

F. B. ANDERSON.
 APPARATUS FOR EXTRACTING OIL.
 APPLICATION FILED OCT. 21, 1907.

960,144.

Patented May 31, 1910.

4 SHEETS—SHEET 1.

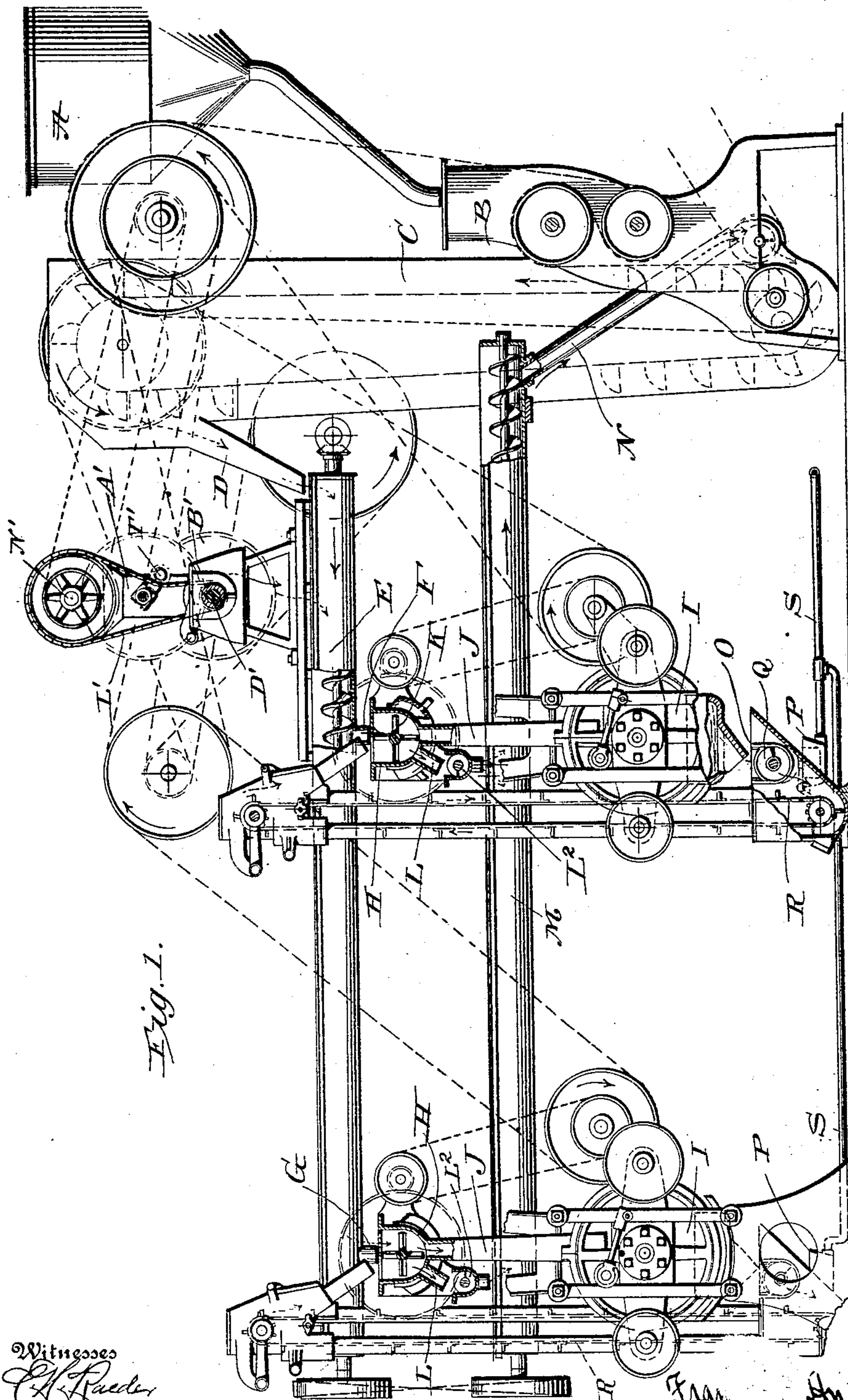


Fig. 1.

Witnesses
C. E. Raeder
K. E. Stenhall

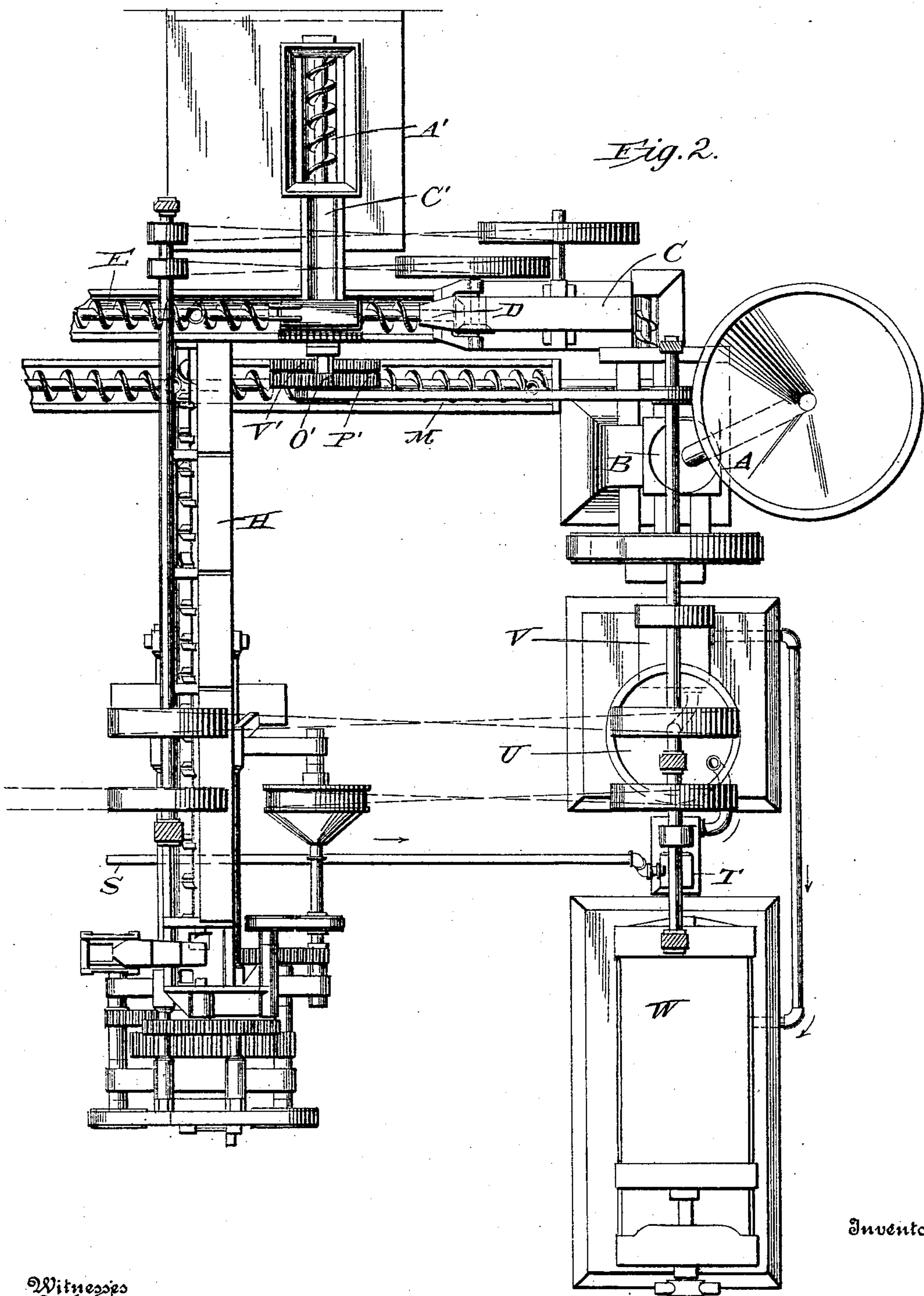
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Witnesses
R. H. Gaider
A. E. Chamberlain

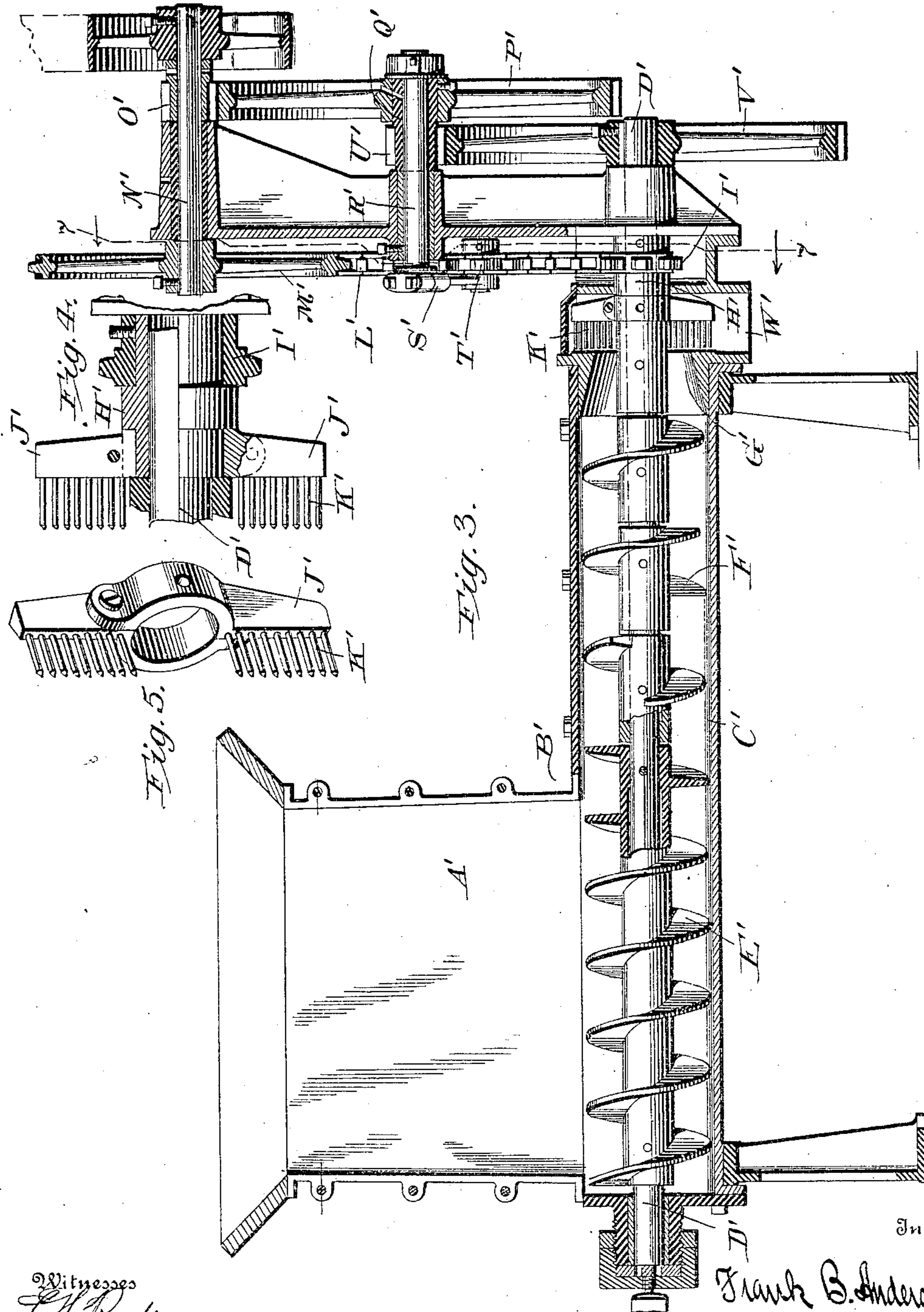
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Witnesses
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4 SHEETS—SHEET 4

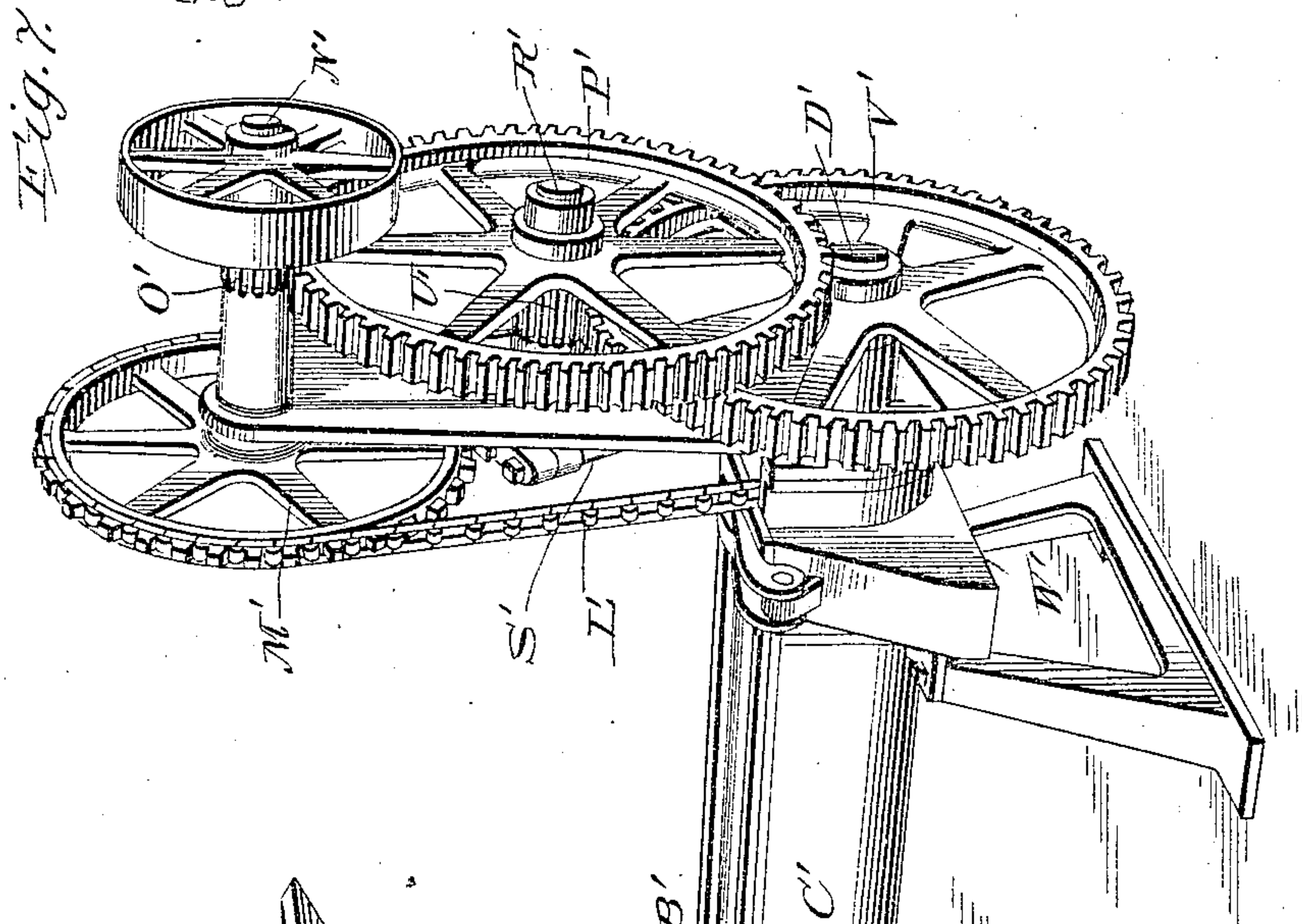
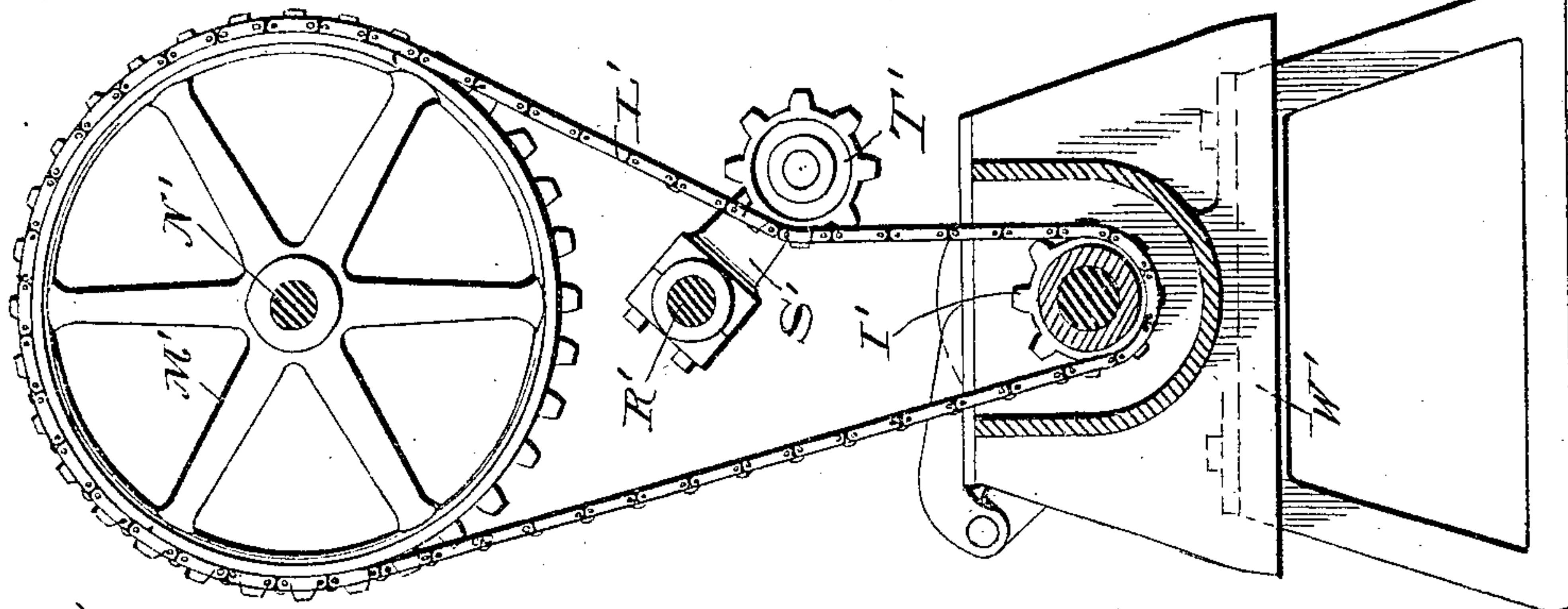
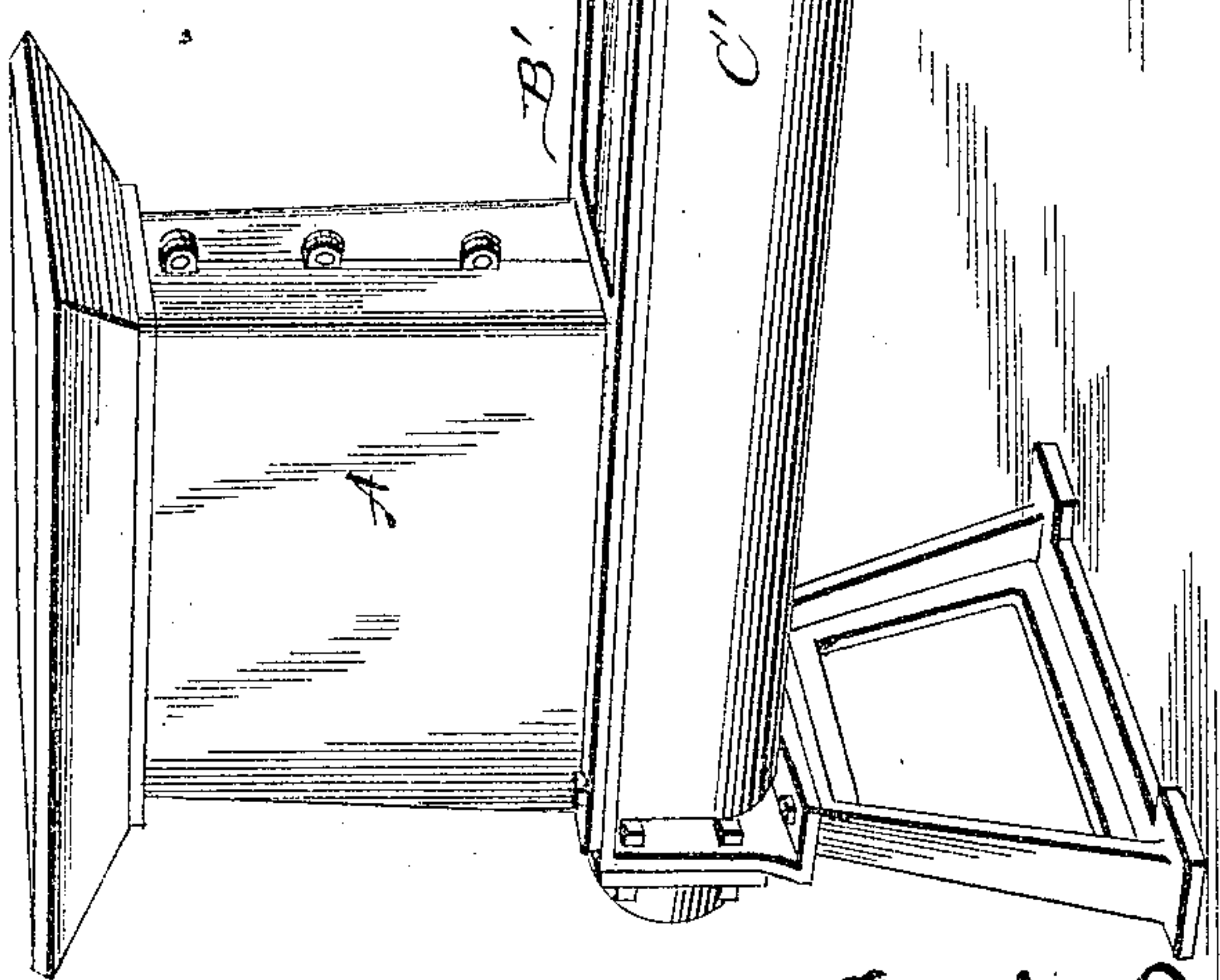


Fig. 6.



Witnesses
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UNITED STATES PATENT OFFICE.

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APPARATUS FOR EXTRACTING OIL.

960,144.

Specification of Letters Patent.

Patented May 31, 1910.

Application filed October 21, 1907. Serial No. 398,427.

To all whom it may concern:

Be it known that I, FRANK B. ANDERSON, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Apparatus for Extracting Oil, of which the following is a specification.

My present invention pertains to an improved plant for extracting oil, the construction and advantages of which will be hereinafter set forth, reference being had to the annexed drawings, wherein:

Figure 1 is a side elevation of the plant; Fig. 2 a top plan view of a portion thereof; Fig. 3 a longitudinal vertical sectional view of the foots-distributor; Fig. 4 a detail sectional elevation of a portion of the distributor; Fig. 5 a detail perspective view of the comb or disintegrator employed to break up the compressed foots; Fig. 6 a perspective view of the foots-distributor; and Fig. 7 a transverse vertical sectional view on the line 7-7 of Fig. 3.

The main object of the present invention is to produce a plant in which oil may be readily extracted from seeds or the like, and the foots recovered from the oil commingled with the fresh stock which is being fed to the press or expeller.

A further object of the invention is to so construct the plant that the expressed oil may be forced through a filter press, to effect a complete recovery of the foots, and such recovered foots returned to the press along with the new stock with which it is intermingled.

A still further object is to provide a foots-disintegrator which will take the filter-press foots and deliver the same in a granular condition to the fresh stock being fed.

In the apparatus herein set forth the foots which are taken from the filter press and those that are gathered at the expellers or initial presses are returned continuously to the expellers. In the so-called "expeller" process of extraction, the oil-seed or oil-seed meal which is passed to the expeller is not heated sufficiently to harden the albumen therein, and this albumen, therefore, remains in the cake. This condition makes it possible to pump the oil coming from the expeller directly through the filter press, so that at the end of the day's run the output of the plant is weighed up in filtered oil.

With the "hydraulic" or old process, the meal requires cooking to such an extent that the resultant oil, containing more or less albuminous matter in suspension, requires settling before it can be pumped through the filter press without stopping up the filter cloths. By the old process there was no practical way of working back the filter-press foots, and in the majority of cases such foots were sold for soap-stock. The filter-press foots obtained from the expeller oil contain less albuminous matter and are consequently more granular and easily fed back with the fresh material to the expellers and thus turned into oil and cake. By the present process no soap-stock or waste by-product is accumulated.

In the annexed drawings I have illustrated a plant capable of carrying out the process above outlined. The seed passes from a hopper A into a crushing mill B, from which it is taken by an elevator C and discharged through a spout D into a conveying and distributing trough E. The material is discharged from said trough through spouts F and G, Fig. 1, the meal or disrupted seed passing from the spouts into tempering troughs H, said troughs being by preference constructed similar to that shown in the patent granted to V. D. Anderson under date of November 21, 1905, No. 805,112.

An expeller I is located beneath each of the tempering troughs and the material is discharged from said troughs through spouts J into the feed end of the expellers, which may be of the type shown in Letters Patent No. 801,704, granted to V. D. Anderson under date of October 10, 1905.

Each tempering trough contains an agitator K, which also serves to advance the material from the feed end of the trough to the discharge spout J. Any excess of material which may be fed into the tempering troughs will pass out by spouts L into screw conveyers L², which in turn discharge into an overflow return conveyer M, which extends beneath both tempering troughs and above the expellers. Said return overflow conveyer discharges through a spout N at a point adjacent to the elevator C, so that the excess material is again carried up by the elevator and fed back to the expellers.

The oil which passes from each expeller or press is discharged into a strainer O, similar to that shown in Letters Patent No. 801,704,

aforesaid, and from the strainer passes into a pan or receptacle P. Such foots as are caught by the strainer are fed out therefrom by a worm Q to a conveyer R which elevates and discharges the same into the tempering trough.

The oil from the pan P flows through a pipe S, connected to the pan of each expeller, the pipe (see Fig. 2) passing to a pump T which serves to withdraw the oil from the pans and cause the same to enter a tank U. From the tank the oil is forced by a pump V into a filter-press W, the latter being indicated in outline only in Fig. 2. Such filter-press may be of any approved type now upon the market, of which there are many.

At the end of one or two days' run the filter-press becomes full of accumulated semi-hard cake, termed in the trade "filter-press foots." When this condition obtains, the filter-press foots are removed and placed in the hopper A' of a foots-distributor B' located at a point adjacent to spout D, so that the foots may be discharged gradually into the conveyer trough E and be intermingled with the fresh material which is being passed into the trough. It is necessary to a complete and perfect operation that the foots be fed in in small quantities, as otherwise they would pass freely through the expellers without being deprived of the contained oil.

In Figs. 3 to 7 inclusive a distributor which will accomplish this result is shown in detail. Located beneath the hopper A' is a body portion C', preferably cylindrical in cross-section and having mounted therein a shaft D' which carries a feed screw E' and a series of feed and compressing screws F', the flights upon the latter screws being separated or broken away, similar to the arrangement shown in Letters Patent to V. D. Anderson No. 647,354, dated April 10, 1900. At the outer or discharge end of the body portion is provided a collar or mouth-piece G', the inner face of which is inclined so as to form a contracted passage to further condense and compact the material which is forced outwardly through the mouth-piece by the action of the screws. A sleeve H' is mounted upon the shaft D' (see Fig. 4) and a sprocket-wheel I' is secured to said sleeve. The inner end of the sleeve is reduced, and mounted thereon is a frame having two arms J', each arm being provided with a series of outwardly-extending fingers or teeth K', the ends of the teeth standing adjacent to the outer face of the mouth-piece and serving, as the sleeve and arms are rotated, to disintegrate the material which is forced through the mouth-piece. Rapid motion is imparted to the sleeve and disintegrating fingers by a sprocket-chain L' which passes about the sprocket-wheel I' and a

larger sprocket-wheel M' secured upon a driving shaft N'. A pinion O', also mounted upon the shaft N', meshes with a gear P' carried by and secured to a sleeve Q' which latter is free to turn upon a shaft R', the shaft also supporting an arm S' which at its outer end is provided with a sprocket-wheel T' that serves as a tightener for the sprocket-chain L'. A pinion U' is secured to the sleeve Q', said pinion in turn meshing with a large gear V' mounted upon the outer end of the shaft D'. By means of this arrangement a rapid motion will be imparted to the comb or disintegrating fingers, while a relatively slow speed is given to the screws carried by the shaft D'. Thus the hopper A' may be filled with foots and no further attention need be paid thereto, as the material will be forced out of the distributor gradually and will be broken up into fine particles by the comb, which rotates rapidly at the discharge end thereof. The foots in this condition pass through an opening W' into the distributing trough E, where they are slowly intermingled with the new material which is passing to the trough through the spout D.

While I have referred to the expellers shown in the Anderson patents, it is to be understood that so far as the generic invention is concerned any expeller may be employed. So, too, any form of foots-distributor that will gradually feed the foots to the new stock which is being passed to the expellers, may be used.

No claim is made herein to the method of extracting oil with the apparatus as above set forth, as such method forms the basis of my co-pending application Serial No. 398,426 filed the 21st day of October, 1907.

Having thus described my invention, what I claim is:

1. In an apparatus for extracting oil, the combination of an expelling press; a filter press; means for conveying the oil from the expeller to the filter press; and means for feeding the filter-press foots to the stock placed in the expeller whereby it may be mingled with such stock and thereafter passed through the expeller with the stock.

2. In an apparatus for extracting oil, the combination of an expelling press; a filter press; means for conveying the oil from the expeller to the filter press; and means for gradually feeding and mixing the filter-press foots with the stock which is to be passed through the expeller.

3. In an apparatus for extracting oil, the combination of a continuously-acting expelling press; means for crushing the seed or other material from which the oil is to be extracted; means for feeding the stock thus treated to the expeller; a filter press; means for conveying the oil from the expeller to the filter press; and means for

gradually feeding the filter-press foots to the stock being fed to the expeller.

4. In combination with a shell or casing; a feed hopper opening into one end thereof; a shaft extending through said shell or casing; a series of screws mounted on the shaft, said screws serving to condense and to force the material through the discharge end of the shell; and a rapidly-rotating member located at said discharge end and serving to disintegrate the material as it is forced outwardly.

5. In combination with a shell or casing; a feed hopper opening into one end thereof; a shaft extending through said shell or casing; a series of screws mounted thereon and serving to condense and to force the material through the discharge end of the shell; a rotary disintegrator located at the discharge end of the shell; and means for imparting a slow movement to the screws and a rapid movement to the disintegrator.

6. In combination with a shell or casing; a feed hopper opening into one end thereof; means contained within the shell for condensing the material fed from the hopper and forcing such condensed material from the shell; and a rapidly moving comb-like member acting to disintegrate the material as it is discharged from the shell.

7. In combination with a shelf or casing;

a feed hopper opening into one end thereof; a shaft extending longitudinally within the shell; a series of separated screws mounted thereon; a contracted mouth-piece located at the discharge end of the shell; a comb-like member working adjacent to the mouth-piece; and means for imparting a slow movement to the shaft and screws and a rapid movement to the comb-like member.

8. In combination with a shell or casing; a feed hopper opening into one end thereof; a shaft extending longitudinally within the shell; a series of separated screws mounted thereon; a mouth-piece located at the discharge end of the shell, the inner face of the mouth-piece contracting toward its outer end; a sleeve rotatably mounted on the shaft adjacent to the mouth-piece; a pair of arms secured to the sleeve; a series of fingers extending outwardly from the arms toward the mouth-piece; and means for imparting a relatively slow motion to the shaft and screws, and a relatively rapid motion to the sleeve and the arms carried thereby.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FRANK B. ANDERSON.

Witnesses:

CHARLES W. TOLAND,
RALPH BLUE.