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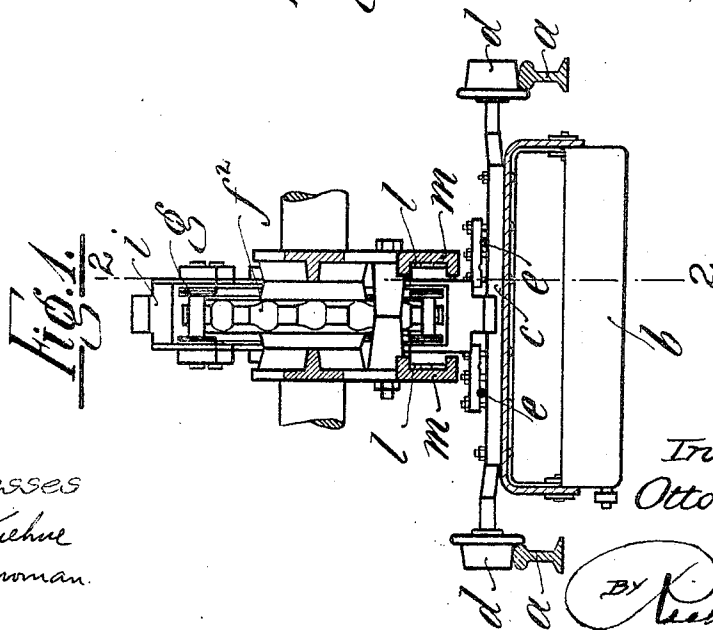
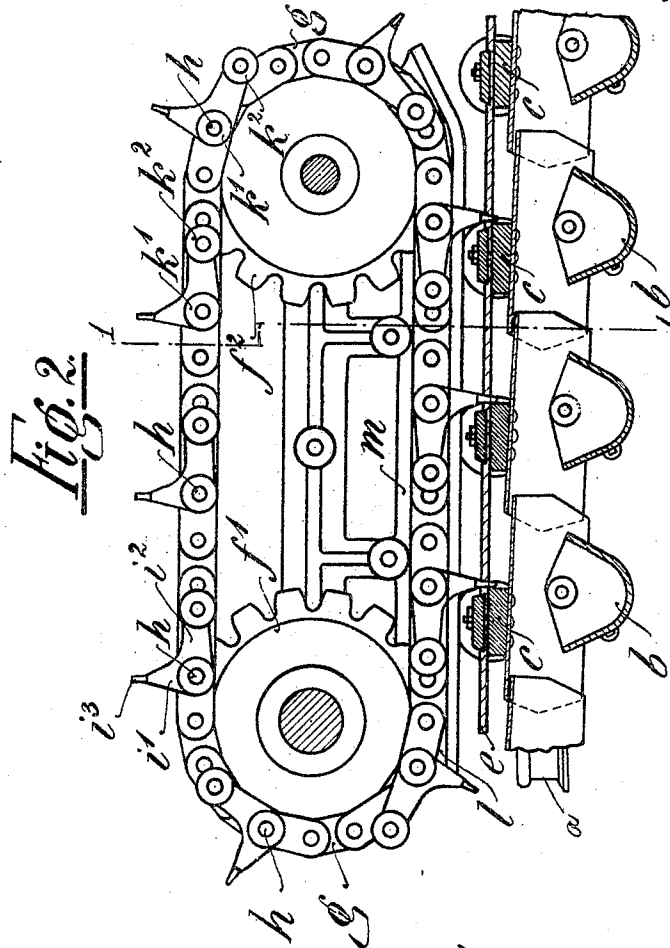
O. KRELL.

PATENTED OCT. 17, 1905.

MECHANISM FOR OPERATING BUCKET ELEVATORS OR THE LIKE.

APPLICATION FILED NOV. 8, 1904.

3 SHEETS—SHEET 1.



Witnesses
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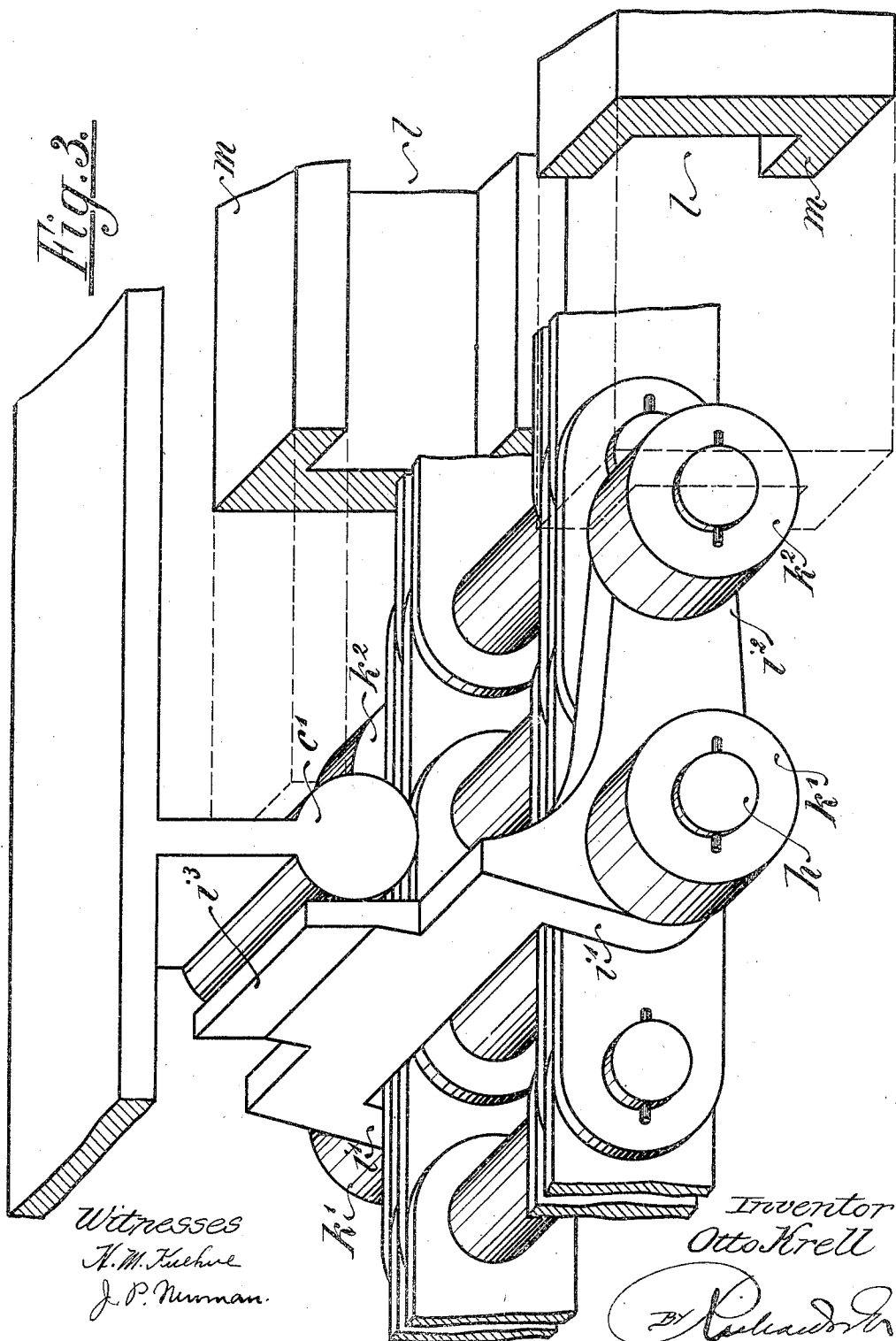
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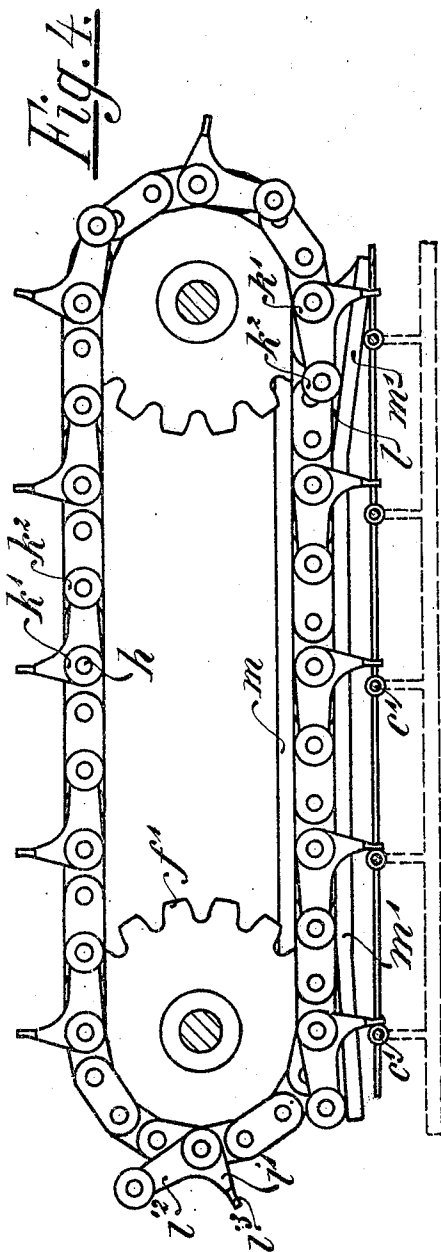
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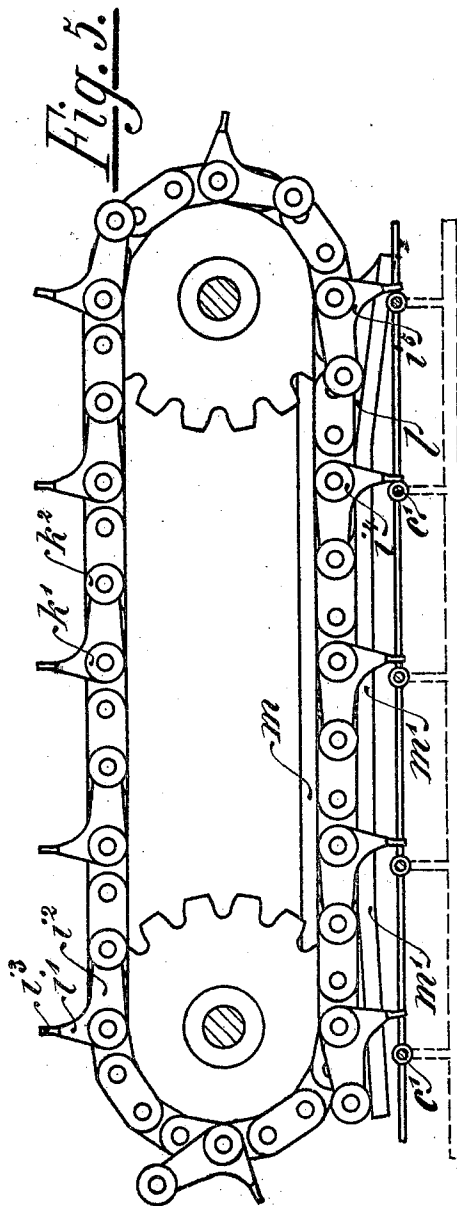
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UNITED STATES PATENT OFFICE.

OTTO KRELL, OF NUREMBERG, GERMANY.

MECHANISM FOR OPERATING BUCKET ELEVATORS OR THE LIKE.

No. 802,047.

Specification of Letters Patent.

Patented Oct. 17, 1905.

Application filed November 8, 1904. Serial No. 231,927.

To all whom it may concern:

Be it known that I, OTTO KRELL, director, a subject of the German Emperor, residing at Nuremberg, Bavaria, Germany, have invented
5 new and useful Improvements in Mechanisms for Operating Bucket Elevators, Conveyer-Chains, and the Like, of which the following is a specification.

In the endless cam-chains hitherto employed for driving conveyer-chains, bucket elevators, and the like each driving-cam is rigidly and immovably connected with a link of the chain. So long as a link of the chain rests on one or the other of the two chain-
10 wheels carrying the driving-chain the end of the cam which comes in contact with the projections on the conveyer-chain as it stands farther away from the axis of the chain-wheel (the cam-chain link itself) moves with
15 greater speed than the latter; but while moving in a straight line between the chain-wheels both the speed of the driving-chain and the speed of the cam exactly coincide. Consequently the ends of the cams undergo
20 each time a sudden alteration of speed which involves a vigorous jerk on the conveyer-chain, bucket elevator or the like at the moment at which the respective chain-link rises off one chain-wheel and when it runs onto
25 the other chain-wheel.

Now this invention has for its object to allow of the driving of conveyer-chains, bucket elevators, and the like free from jerks. This may be attained by giving the driving-cams
35 the form of elbow-levers, which are mounted on the chain-pins and during the movement in a straight line in the direction of the conveyer-chain slide with one arm in fixed straight guides.

Such means of driving conveyer-chains, bucket elevators, and the like is shown in the accompanying drawings, in which—

Figure 1 is a section on lines 1 1 of Fig. 2, and Fig. 2 a section on the lines 2 2 of Fig. 1;
45 Fig. 3, an isometric view, on an enlarged scale, of a propelling-cam on the driving-chain, showing the form and attachment. Figs. 4 and 5 are side views of such a driving device, in which, however, the guides for the
50 one arm of the elbow-lever-shaped driving-cams are inclined at their ends.

The separate forwarding or conveying buckets *b* of an ordinary bucket elevator or conveyer are mounted on two rails *a* by
55 means of two rollers *d*, mounted on the spindles *c* of the buckets. These spindles *c*, which

lie one behind the other, are connected by a suitable drawing appliance—for instance, a rope *e*. Above a straight portion of the track *a* there runs an endless drive-chain *g* on two
60 chain-wheels *f'* *f''*, operated by motive power. Pins *h*, standing at equal distances apart on said chain, are prolonged on both sides and form pivots for two similar-shaped elbow-levers *i'* *i''*, the outwardly-extending arms *i'* *i''* of which are combined to form a catch *i'''*.
65 These catches *i'''* come in contact with the spindles *c* between the ropes *e*, and thus move the said spindles, with the buckets *b*, forward.

The lever-arms *i''* of the driving-cams *i'''*, extending forward in the direction of the movement of the driving-chain, carry externally to the pins *h* and also at the outer end laterally-projecting loose rollers *k'* and *k''*, which during the travel of the members of the driving-chain in a straight line roll along in the
75 direction of the conveyer-chain or bucket mechanism in fixed guide-bars *l*, provided with longitudinal grooves *l'*. The grooves *l* are kept straight between those places at
80 which the driving-chain *g* comes off the driving-wheel *f''* and gets onto the driving-wheel *f'*.

The method of working the conveyer-chain and the like driving mechanism, hereinbefore
85 described, is as follows: In running off the chain-wheel *f''*, located at the entrance side, the cam-rollers *k''* *k'* come into the grooves *l*, whereby the cams *i'''* are turned into their driving position—that is to say, are placed
90 against the spindles *c* of the bucket mechanism *b* *c*, the conveyer-chain, or the like. The cams *i'''* then only have a driving action on the bucket mechanism *b* *c* when the respective guide-rollers *k''* *k'* are in the said straight
95 piece of the grooves *l*—that is to say, when the cams *i'''* travel with uniform speed in the direction of the bucket mechanism—in other words, in a straight line. In practice it is
100 very difficult to obtain a uniform pitch of the driving-chain and the bucket mechanism or conveyer-chain. In the case of inequalities in these pitches a jerky dragging movement of the bucket mechanism, conveyer-chain, or
105 the like is produced, whereby their connecting parts—for instance, the ropes *e*—are greatly strained, and thereby results a great loss of power. To avoid these drawbacks, as shown
in Figs. 4 and 5, the lower portion *m'* of the straight grooves *l*, which portion serves as the
110 surface onto which the rollers *k'* *k''* of the driving-cams *i'''* mount, are prolonged at both

ends and these prolongations are so formed that the cams i^3 gradually pass over into their driving position and are gradually released from this position. In case, as shown in Fig. 5, the pitch of the bucket mechanism, the conveyer-chain, or the like is greater than that of the driving-cams i^3 only the rearmost of the driving-cams each time held by the straight part of the guide-grooves l —that is to say, always only i^4 , the one which has the last come into action—can bear against the respective contact c' and carry with it the bucket mechanism or conveyer-chain. The next following cam i^5 , on the other hand, cannot bear against the contact c' belonging to it, as the rollers k^2 sinking down under the action of their own weight turn away the cams i^5 from the contact c' until the driving-chain g having progressed the rollers k^2 of the driving-cam i^5 run on the guide-surfaces m' , and thereby are slowly lifted or pressed up again. By this means the driving-cams i^5 are slowly pressed against the contacts c' belonging to them, and simultaneously a suitable release of the previous cam i^4 is operated, so that any jerking action is avoided. In case the pitch of the contacts of the conveyer-chain is smaller than that of the driving-cams the corresponding operations take place at the exit side, which may be easily followed by reference to Fig. 4. This improved driving arrangement also prevents any jerky action if either the driving-chain or the bucket mechanism or the conveyer-chain are slightly irregularly divided, and consequently the pitch sometimes of one and sometimes of the other chain is the greater. Whichever of the cams belonging to the driving-chain at a given moment may find itself in action, (because on the straight driving stretch the mutual distance of the cams i^3 from the respective contacts c' undergoes no alteration) it can only come out of engagement in such a way that one of the cams i^3 passing over the prolongations of the guide-bars m comes permanently or temporarily into action, which quite suffices to prevent any jerks.

In the driving-cam gear hereinbefore de-

scribed the use of any auxiliary means hitherto employed for mitigating the shocks and jerks in the transfer of the movement to the bucket mechanism, the conveyer-chain, or the like may of course be dispensed with. More particularly it is admissible to employ chain-wheels of small diameter, (sixteen teeth and less.) Further, the speed, and thereby the effectiveness, of the bucket mechanism, conveyer-chain, or the like may be increased without injury. Further, a modification may be adopted by which for driving very wide bucket mechanisms or the like two driving-cam chains lying side by side may be employed which are driven each from toothed wheels of uniform size mounted on a shaft common to both.

I declare that what I claim is—

1. In a driving mechanism for bucket mechanism conveyer-chains and the like, in which the bucket mechanism, conveyer-chains or the like is driven by means of an endless driving-cam chain running parallel to the bucket mechanism conveyer-chain or the like, the driving-cams consisting of elbow-levers i' i'' mounted on the bolts of the chain one arm i'' of which levers, between the places where the driving-chain runs off one chain-wheel f^2 and onto the other f' is guided in straight grooves l , of the framework and has a driving action while traveling at a uniform speed in a straight line in the direction of the bucket mechanism conveyer-chain or the like (Figs. 1 and 2) substantially as described.

2. The driving mechanism comprising the drums, the chain, arms connected thereto, cams formed on said arms and the portions having grooves therein forming ways for said arms, said grooves being inclined at the running-off or running-on portions of the drums, substantially as described.

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

OTTO KRELL.

Witnesses:

ANDREAS STICH,
OSCAR BOCK.