

C. H. FETTEL.
CHAIN TENSION DEVICE FOR SINTERING KILNS.
APPLICATION FILED NOV. 30, 1908.

912,550.

Patented Feb. 16, 1909.

4 SHEETS—SHEET 1.

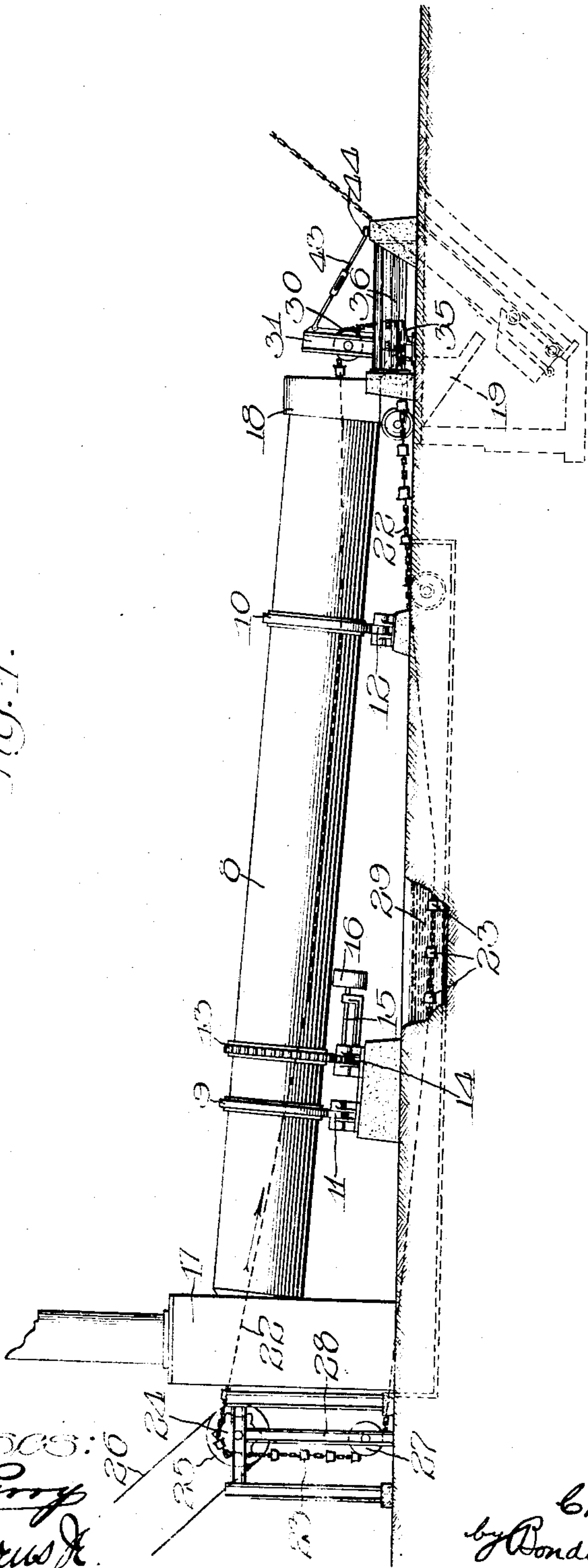


FIG. 1.

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J. V. Dourand

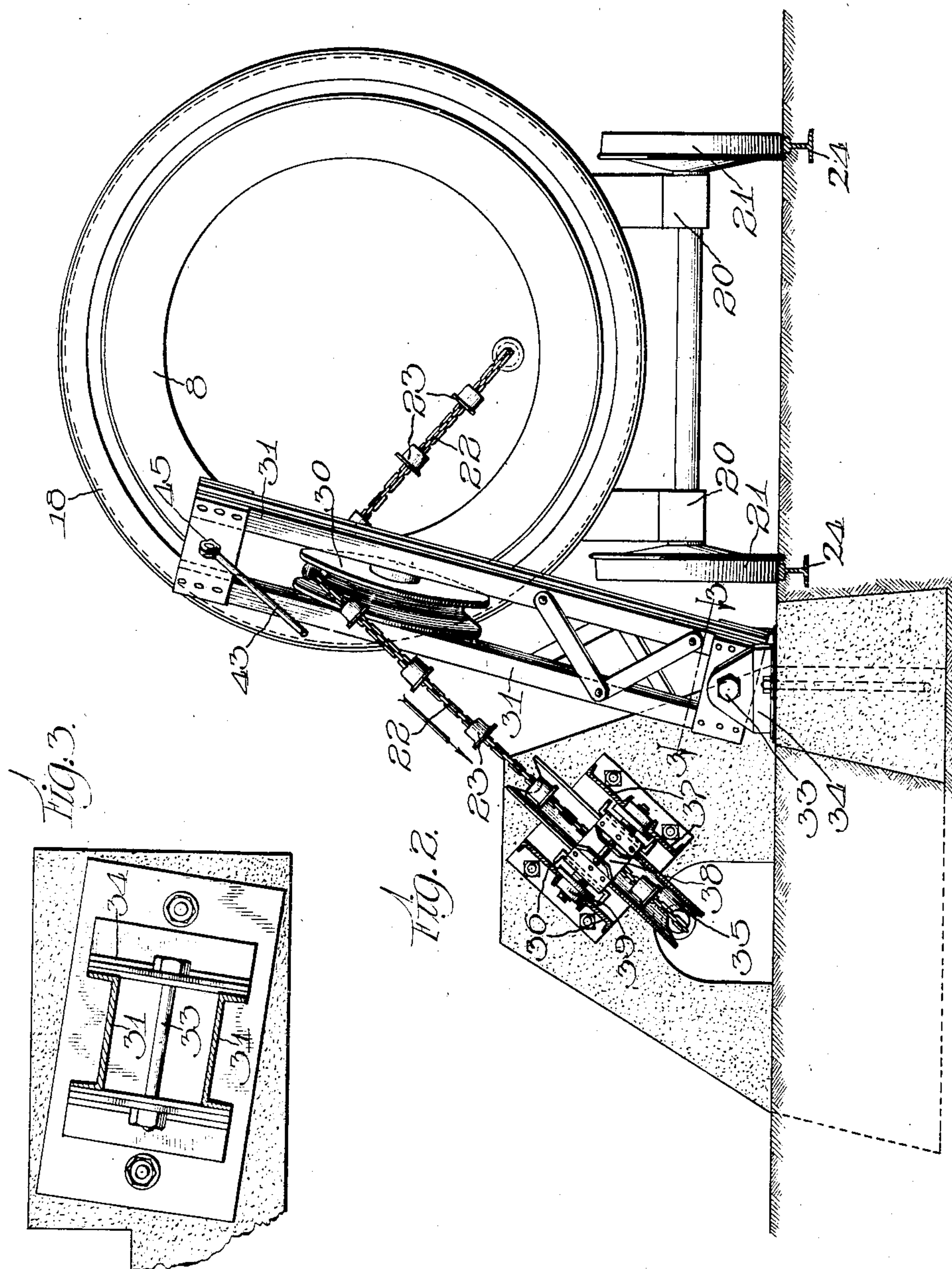
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4 SHEETS—SHEET 3.



Fig. A.

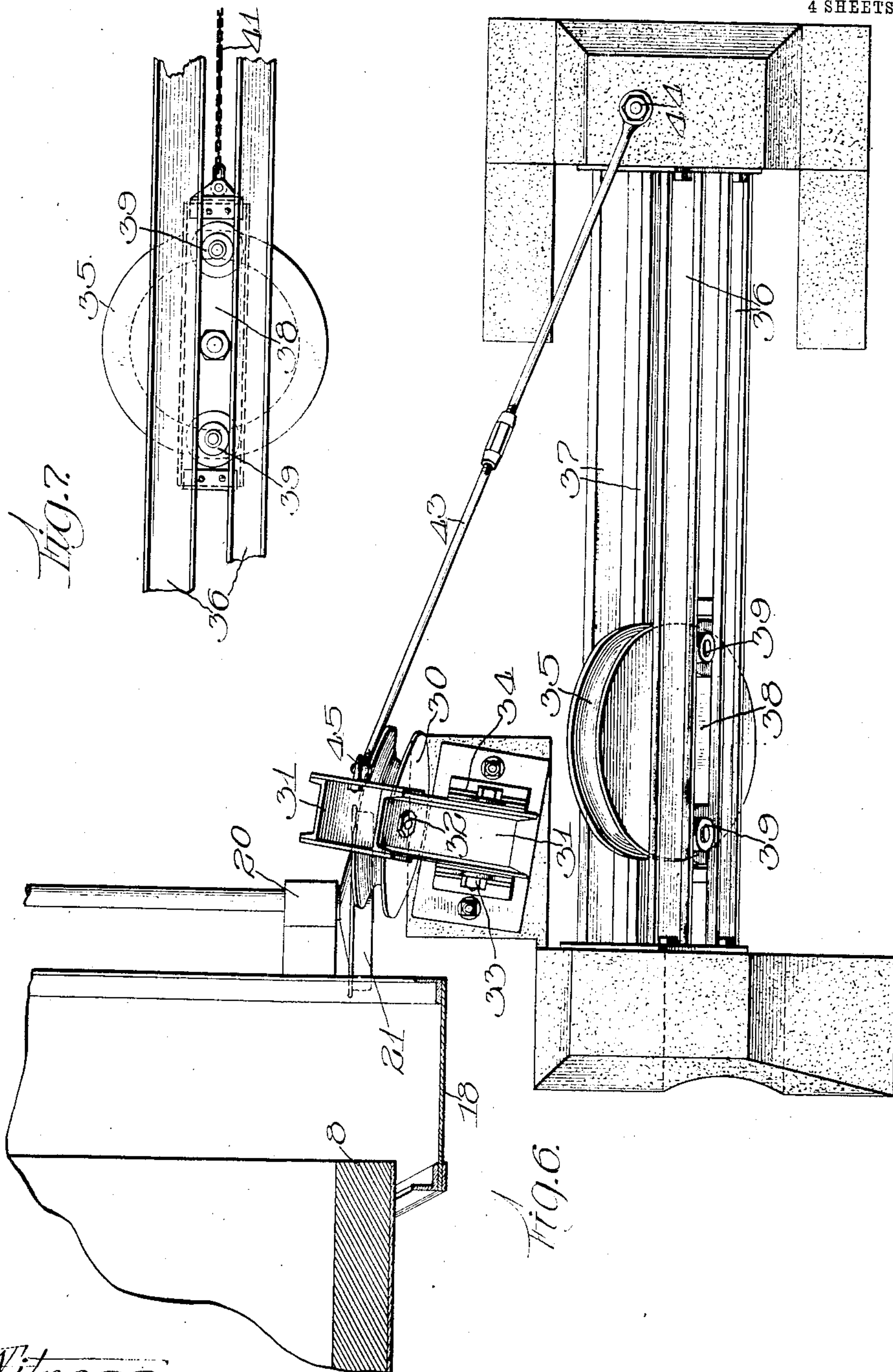
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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

CHARLES H. FETTEL, OF HUBBARD, OHIO, ASSIGNOR TO AMERICAN SINTERING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

CHAIN-TENSION DEVICE FOR SINTERING-KILNS.

No. 912,550.

Specification of Letters Patent.

Patented Feb. 16, 1909.

Application filed November 30, 1908. Serial No. 465,372.

To all whom it may concern:

Be it known that I, CHARLES H. FETTEL, a citizen of the United States, residing at Hubbard, in the county of Trumbull and State of Ohio, have invented certain new and useful Improvements in Chain-Tension Devices for Sintering-Kilns, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to sintering apparatus, such, for example, as that shown in patent to Eugene B. Clark, No. 887,379, dated May 12, 1908, in which the material to be treated is passed through a rotary kiln set in an inclined position and during its passage through the kiln is operated on by scrapers carried by an endless chain which moves into the inlet end of the kiln and out at the outlet end thereof. At the outlet end of the kiln there is a housing through which the scraper chain passes, thence passing over idler wheels and thence back through a cooling pit to the inlet end of the kiln. In practice it has been found that in the course of time in operating an apparatus of this character the wearing away of the links of the chain and also the stretching of the chain cause a certain amount of slack which must be taken up from time to time to secure efficient operation of the device, and to accomplish the taking up of such slack in such manner as to secure the greatest efficiency of the apparatus is one of the objects of my invention.

A further object is to provide a construction by which the chain-supporting devices at the lower or outlet end of the kiln may be conveniently manipulated so as not to interfere with the removal of the housing when it is desired to obtain access to the kiln at that end.

I accomplish these objects as illustrated in the drawings and as hereinafter described.

What I regard as new is set forth in the claims.

In the accompanying drawings,—Figure 1 is a side view of a sintering kiln having my improvements applied thereto; Fig. 2 is an end view of the lower end of the kiln showing the mechanism for supporting and guiding the scraper chain, some parts being broken away; Fig. 3 is an enlarged detail, being a section on line 3—3 of Fig. 2; Fig. 4 is a side elevation showing the lower end

of the kiln and the chain-supporting devices; Fig. 5 is a sectional view on line 5—5 of Fig. 4, illustrating the sheave around which the cable of a counterbalance weight operates; Fig. 6 is a plan view, a part of the kiln being shown in section; and Fig. 7 is a detail illustrating a traveling pulley and the parts that support it.

Referring to the drawings,—8 indicates the kiln which, as shown in Fig. 1, is provided with tires 9—10 which run on rollers 11—12. The kiln is also provided with an annular rack 13 which meshes with a pinion 14 driven from a shaft 15 provided with a pulley 16. Power is applied to the pulley 16 for rotating the shaft. Instead of using the construction shown for rotating the kiln, any other suitable mechanism may be employed.

17 indicates a housing at the inlet end of the kiln through which the materials to be treated are supplied thereto, and 18 indicates a housing at the lower or outlet end of the kiln through which the materials are discharged, preferably into a chute or hopper 19. The housing 18 is mounted on a truck 20 having wheels 21 so that it is movable toward and from the lower end of the kiln. When the kiln is in use the housing 18 fits closely over the lower end thereof, but it may be moved away when for any reason it is desired to have access thereto.

22 indicates an endless chain carrying scrapers 22. Said chain extends longitudinally through the kiln and through the housings 17—18 and moves from the inlet to the outlet end of the kiln, as indicated by the arrow in Fig. 1. At its upper end it is mounted on a sprocket wheel 24 driven by a pulley 25 and belt 26, or other suitable means. It also passes around a guide-pulley 27 secured in a suitable support 28. At the lower end of the kiln the chain 22 is suitably guided and thence passes through a cooling pit 29 where it is cooled before it returns to the kiln.

My present invention has particularly to do with the mechanism at the lower end of the kiln for supporting the scraper chain. The construction and arrangement of such apparatus is best shown in Figs. 2, 4 and 6 of the drawings. Before describing this apparatus it may be well to explain that the lengthening of the scraper chain due to wear

and stretching causes a considerable amount of slack which it is necessary to take up from time to time, and heretofore it has been the practice to accomplish this by providing an idler wheel for supporting the chain opposite the housing and moving such idler wheel back away from the kiln sufficiently to take up the excessive slack. This, however, is unsatisfactory for the reason that it increases the distance between the idler and the front of the housing and consequently the movement of the chain both vertically and from side to side due to the rotation of the kiln is increased as the idler pulley gradually recedes from the kiln. This motion of the chain at the point where it leaves the housing is objectionable because it increases the size of the opening which must be provided in the brickwork of the kiln housing, thus admitting cool air which increases fuel consumption, decreases production and is otherwise objectionable. By my invention the objections above pointed out are avoided, since I provide for taking up the slack of the chain without increasing the distance from the idler pulley to the front of the housing, said pulley being maintained at a fixed minimum distance. I also provide means by which the movement of the housing away from the kiln is not interfered with by the idler pulley supporting devices.

As shown in Fig. 4, 30 indicates the idler pulley over which the chain runs immediately after passing out of the housing 18, which idler I shall term the "fixed idler". Said pulley is supported by a rocking standard 31, preferably composed of two channel-irons suitably secured together, the pulley being mounted between them on a suitable pivot 32. The standard 31 is mounted at its lower end on a pivot 33 secured near the housing 18 and a little to one side thereof, as best shown in Fig. 2. It will be noted that the wheels of the truck 20 run on rails 24 and that the base 34 which carries the pivot 33 of the standard 31 is placed at one side of the housing track. By the construction described the standard 31 may be swung over in front of the housing 18 or it may be swung away from in front thereof, thereby permitting the housing to be moved away from the lower end of the kiln. When the idler 30 is in operative position, however, it is always at a uniform distance from the face of the housing and consequently the amount of vertical or lateral swing of that portion of the chain lying within the kiln and housing 18 is practically constant. After passing around the fixed idler 30 the chain 22 passes around a movable idler 35 which is adjustable to take up the slack, and thence passes to the cooling pit 29, as hereinbefore explained. The movable idler 35 is mounted between

suitable guides, preferably composed of two pairs of channel-bars 36—37. The channel-bars composing each pair are set a short distance apart forming ways 38 in which move rollers 39 carried by the movable idler. A counterbalance weight 40 is connected to said idler by a cable 41 which passes around a sheave or pulley 42, as shown in Figs. 4 and 5. The weight 40 serves to maintain practically a uniform tension on the chain 22 and automatically takes up the slack.

43 indicates a stay-rod which is suitably anchored at one end, as shown at 44 in Fig. 4, and is connected at the other end with the upper end of the standard 31, as shown at 45 in Fig. 4. When it is desired to move the housing 18 away from the kiln, the chain is disconnected and the standard 31 swung over to one side far enough so that the housing will clear it.

I thus provide means by which the proper tension is maintained on the scraper chain without increasing the distance between the idler which supports said chain as it passes out of the kiln and the housing, and thus vibration or oscillation of the chain either vertically or laterally is kept within the proper limits so that it does not enlarge the opening from the kiln, and consequently I am able to avoid the objectionable results which heretofore have ensued from such enlargement of the outlet.

That which I claim as my invention, and desire to secure by Letters Patent, is,—

1. The combination of a rotary kiln, an endless carrier moving through said kiln, supports for said carrier at the ends of the kiln, and means for taking up the slack of said carrier without materially varying the distance between said supports.

2. The combination of a rotary kiln, an endless carrier moving therethrough, supports at the ends of the kiln on which said carrier is swung, said supports being at a substantially fixed distance apart, and means for taking up the slack of the carrier.

3. The combination of a rotary kiln, an endless carrier moving therethrough, and supports at the ends of the kiln on which said carrier is swung, said supports being at a substantially fixed distance apart, one of said supports being movable toward and from the axis of the kiln.

4. The combination of a rotary kiln, an endless carrier moving therethrough, supports at the ends of the kiln on which said carrier is swung, said supports being at a substantially fixed distance apart, one of said supports being movable toward and from the axis of the kiln, and means for taking up the slack of the carrier.

5. The combination of a rotary kiln, an endless carrier moving therethrough, scrapers carried by said carrier, a pulley adjacent to one end of the kiln for guiding said carrier,

said pulley being mounted at a substantially fixed distance from the kiln, and means for taking up the slack of said carrier.

5 6. In a sintering apparatus, the combination of a rotary kiln, a support mounted at a substantially fixed distance from one end of said kiln, a pulley carried by said support, an endless carrier operating on said pulley and moving through the kiln, and means for taking up the slack of said carrier.

10 7. In a sintering apparatus, the combination of a rotary kiln, a support mounted at a substantially fixed distance from one end of said kiln and movable toward and from the axis of the kiln, a pulley carried by said support, an endless carrier, operating on said pulley and moving through the kiln, and means for taking up the slack of said carrier.

15 20 8. In a sintering apparatus, the combination of a rotary kiln, a housing adapted to be applied to one end thereof, a support mounted adjacent to and at a substantially fixed

distance from said housing, a pulley carried by said support, an endless carrier supported by said pulley and operating in said kiln, 25 scrapers carried by said carrier, and tension devices for taking up the slack of said carrier.

9. In a sintering apparatus, the combination of a rotary kiln, a housing adapted to be applied to one end thereof, a support mounted adjacent to and at a substantially fixed distance from said housing, said support being movable toward and from the axis of the kiln, a pulley carried by said support, an endless carrier supported by said pulley and operating in said kiln, scrapers carried by said carrier, and tension devices for taking up the slack of said carrier. 30 35

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