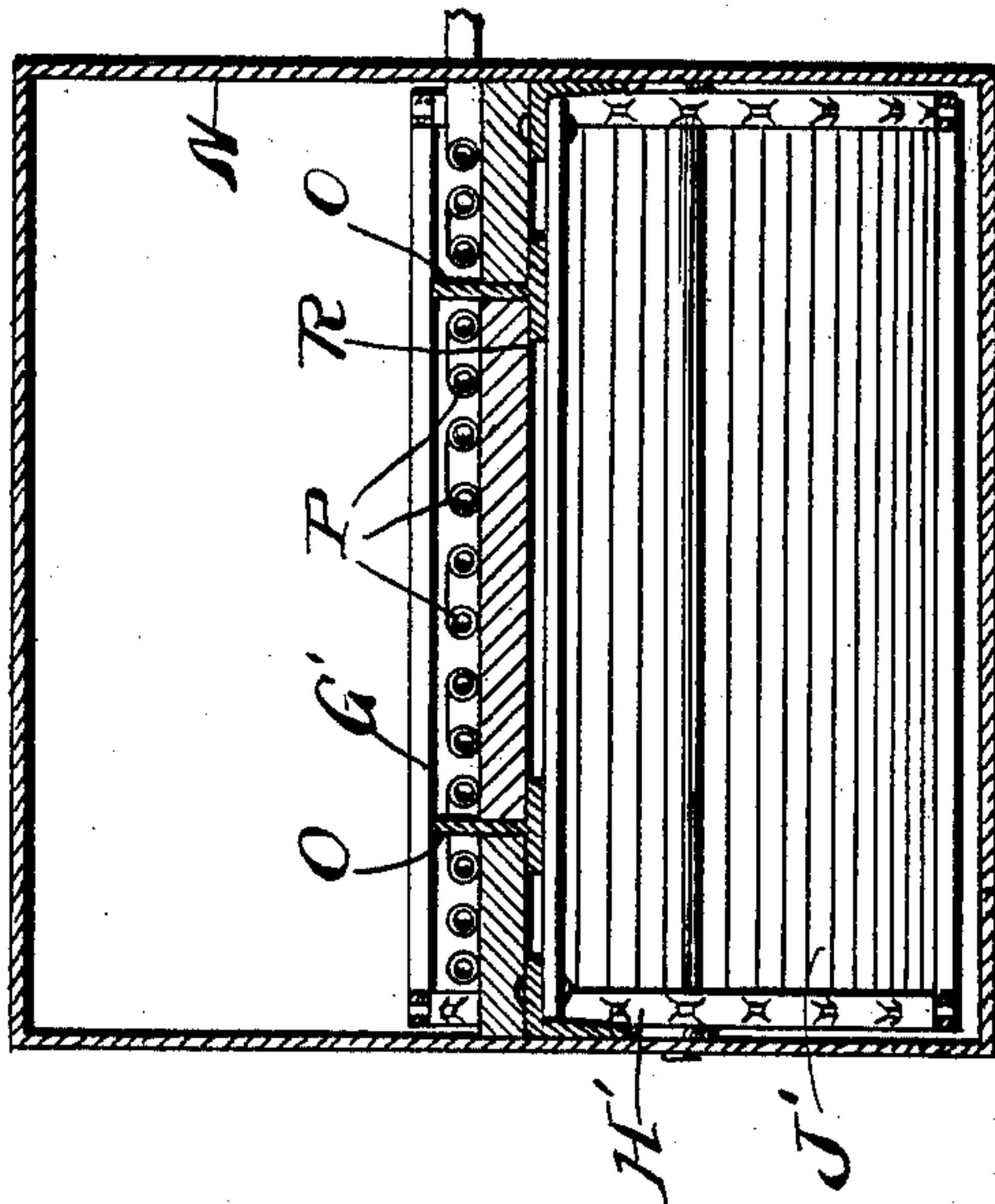
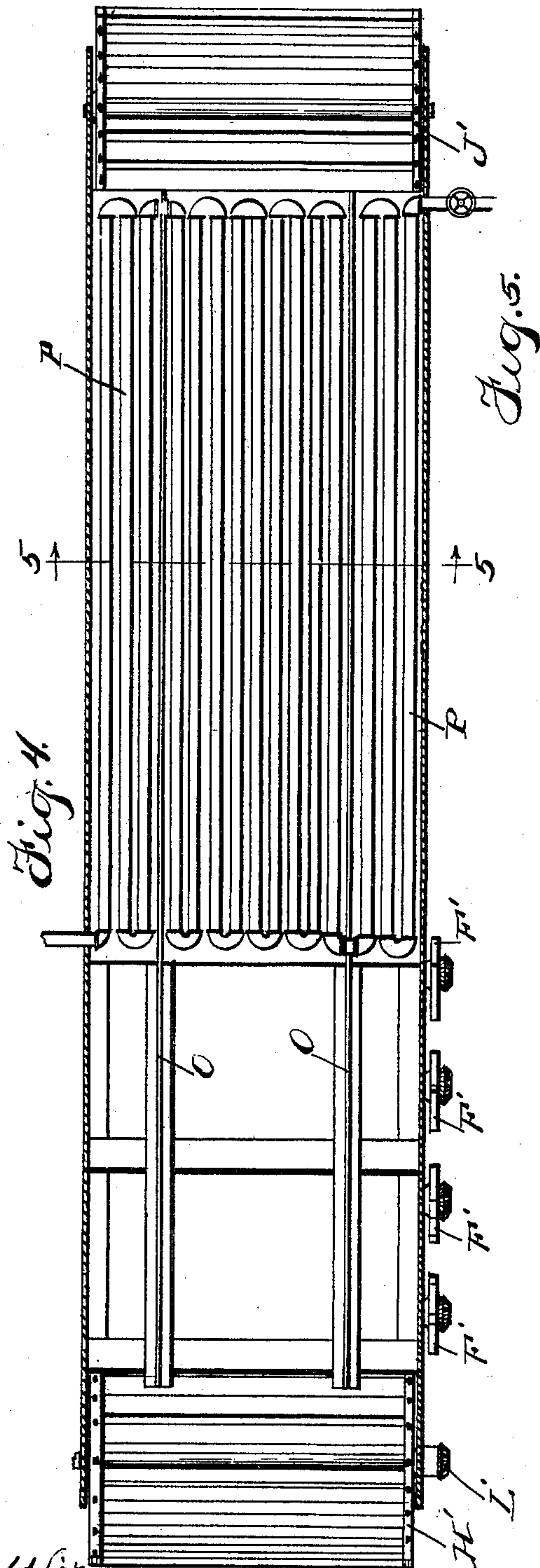
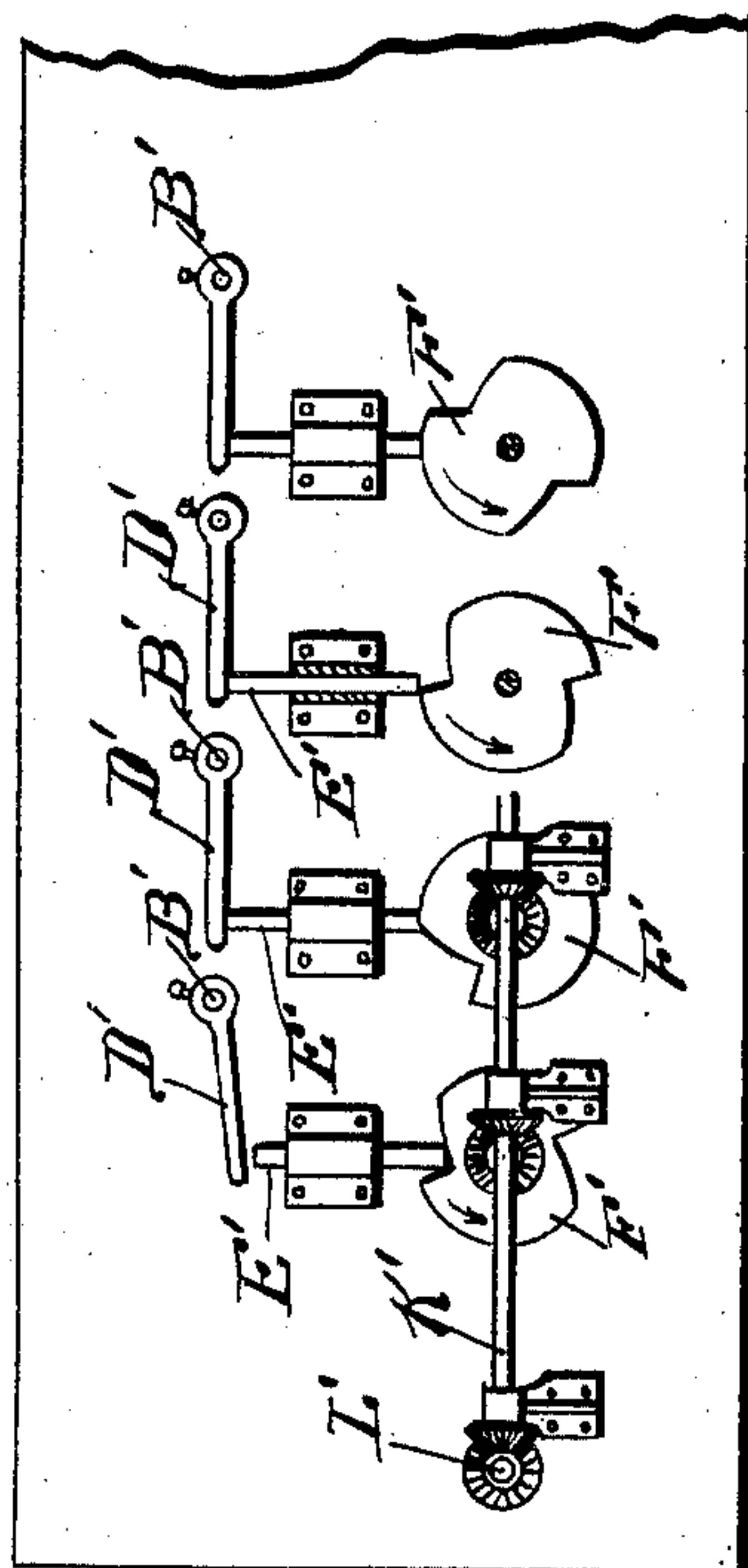


Fig. 6



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# UNITED STATES PATENT OFFICE.

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APPARATUS FOR SEPARATING THE PITH OR CORE FROM THE RIND PORTION OF FIBROUS MATERIAL.

SPECIFICATION forming part of Letters Patent No. 707,531, dated August 26, 1902.

Application filed July 19, 1901. Serial No. 68,906. (No model.)

*To all whom it may concern:*

Be it known that I, ANDREW J. ADAMSON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Apparatus for Separating the Pith or Core from the Rind Portion of Fibrous Material, of which the following is a specification.

This invention relates to apparatus for separating the pith or core from the rind or cover of fibrous or other material.

The object of the invention is to provide an apparatus which is of simple construction and arrangement for efficiently loosening and separating the pith or core portion of fibrous or other material from the rind or outside hull or cover thereof in such manner that the various parts or portions may be utilized for the purposes for which they are specially adapted.

The invention consists, substantially, in the construction, combination, location, and arrangement of parts, all as will be more fully hereinafter set forth, as shown in the accompanying drawings, and finally pointed out in the appended claims.

Referring to the accompanying drawings and to the various views and reference-signs appearing thereon—

Figure 1 is a view in longitudinal section of an apparatus embodying the principles of my invention. Fig. 2 is a horizontal section on the line 2 2 of Fig. 3 looking in the direction of the arrows and showing the arrangement of drier and beater apparatus. Fig. 3 is a longitudinal section on the line 3 3 of Fig. 2 looking in the direction of the arrows. Fig. 4 is a top plan view of the construction shown in Figs. 2 and 3, parts in horizontal section on the line 4 4, Fig. 3. Fig. 5 is a transverse section on the line 5 5, Fig. 4. Fig. 6 is a broken detail view in side elevation, showing the beater-actuating means. Fig. 7 is a broken detail view in perspective of the traveling carrier. Fig. 8 is a detail view showing the arrangement of the cleaning device.

The same part is designated by the same reference-sign wherever it occurs throughout the several views.

Various fibrous or other material—such, for instance, as sugar and sorghum cane, cotton-stalks, ramie, cornstalks, and the like—possess a pith or core which I have found exceedingly valuable for making paper-pulp in the manufacture of fine grades of paper, cardboard, and the like, as well as for other purposes. So far as I am aware, no systematic effort has heretofore been made to utilize this product in the manufacture of paper or other purpose, and large quantities of such material are annually neglected and wasted. It is the special purpose of my present invention to provide an apparatus which is simple in construction and efficient in operation for separating the pith or core portion from such material, so that such portion may be recovered and utilized.

In carrying out my invention I first roast or heat the material in order to evaporate a portion of the water content thereof and to eliminate therefrom any impurities or deleterious bacteria and to loosen the pith or core from the rind or hull portion. The heated or roasted material is then subjected to pressure in order to express or expel therefrom any liquid content thereof remaining after the heating or roasting operation and in order to crush or break up the rind, outside or hull portion, and to still further detach the same from the pith or core. The crushed material is then thoroughly dried and is subjected to the action of beaters, which serve to complete the separation of the pith or core from the rind, thereby enabling the pith or core to be recovered and collected for use in making paper-pulp or for any other purpose for which it is adapted.

Referring to the accompanying drawings, reference-sign A designates generally a heating or roasting furnace.

B designates generally the pressure mechanism, and C the drying and beating apparatus. The heating and roasting apparatus A consists of a furnace-chamber or fire-box D, a smoke-stack E, and a roasting or heating chamber F, said chamber extending the entire length of the furnace. Arranged to operate through the furnace-chamber F is a



carrier G. In the particular form shown, to which, however, the invention is not limited or restricted, the carrier G comprises an endless belt or conveyer operating over rollers H J, arranged, respectively, adjacent to the ends of the roasting apparatus and comprises slats K, respectively connected together at their ends by means of links L. Upon this carrier the material is placed by hand or otherwise and slowly fed through the roasting-chamber F, where it is subjected to the action of the heat. The temperature of the furnace-chamber should be maintained at about the temperature of boiling water; but the exact degree of temperature varies according to the character of the material operated on. In the case of green sorghum or sugar cane I have found about ten minutes a sufficient length of time for the material to traverse the length of the furnace or roasting-chamber. The heat to which the material is subjected while being roasted serves to evaporate a portion of the water content of the material and to cause the impurities and bacteria therein to exude in the form of a gummy substance, which is evaporated or burned, and also the pith or core becomes loosened from the rind, cover, or hull portion of the material. The carrier G delivers the roasted material from the roasting-furnace to the pressure mechanism B, which, if desired and in the form shown, may comprise an ordinary arrangement of grinding-rollers M, between which the roasted material is passed and by which any remaining liquid portion of the material is expressed, and which in the case of sorghum or sugar cane or the like is the pure natural juice of such material freed from bacteria or impurity. This liquid or juice may be collected and preserved and utilized for the manufacture of sugar or syrup. In the case of corn-stalks, cotton-stalks, and the like, however, it is unnecessary to collect any of the juices expressed therefrom by the pressure mechanism B, and in any case the action of the compressing mechanism is to crush and break up the rind, hull, or cover portion of the material and to effect a still further detachment of the pith or core therefrom.

It is sometimes desirable to remove any charred fragments of leaves, twigs, or the like which may remain adhering to the stalks after passing through the roasting-furnace and before being delivered to the compressing mechanism. This is particularly desirable where sugar or sorghum cane is employed and the juices thereof expressed by the compressing mechanism are to be collected and converted into sugar or syrup in order to avoid the presence of such charred or burned fragments in the collected juices. I attain the desired object by arranging a suitable scraping device in the path of the material and between the roasting-furnace and the compressing apparatus and in position to operate on the material. This scraping device

may be of any suitable embodiment. The device shown consists of a rotary brush-drum A<sup>2</sup>, preferably provided with wire bristles. Said drum is journaled transversely of or across the carrier G and somewhat above the same, with the bristles thereof adapted to be revolved against the material and sweep off or detach any burned or charred fragments from the cane. In practice I propose to drive or rotate the brush-drum in the direction of travel of the cane, but at a somewhat higher rate of speed, in order to avoid displacing the cane-stalks from proper relation for being received by the compressing mechanism, while at the same time insuring an efficient removal of the charred or unburned fragments of twigs or the like.

The heating or roasting leaves the pith or core in a softened pliable condition, which is merely compressed into thin strips by the compressing apparatus and is not injured or broken thereby. From the compressing mechanism the material is delivered to the drying and beating apparatus C. This comprises a suitable closed chamber N, through which operates a carrier G', similar in all respects to the carrier G, operating through the roaster A, said carrier operating upon suitable guides or supports O, extending longitudinally through the drying-chamber N and over sprocket wheels or drums J' H', respectively arranged at the front and rear ends of the drier-chamber N. Adjacent to the front or receiving end of the drier-chamber I provide for the efficient drying of the material as it is received from the pressure mechanism. This may consist of suitable heating pipes or coils P, arranged upon a support R and immediately beneath the path of carrier G', as clearly shown in the drawings. The crushed or compressed material is thus efficiently dried, and any moisture or liquid content thereof remaining after the action of the compressing mechanism is dried and evaporated, leaving the pith or core portion entirely free from moisture or impurity. In order to finally effect the thorough separation of the pith or core portion from the rind, cover, or hull thereof, the material after being dried is subjected to the action of suitable beaters. These are shown most clearly in Figs. 2 and 3 and comprise arms A', suitably mounted on shafts B', extending transversely of the drier-chamber and above the carrier G' and carrying slats C', arranged to extend transversely across and somewhat above the carrier G'. Rocking movement may be imparted to the shafts B' in order to enable the slats C' to exert a beating effect upon the material carried by carrier G'. This rocking movement may be effected by means of crank-arms D', connected to said shafts B' and arranged to be rocked by rods E', said rods reciprocated by means of cams F'. The cams F' are actuated from a shaft K', driven from any suitable or convenient source—as, for instance, from the shaft L' of sprocket-drum H', the



latter being driven from any suitable or convenient source—as, for instance, through pulley P'. The cams F' are set at different positions of eccentricities, so that as the material is progressed by the actuation of carrier G' it is subjected to the beating action of the slats C', springs S' serving to oppose the rocking movement of the crank-arms D' under the influence of cams F'.

It will be noted that the beaters do not begin to operate until after the material is roasted, compressed, and dried, and since the roasting as well as the compressing operations result in detaching or loosening the pith or core from the rind, and since the rind is broken or crushed by the compressing apparatus, the thorough separation of the pith or core is completed by the beaters. The pith or core thus separated and collected forms a most excellent material for use in making paper-pulp in the manufacture of fine grades of paper, cardboard, and the like, or it may be used for any other purpose for which it is adapted. The rind or outside portion of the material thus separated may also be collected and bundled and sold or used for fuel purposes and, if desired, may be utilized in the fire-box D and also for heating the heating-coils P, or it may be used as a substitute for excelsior or other straw packing or the like.

Many variations and changes in the details of construction and arrangement would readily suggest themselves to persons skilled in the art and still fall within the spirit and scope of my invention. I do not desire, therefore, to be limited or restricted to the exact details shown and described; but,

Having now set forth the object and nature of my invention and a construction embodying the principles thereof, what I claim as new and useful and of my own invention, and desire to secure by Letters Patent, is—

1. In an apparatus for separating the pith or core from fibrous or other material, the combination of roasting, compressing, drying and beating apparatus, arranged and operating in the manner and for the purpose set forth.

2. In an apparatus of the class described, a roasting-furnace, means for feeding the material to be roasted therethrough, a compressing apparatus to which said feeding means delivers the roasted material, a drier arranged to receive the compressed material from said compressing mechanism, and beaters operating to separate the pith or core from the rind portion of the material treated, as and for the purpose set forth.

3. In an apparatus of the class described, a roasting-furnace provided with a chamber extending therethrough, a carrier operating through said chamber, a compressing mechanism to which said carrier delivers, a drying-chamber, a carrier operating therethrough and arranged to receive the material from the

compressing apparatus, and beaters arranged to complete the separation of the pith or core from the rind portion of the material treated, all combined and arranged as and for the purpose set forth.

4. In an apparatus of the class described and in combination with roasting and compressing mechanisms, of a drier comprising a chamber, a carrier operating through said chamber, means for heating said chamber, shafts transversely journaled in said chamber and provided with beaters, and means for rocking said shafts, as and for the purpose set forth.

5. In an apparatus of the class described and in combination with roasting and compressing mechanism, of a drier, a carrier operating through said drier, shafts journaled above said carrier and having arms, transverse slats carried by said arms, and means for rocking said shafts whereby said slats exert a beating effect over said carrier, as and for the purpose set forth.

6. In an apparatus of the class described and in combination with roasting and compressing mechanism, of a drier, a carrier operating therethrough, shafts transversely mounted in said drier and carrying arms, slats connecting the arms of each shaft, said slats extending transversely of the carrier and above the same, crank-arms carried by said shafts, cams arranged to rock said arms, means for actuating said cams, and means for opposing the action of said cams, as and for the purpose set forth.

7. In an apparatus of the class described and in combination with roasting and compressing apparatus, of a drier, supports extending longitudinally therethrough, a carrier operating upon said supports and comprising transverse slats connected at their ends by links, heating-coils arranged beneath the path of travel of said carrier and adjacent thereto, and beaters operating over the upper surface of said carrier adjacent to the rear end thereof to pound or beat the material conveyed by said carrier, as and for the purpose set forth.

8. In an apparatus of the class described, a furnace, a carrier operating therethrough, a compressing mechanism to which said carrier delivers, and a scraping device interposed between the furnace and compressing mechanism and operating to remove any charred or burned fragment from the material operated on, as and for the purpose set forth.

9. In an apparatus of the class described, a furnace, a carrier operating therethrough and a compressing mechanism to which said carrier delivers, in combination with a drum-brush arranged transversely across and above said carrier and between said furnace and compressing mechanism, as and for the purpose set forth.

10. In an apparatus of the class described, a furnace, a carrier operating therethrough, a



compressing mechanism to which said carrier  
delivers, in combination with a rotary brush  
arranged transversely across the path of  
travel of said carrier and above the same,  
5 said brush adapted to be rotated in the direc-  
tion of travel of the carrier but at a higher  
rate of speed, as and for the purpose set forth.

In witness whereof I have hereunto set my  
hand, this 2d day of July, 1901, in the pres-  
ence of the subscribing witnesses.

ANDREW J. ADAMSON.

Witnesses:

CHAS. H. SEEM,  
S. E. DARBY.