

No. 620,299.

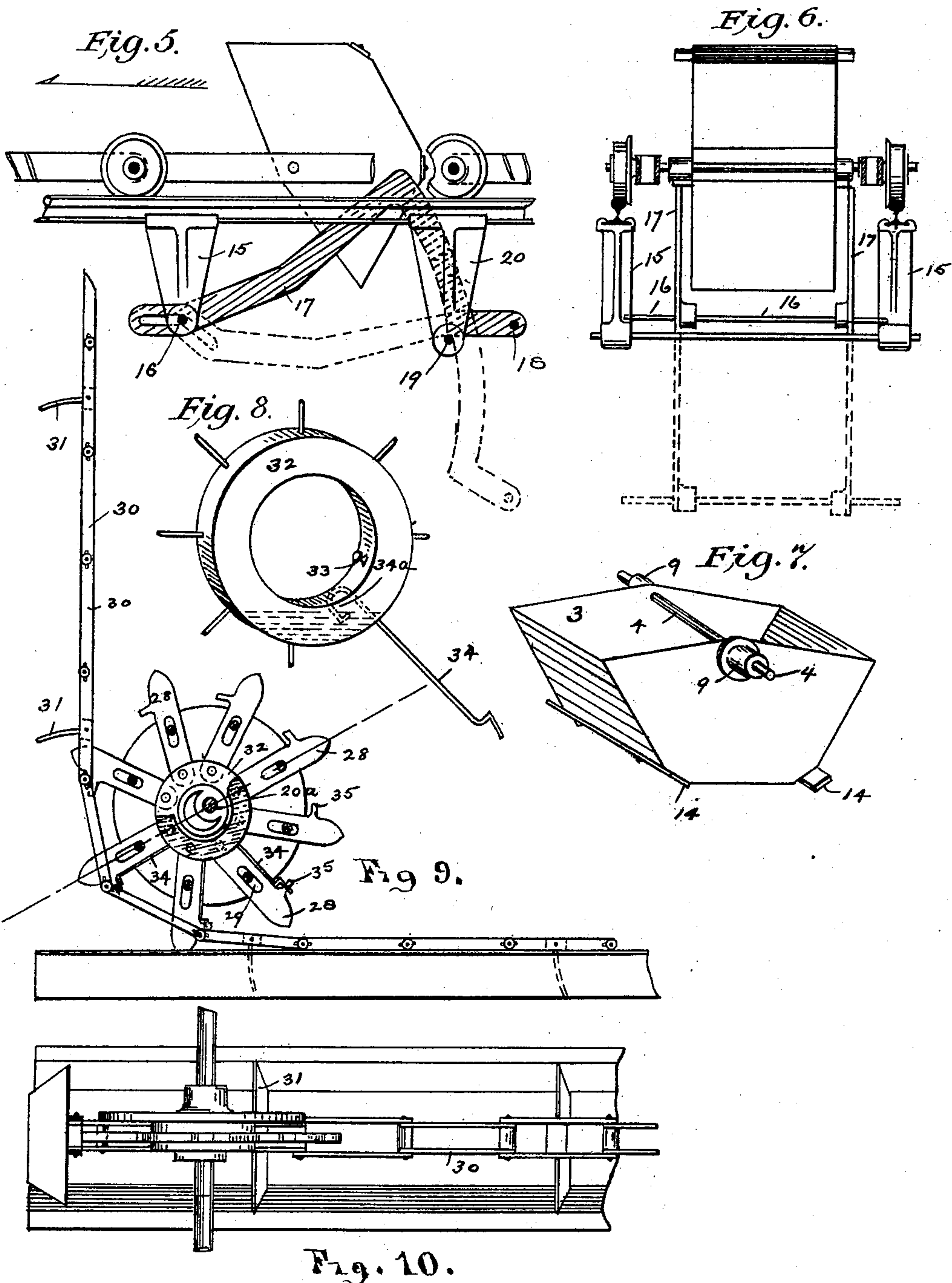
Patented Feb. 28, 1899.

A. J. FRITH.
CONVEYER.

(Application filed Aug. 10, 1897.)

(No Model.)

3 Sheets—Sheet 2.



WITNESSES

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Fig. 12.

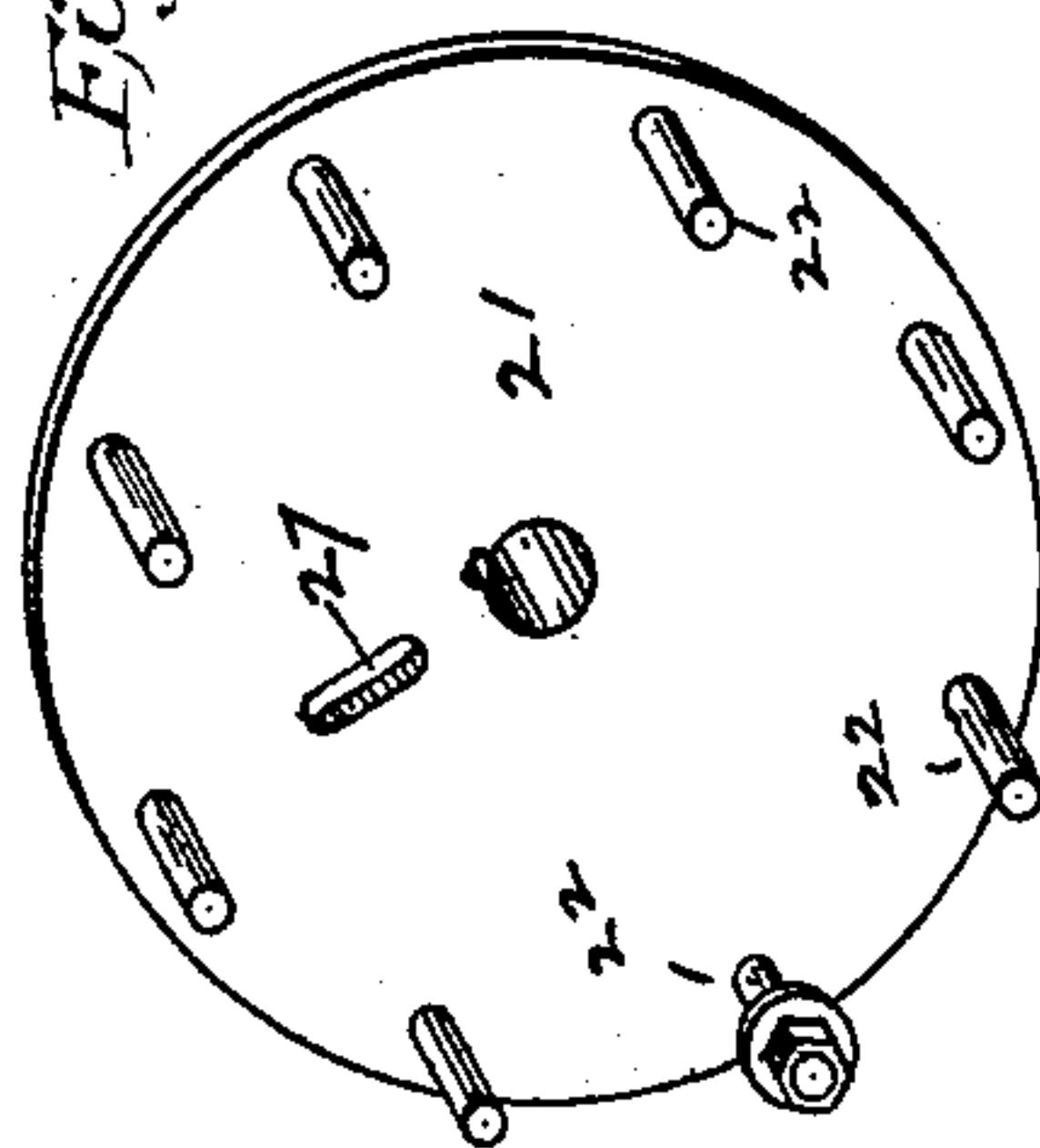


Fig. 11

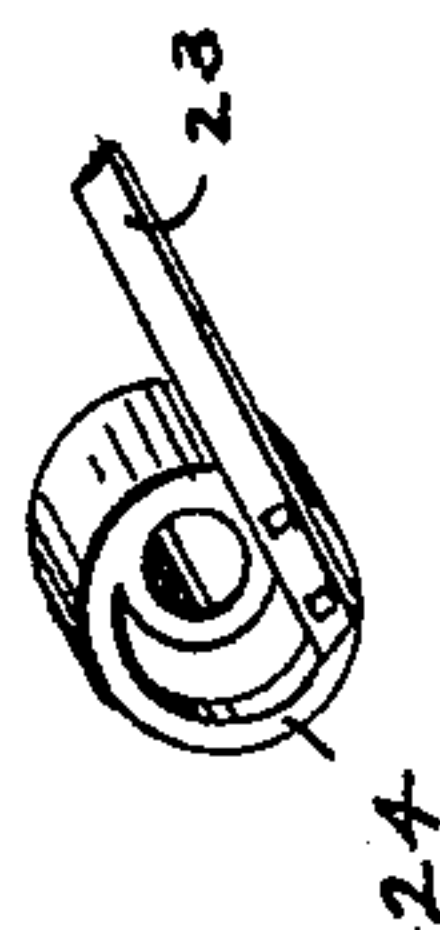


Fig. 13

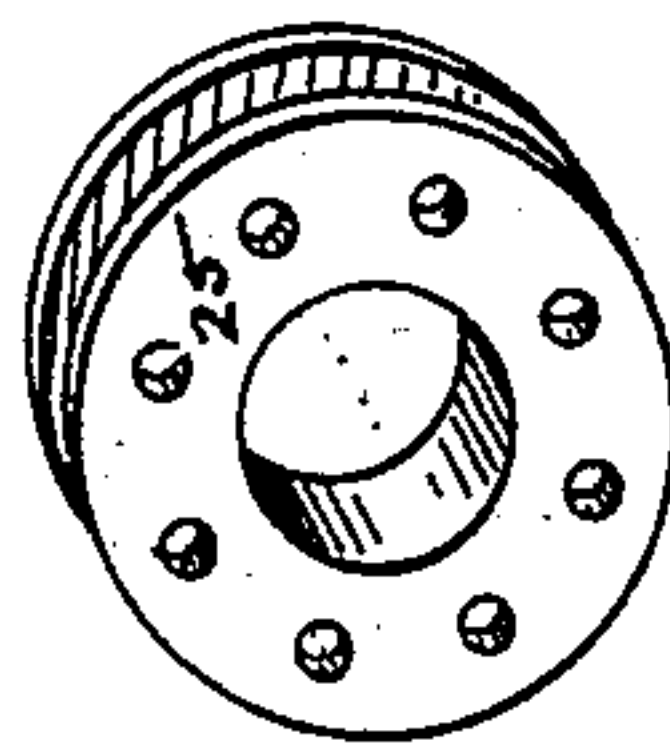


Fig. 16

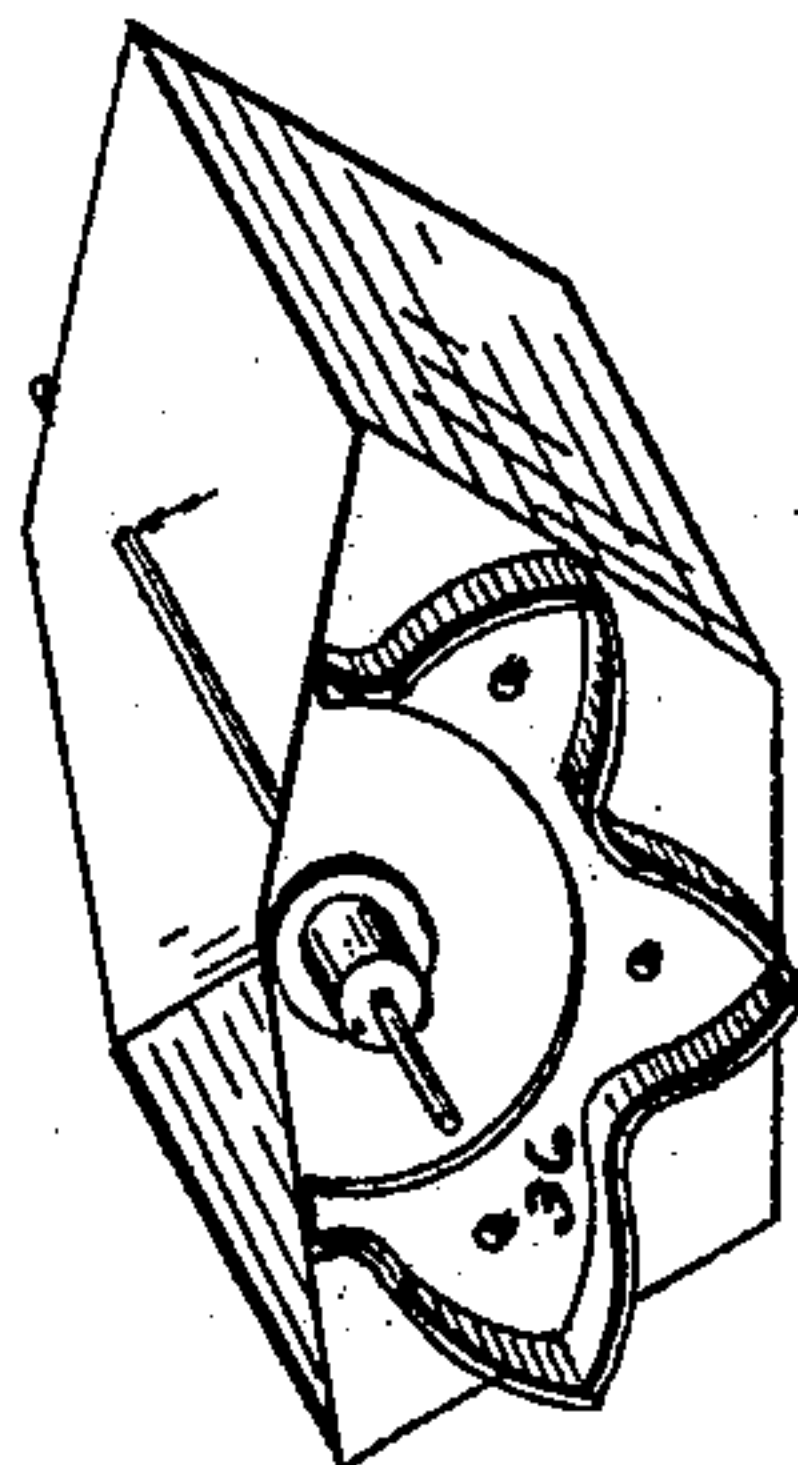


Fig. 15.

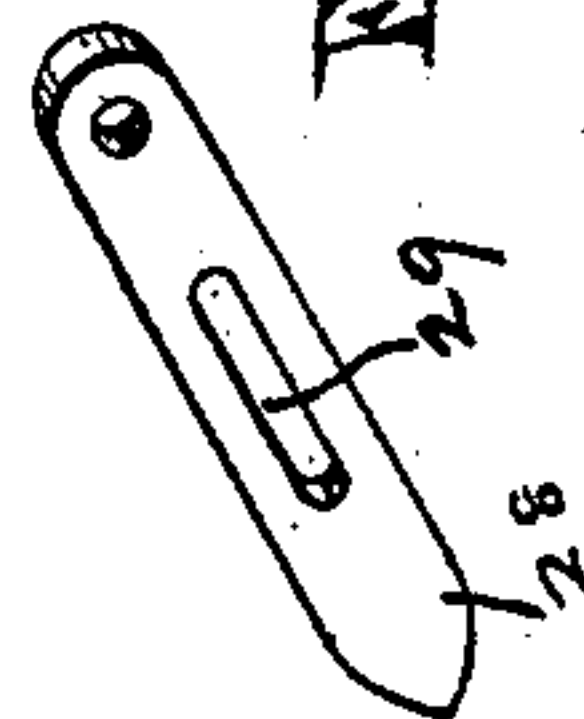


Fig. 14.

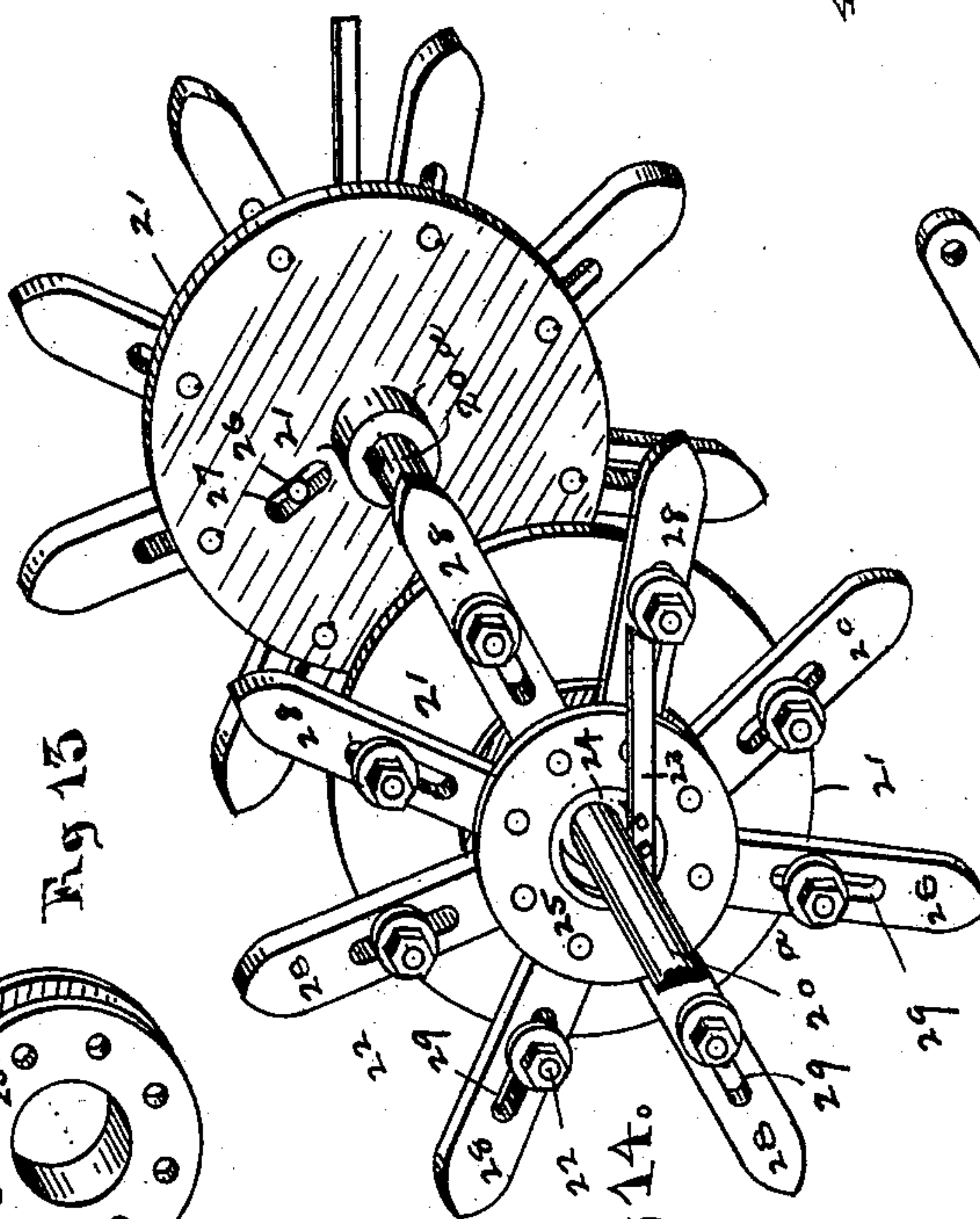
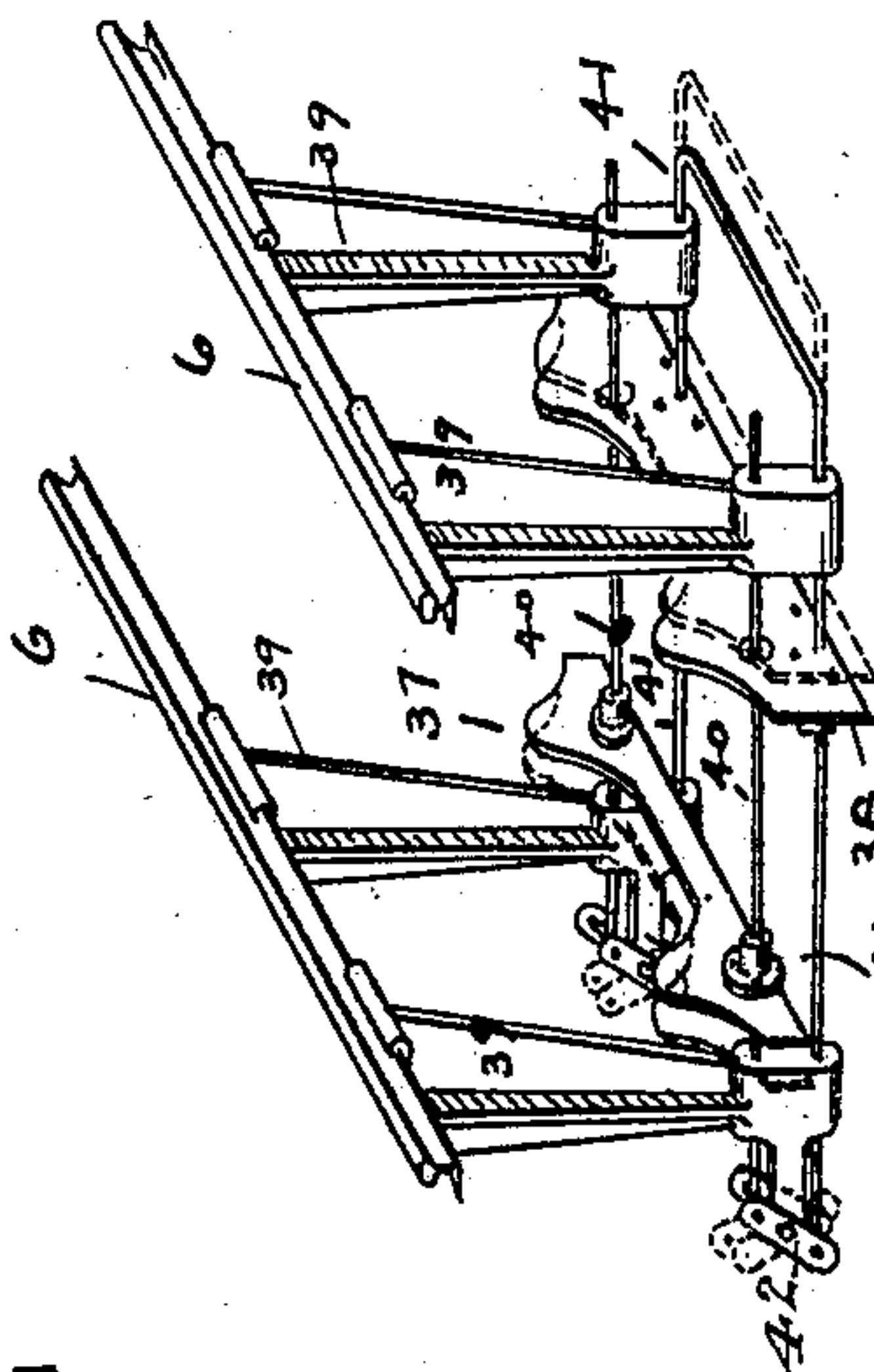


Fig. 17.



WITNESSES

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UNITED STATES PATENT OFFICE.

ARTHUR J. FRITH, OF NEW YORK, N. Y.

CONVEYER.

SPECIFICATION forming part of Letters Patent No. 620,299, dated February 28, 1899.

Application filed August 10, 1897. Serial No. 647,770. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR J. FRITH, of the city of New York, in the county and State of New York, have invented certain new and useful Improvements in Conveyers, which invention or improvements are fully set forth and illustrated in the following specification and accompanying drawings.

The object of this invention is to provide a conveyer for conveying coal, dirt, or other material which shall be of simple construction and very simple in operation.

The invention will first be described in detail and then set forth in the claims.

In the accompanying drawings, Figure 1 shows in side elevation, partly in section, an endless gravity bucket conveyer embodying certain features of my invention. Fig. 2 is an enlarged side elevation of one of the links of the conveyer-chain detached. Fig. 2^a is a view in plan of Fig. 2. Figs. 3 and 3^a show in plan and end view, respectively, one of the supporting axles or shafts of the conveyer, illustrating a detail of the construction hereinafter described. Fig. 4 is a view in plan of the conveyer shown in Fig. 1 at its lower level. Figs. 5 and 6 show in side and end view, respectively, detached and enlarged, the bucket-dumping mechanism illustrated in Fig. 1. Fig. 7 is an enlarged view in perspective of one of the gravity-buckets shown in Fig. 1. Fig. 8 is a view in perspective of a device for lubricating the pivots of the conveyer-chain. Figs. 9 and 10 illustrate in sectional side elevation and plan, respectively, another form of conveyer, a "scraper conveyer," also embodying certain features of my invention. Figs. 11, 12, 13, 14, and 15 are views in perspective, upon an enlarged scale, illustrating the different parts of the driving mechanism employed to drive the conveyers shown in the preceding figures. Fig. 16 is a view in perspective of a modified form of a gravity - bucket hereinafter described. Fig. 17 shows in perspective a modified form of bucket-dumping mechanism hereinafter described.

In said figures the several parts are respectively indicated by reference - numbers, as follows:

Referring first to Figs. 1 to 7 and 11 to 15, inclusive, the gravity bucket conveyer shown

in these figures is constructed with two endless chains 1, each of which is composed of a series of links formed of two flat parallel plates 2, Figs. 2 and 2^a, between which chains are suspended the buckets 3 by means of axles or shafts 4. Each alternate shaft passes through the center of a bucket, and all of said shafts are provided with wheels 5, which run upon upper and lower tracks 6 7, carried in the framework of the conveyer, suitable curved guide-rails 6^a 7^a being provided at the corners of the conveyer. The shafts 4 pass through elongated holes or slots 8 in the ends of the links 2 and between said links are provided with hubs 9. In order to prevent the turning of said shafts within the slots and a consequent grinding effect, a collar or boss 10, Figs. 3 and 3^a, provided with a projecting lug 11, is secured to each shaft 4 by a pin 12. The lug 11 enters the slot in one of the link-plates 2, (which slot is made longer than the others, as shown at 8^a, Fig. 2^a), and thus the shaft 4 is prevented from turning within said slot.

One or more hoppers or chutes 13 may be placed at any suitable point or points above the lower track 7, so that the material to be conveyed may be delivered from any source of supply through said hoppers or chutes into the buckets as they travel beneath the hoppers.

The buckets 3 when in normal position are not in contact with each other, but are spaced apart, and each bucket, as shown in Fig. 7, has secured to its under side two transverse flat plates 14, forming transversely - projecting lugs at or near the bottom of the bucket.

For the purpose of overturning the bucket and discharging its contents the overturning mechanism (shown in Figs. 1, 5, and 6) may be located at any desired point in the bucket's line of travel. A pair of brackets 15, supported in the framework of the conveyer, carry a transverse shaft or rod 16. Engaging this shaft or rod are the slotted ends of two cam-levers 17, the shape of which is shown in full lines in Figs. 1 and 5. The other or free ends of said levers, connected by a rod 18, are supported upon a transverse rod or shaft 19, carried by a pair of brackets or castings 20. The free ends of the cam-levers 17 are not pivoted or connected in any way to the shaft

19, but merely rest thereupon and are supported thereby, so that said levers form a dumping-cam projecting above the track 6 in the line of travel of the loaded buckets, the inclined upper surface of said cam permitting a gradual and easy righting of the bucket after discharge.

At the lower left-hand corner of Fig. 1 is shown an improved driving mechanism for imparting motion to the conveyer, the several parts of said mechanism being shown detached in Figs. 11 to 15, inclusive. Fixed upon a shaft 20^a are a pair of plates 21, each provided with a series of projecting pins 22, Fig. 12. Mounted upon the shaft 20^a also and secured to some part of the framework by a bracket 23 is an eccentric 24, Fig. 11, surrounded, Figs. 1 and 14, by a grooved ring 25, Fig. 13, driven from the plates 21 by a pin 26, passing through a slot 27, Figs. 12 and 14. Pivoted to the ring 25 are a series of arms 28, Fig. 15, provided with slots 29, engaging the pins 22 on the plates 21.

The operation of the conveyer constructed as above described is as follows: If motion be imparted to the driving-shaft 20^a by a steam-engine or other motor, the revolution of said shaft through the plates 21 and arms 28 will drive the conveyer, said arms engaging the axles or shafts 4. It will be evident that as the pins 22 revolve around the shaft-center and the pitch-circle of the arms 28 revolves around the eccentric-center the velocity of the driving-arms 28 at the pitch-circle will vary as their pins approach or recede from the eccentric-center, and as the unloaded buckets descend the left vertical path of the conveyer and pass upon the lower horizontal tracks 7 the relative pitch distance of the arms 28 lessens gradually and the links 2 slip in their grooves 8 and pass from a condition of tension to that of compression, thus closing up the spaces between the buckets and bringing the ends of the buckets into contact with the shafts 4. A continuous series of buckets is thus formed upon the lower track 7 at the loading-point with no spaces between the buckets, and in this condition the buckets are there loaded from the hopper or chute 13, the material being delivered directly into the bucket without the intervention of a loading mechanism. As the buckets continue to travel and pass loaded from the lower tracks 7 to the vertical path of the conveyer the links 2 will be released from pressure and the conveyer will resume its normal condition of tension, with the buckets spaced apart. The loaded buckets then pass upon the upper tracks 6 until one of the transverse plates 14 thereon comes into contact with the dumping-cam 17. The buckets will then be overturned, as shown in Fig. 1, and their contents discharged, the unloaded buckets then continuing their travel and descending the vertical path of the conveyer to be again formed into a continuous series and reloaded in the manner above described.

By the use of two transverse plates 14 on each bucket swinging of the empty buckets is avoided, as after a bucket has been overturned by one plate coming in contact with the dumping-cam and the empty bucket swings back to its normal position the other plate 14 will strike the dumping-cam and so prevent further swing of the bucket upon its pivot.

By the use in a bucket conveyer of the driving mechanism above described all shields or other devices for closing the spaces between the buckets may be dispensed with and the material to be conveyed may be delivered from a hopper or chute directly into a continuous series of buckets at the loading-point without the intervention of any loading mechanism.

It is evident that in this form of conveyer the speed of the conveyer-chain when extended is greater than when the buckets are close together. The point of variation will naturally be at the driving mechanism, and it is advantageous that this change of speed should be made without shock. This object is attained by having the pitch distance of the driving-arms 28 slowly decrease, allowing movement in the link-slots 8 to take place gradually, as described, thus continuously varying without violence the speed of the conveyer.

While the driving mechanism above described may be used in a bucket conveyer to perform the double office of driving the conveyer and spacing the buckets, it is evident that it may be used solely as a driving mechanism in any conveyer in which the speed of the chain is variable. Thus, for example, it may be employed, as shown in Figs. 9 and 10, to drive a "link-belt" conveyer, composed of links 30, provided with scrapers 31. With this and other forms of conveyer it has heretofore been found necessary to use a special arrangement of "equalizing-gears" to overcome the pulsating or jerky motion imparted to chains of long pitch by the driving-sprocket, the variation in speed being destructive to the chain. My improved driving mechanism will perform all the functions of these equalizing-gears and render their use unnecessary, and said mechanism may be used in any conveyer in which the speed of the chain is variable. The construction of said driving mechanism may also be varied without departing from my invention.

In Figs. 8 and 9 is shown a device for lubricating the pivots of the conveyer-chain, which consists of a circular oil reservoir or chamber 32, into which the lubricating fluid is poured through an opening 33. In Fig. 9 this oil-reservoir is shown mounted upon the driving-shaft 20, so as to be rotated thereby, and is provided with a series of pipes 34. The inner end of each of these pipes within the chamber 32 is bent, as shown at 34^a, Fig. 8, and said pipes extend outwardly along the driving-arms 28, being held in place by lugs

35, formed on said arms. It will be evident that when the conveyer is in operation each pipe 34 will take into its curved end 34^a a certain quantity of the lubricating fluid in the chamber 32, and as said chamber and pipes continue to revolve the lubricant will flow through the pipes and be delivered upon the pivots of the conveyer-chain, each pipe when in a vertical position lubricating a pivot, as shown in Fig. 9. A simple and effective device is thus provided for automatically lubricating the pivots of the conveyer-chain by the travel of the conveyer.

The bucket-dumping mechanism (shown in Figs. 1, 5, and 6) presents the important advantage that it is automatically removed from the path of travel of the buckets in case of a reversal of the motion of the conveyer. In bucket conveyers it sometimes happens that through accident the direction of travel of the conveyer is reversed, and in such cases the empty buckets are returned at considerable speed over the path just traversed. On such reverse travel the buckets will come into contact with the projecting dumping mechanism and as a result they will be jammed together and some portion of the conveyer probably strained or broken. With my improved dumping mechanism all danger of breakage is avoided. Should the direction of travel of the buckets be reversed, so that instead of traveling in the direction of the arrow, Fig. 5, they travel toward the right, the effect will be that when a bucket strikes the dumping-cam 17 said cam will be forced toward the right, its slotted end sliding upon the rod 16 and its free end slipping off its support 19. Said cam will thus automatically be thrown into the position shown in dotted lines in Fig. 5 entirely clear of the path of travel of the buckets, thus preventing all jamming and danger of breakage. Said cam may also at any time desired be removed by hand from the path of travel of the buckets by simply throwing it toward the right, so as to release it from its support 19.

Instead of the bucket-dumping mechanism above described the mechanism shown in Figs. 16 and 17 may be employed, which, however, does not present the advantage of automatic removal above set forth. The bucket shown in Fig. 16 has secured to each of its ends a half-gear 36, which gears effect the overturning of the bucket by engaging with two dumping cams or racks 37 38, supported in the path of travel of the buckets by brackets 39 and rods 40 41. Two rods 40 are secured to the cam 37 and a bent rod 41 is secured to the cam 38. The rods 40 are connected with the two ends of the rod 41 by links 42, as shown at the left-hand side of Fig. 17. It will be evident that by moving the rod 41 by hand the cams 37 38 can be caused to slide horizontally, and thus be thrown into position to effect the dumping of the buckets or to clear said buckets, as may be desired, the

dotted lines in Fig. 17 showing the positions assumed by the different parts when the rod 41 is pulled toward the right.

I do not herein broadly claim the bringing of the buckets of a conveyer toward each other at the loading-point, as such invention is fully claimed in a previous application for Letters Patent filed by me on the 21st day of December, 1896, bearing Serial No. 616,440.

Having thus fully described my invention, I claim—

1. In a conveyer, a driving mechanism comprising the following-named elements in combination: a fixed eccentric; a series of driving-arms revolving around the center of said eccentric; and a driving-shaft, for operating said arms, eccentric with the pitch-circle and with the eccentric-center; whereby the relative distance of said arms upon the pitch-circle is varied.

2. In a conveyer, a driving mechanism comprising the following-named elements in combination: a fixed eccentric; a series of driving-arms revolving around the center of said eccentric; a driving-shaft for operating said arms, eccentric with the pitch-circle and with the eccentric-center and a shifting connection between said arms and said shaft.

3. In a conveyer, a driving mechanism consisting of the following-named elements in combination: a driving-shaft; a pair of plates mounted upon said shaft; a fixed eccentric; a ring surrounding said eccentric; and a series of arms connected to said ring, and having a shifting connection with said plates.

4. In a conveyer, a driving mechanism consisting of the following-named elements in combination: a driving-shaft; a pair of plates mounted upon said shaft and provided with projecting pins; a fixed eccentric; a ring surrounding said eccentric and driven from said plates; and a series of arms connected to said ring and provided with slots engaging said pins.

5. In a conveyer, a driving mechanism consisting of the following-named elements in combination: a driving-shaft; a plate mounted upon said shaft and provided with a slot; a fixed eccentric; a ring surrounding said eccentric and provided with a pin engaging the slot in said plate; and a series of arms connected to said ring and having a shifting connection with said plate.

6. In a conveyer, a driving mechanism consisting of the following-named elements in combination: a driving-shaft; a pair of plates mounted upon said shaft and provided with projecting pins, one of said plates being also provided with a slot, as 27; a fixed eccentric; a ring surrounding said eccentric and provided with a pin, as 26, engaging the slot 27; and a series of arms connected to said ring and provided with slots engaging said pins.

7. In a conveyer, the combination of a supply source of material; an endless traveling chain composed of a series of slotted links

pivoted together through said slots and capable of end movement; a series of buckets suspended from said chain; and means for effecting end movement in the links at the source of supply and bringing the buckets toward each other at said point, while the buckets at other points remain spaced apart.

8. In a conveyer, the combination of a supply source of material; an endless traveling chain composed of a series of pivoted links, each composed of two parallel plates, as 2, provided with slots, as 8; a series of buckets suspended from said chain; and means for effecting end movement in the links at the source of supply and bringing the buckets toward each other at said point, while the buckets at other points remain spaced apart.

9. In a conveyer, the combination of a supply source of material; an endless traveling chain composed of a series of links, each composed of two parallel plates, as 2, provided with slots, as 8; pivots for said links, passing through said slots and provided with hubs between said plates; a series of buckets suspended from said chain; and means for effecting end movement in the links at the source of supply and bringing the buckets toward each other at said point, while the buckets at other points remain spaced apart.

10. In a conveyer, the combination of an endless traveling chain, having a series of slotted links; gravity-buckets; and supporting axles or shafts for said buckets, passing through the slots in said links and forming pivots therefor.

11. In a conveyer, the combination of an endless traveling chain, having a series of links each composed of two parallel plates, as 2, provided with slots, as 8; gravity-buckets; and supporting axles or shafts for said buckets, passing through said slots and forming pivots for the links.

12. In a conveyer, the combination of an endless traveling chain, composed of a series of slotted links; gravity-buckets; supporting axles or shafts for said buckets, passing through the slots in said links and forming pivots therefor; and means for preventing the revolution of said axles or shafts within said slots.

13. In a conveyer, the combination of an endless traveling chain, composed of a series of slotted links; gravity-buckets; supporting axles or shafts for said buckets, passing through the slots in said links and forming pivots therefor; and a boss or collar, as 10, pinned to said shafts and provided with a lug or projection, as 11, entering the slots in said links.

14. In a conveyer, the combination of an endless traveling chain composed of a series of slotted links, pivoted together through said slots; a fixed eccentric; a series of driving-arms, for driving said chain, revolving around the center of said eccentric; and a driving-shaft for operating said arms, eccentric with the pitch-circle and with the eccentric-center.

15. In a conveyer, the combination of an endless traveling chain composed of a series of slotted links, pivoted together through said slots; a fixed eccentric; a series of driving-arms, for driving said chain, revolving around the center of said eccentric; a driving-shaft for operating said arms, eccentric with the pitch-circle and with the eccentric-center; and a shifting connection between said arms and said shaft.

16. In a conveyer, the combination of an endless traveling chain composed of a series of slotted links; a series of gravity-buckets; supporting axles or shafts for said buckets, passing through the slots in said links and forming pivots therefor; a fixed eccentric; a series of driving-arms, for engaging said axles or shafts, revolving around the center of said eccentric; and a driving-shaft, for operating said arms, eccentric with the pitch-circle and with the eccentric-center.

17. In a conveyer, the combination of an endless traveling chain having a series of links, each composed of two parallel plates, as 2, provided with slots, as 8; a series of gravity-buckets; supporting axles or shafts for said buckets passing through said slots and provided with hubs between said parallel plates; a fixed eccentric; a series of driving-arms, for engaging said hubs, revolving around the center of said eccentric; and a driving-shaft for operating said arms, eccentric with the pitch-circle and with the eccentric-center.

18. In a bucket conveyer, the combination of a conveyer-chain composed of a series of pivoted links; buckets suspended from said chain; a driving mechanism; and a rotary oil reservoir, or chamber, provided with pipes adapted to lubricate automatically, and in succession, each pivot of the chain as the conveyer travels.

19. In a bucket conveyer, the combination of a conveyer-chain composed of a series of pivoted links; buckets suspended from said chain; a driving-shaft; and a rotary oil reservoir or chamber, rotated by said shaft and provided with pipes, adapted to lubricate in succession each pivot of the chain as the conveyer travels.

20. In a conveyer, the combination of a conveyer-chain composed of a series of pivoted links; buckets suspended from said chain; a driving-shaft; a rotary oil reservoir, or chamber, rotated by said shaft; and a series of driving-arms, each provided with a pipe leading from said reservoir, and adapted to lubricate in succession each pivot of the chain, as the conveyer travels.

21. In a conveyer, a gravity-bucket having secured to its bottom flat transversely-projecting plates, for the purposes set forth.

22. In a conveyer, the combination of an endless traveling chain; a series of gravity-buckets suspended from said chain, each bucket having transversely-projecting lugs secured to its bottom; and a dumping-cam,

for overturning the loaded buckets, located in their path of travel and adapted to be struck by said transverse lugs.

23. In a conveyer, the combination of end-
5 less flexible connections; gravity-buckets suspended from said connections; a dumping-cam arranged in the path of travel of the loaded buckets; and means for automatically removing said cam from the path of travel of
10 the buckets upon a reversal of the motion of the conveyer.

24. In a conveyer, the combination of end-
less flexible connections; gravity-buckets suspended from said connections; a dumping-
15 cam arranged in the path of travel of the

loaded buckets and provided with a slotted end engaging a transverse rod; and a rod or shaft for supporting the free end of said cam.

25. In a conveyer, a bucket - overturning mechanism, consisting of the following-named 20 elements in combination: a transverse rod or shaft, as 16; a pair of cam-levers, as 17, provided with slotted ends engaging said shaft; a rod, as 18, connecting the free ends of said levers; and a transverse rod, as 19, support- 25 ing said free ends.

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Witnesses:

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