No. 882.304. PATENTED MAR. 17, 1908.

C. EITLE.

EXTRACTING APPARATUS FOR HORIZONTAL RETORTS.

APPLICATION FILED OCT. 27, 1903.

2 SHEETS—SHEET 1

Fig. 3.

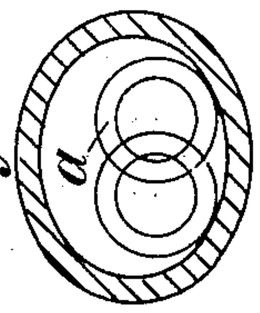


Fig. 4.

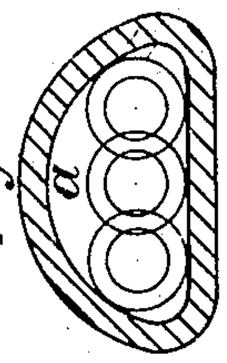
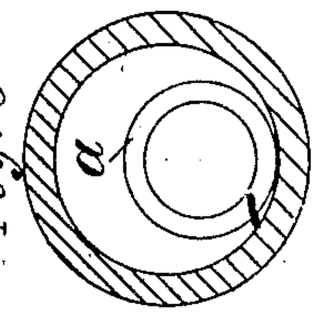


Fig. 5



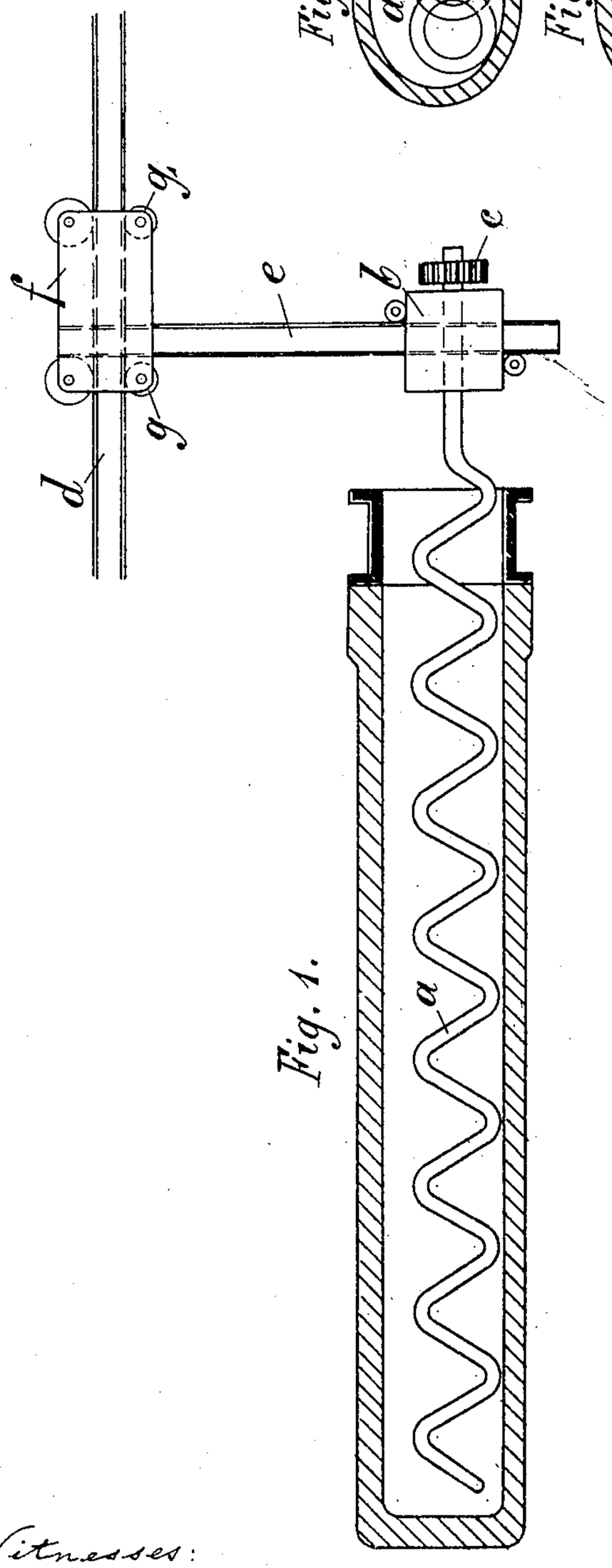


Fig. 1.

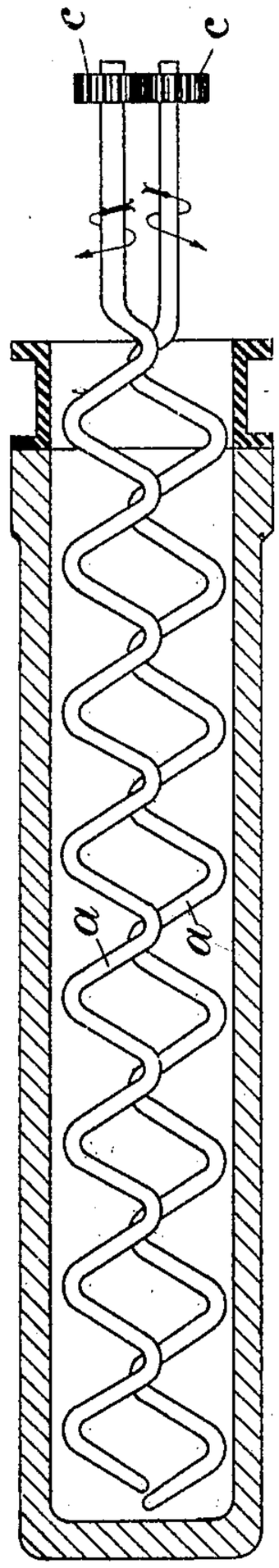


Fig. 2.

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Christina Kelley

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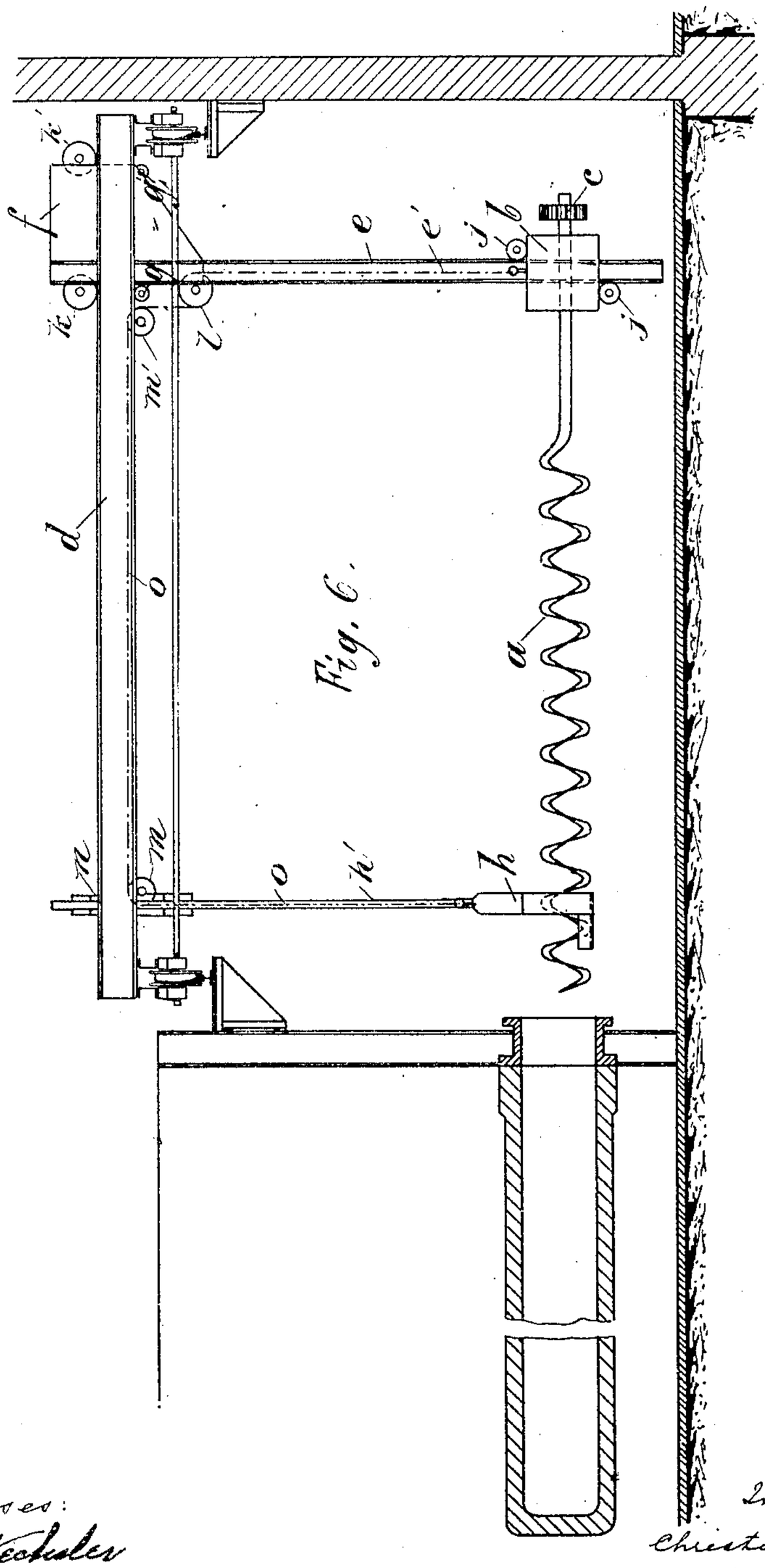

Fig. 6.

Witnesses:
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Attorney.

UNITED STATES PATENT OFFICE.

CHRISTIAN EITLE, OF STUTTGART, GERMANY.

EXTRACTING APPARATUS FOR HORIZONTAL RETORTS.

No. 882,304. Specification of Letters Patent. Patented March 17, 1908.

Application filed October 27, 1903. Serial No. 178,691.

To all whom it may concern:

Be it known that I, CHRISTIAN EITLE, factory owner, and a subject of the German Emperor, residing at 28–32 Rosenbergstrasse, in the city of Stuttgart, Kingdom of Würtemburg, and German Empire, have invented a certain new and useful Extracting Apparatus for Horizontal Retorts, of which the following is a specification.

The apparatus to which this invention refers is intended for the extraction of the contents of horizontal retorts such as are used for the manufacture of illuminating gas, that is to say for the purpose of removing the coke produced by the distillation of the coal, from the retort, after the distillation has been finished. The coke constitutes a glowing, coherent cake part of which adheres firmly to the walls of the retort and which upon extraction and upon being quenched becomes broken up into pieces and into a coarse powder, of which the former still possess a high heating value while the coarse powder is of no great value. In view of the furnaces being worked continuously so as to be charged with fresh stuff immediately after the removal of the coke, it becomes necessary to limit the operation of extraction to the shortest time possible, in order to avoid loss of heat and the escape of gases into the working room, and in particular because the health of the working crew is injured thereby.

The said operation has heretofore been effected almost everywhere by manual labor, the workman extracting the coke from the retort by means of specially shaped extracting hooks, in separate pieces; or in some cases this was effected by large complicated structures the cost of which would eat up the profit.

The present invention is intended to effect this operation, and is shown in Figure 1 in longitudinal section, in Fig. 2 in plan view, while Figs. 3, 4 and 5 represent transverse sections and several modifications.

The apparatus comprises one, two or more spirals *a*, *a* which are rotatably arranged in a journal box *b*. The spirals are arranged at such distance from each other, that they engage for some parts of their lengths with each other. The turns of the spirals are in the contrary direction with relation to each other, the left hand spiral being made with right hand directed turns and the right hand spiral with left hand directed turns. Rotation is imparted to them for instance, as shown in Fig. 3, by means of a pair of toothed wheels *c c* in the direction of the arrow. The points of crossing of both spirals, have to be brought in contact with each other.

The mode of operation is as follows: By the rotation of the two spirals simultaneously with the introduction of the same into the retort, the cake of coke is broken off the walls by the ends of the same, the cake being cut into pieces by the upward turning movement of the sharply pointed ends of the spirals, so that a piece of coke of somewhat larger size, which might result from a large piece of coal, is free to drop into the free space of the retort without being injured. Each turn of each of the spirals constitutes a space which corresponds to two of the largest sized pieces of coke, the said space remaining unchanged by the continued rotation, but advancing in accordance with the turn of the spirals. The said space serves for the feeding forward of the pieces of coke, the spirals being introduced into the retort with a speed below that corresponding to the height of the turns.

The essential feature of the invention consists in the employment before all of two spirals wound in a contrary direction and possessing any suitable sectional area and in the oppositely rotating movement and in the relative position of the turns to each other, whereby a large surface of the retort walls is controlled by the spirals, the cake being broken off from the bottom and being cut up by the upward movement of the same, while the several pieces are pushed in into the space formed by each two turns, the rapid and clean emptying of the retort upon its entire length being thus secured without any material disintegration of the cokes. At any rate there is not more disintegration than will occur invariably by the scraping out of the retort about 12 times by hand and by means of hooks or by means of motive power in particular.

The spirals may be rotated by a crank, or by a power-wheel or by any other suitable means, and as many devices may be used for such purpose which any mechanic skilled in the art can easily supply, I have not deemed it necessary to show and describe the same herein.

The retraction of the device from the retort is accomplished by a reversal of the rotation when at the same time the coal to be coked is fed to the spirals and by such reverse rotation forced into the retort, as the

retort fills and the coal backs up against the rear end of such retort the spirals by the pressure exerted upon the body of coal against the rear end of the retort are slowly and automatically forced out of the same.

The journal-box *b* is mounted on a vertical frame *e* and is equipped with rollers *j*, *j*, so as to be movable on said frame in a vertical direction, in order to raise or lower the extracting spirals for the purpose of removing the coke from retorts arranged on different levels. Said frame *e* is rigidly connected to a carriage *f*, mounted upon a crane carriage *d*. The carriage *f* is equipped with rollers *g*, *g'* and wheels *k*, *k'*, and said carriage *f* travels forward or backward in accordance with the rotation of the spirals *a*.

The raising and lowering apparatus is shown in Fig. 6, the hanger *h* through which the spiral conveyer *a* reciprocates being attached to the lower end of a rod *h'* which reciprocates vertically in a double slip *n*, carried by the crane carriage *d*, adjacent to which journals is an idler pulley *m* over which runs a chain or cable *o* which passes over the like idler pulley *m'* and is wound up on a drum *l*, mounted on the same shaft as a similar drum in Fig. 6, hidden from view by *l*, upon which second drum is wound up a chain or cable *e'* which raises or lowers the journal box *b*, or there may be a single drum having a central flange for keeping the two cables or chains from interference. In any event, it will be seen that the two cables should be simultaneously wound up at the same rate and that this will always keep the spiral conveyer *a* in a horizontal position. As the spiral conveyer *a* is reciprocated in and out of the retort, the carriage *f* rolls along the carriage crane *d* on the wheels *k* and *k'*, and as it does so the chain *o* is tightened when the spiral conveyer is being drawn out and slacked when it is being forced in but before the chain has slacked enough to cause the end of the spiral conveyer to drop such conveyer has already penetrated into the retort and will thus be kept in the right position, although the natural friction of the rod *h'* in the slip journals *n* is frequently sufficient to maintain it in position. If not, a pawl, adjacent to the slip-journal may be provided to prevent dropping of the hanger when once raised, but the device may be worked without any such attachment.

What I claim and desire to secure by Letters Patent of the United States is:—

1. In a device of the class described a supporting frame, a plurality of spiral conveyers revolubly mounted in the frame adapted to enter into a retort, and means for bringing the said conveyers into and out of registry with the mouth of the retort.

2. In a device of the class described, a plurality of spiral conveyers axially movable with relation to horizontal retorts, a carriage, a frame carried by the carriage, a movable support carried by the frame, and a journal-box in which the spiral conveyers are revolubly mounted carried by the support, substantially as shown and described.

3. In a device of the class described, a plurality of spiral conveyers axially movable in relation to horizontal retorts and revolubly mounted in journal-boxes, a hanger supporting the journal-boxes, and means for displacing the hanger and journal boxes in a vertical direction, substantially as shown and described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

CHRISTIAN EITLE.

Witnesses:
WM. HAHN,
ERNEST EUTENMAN.