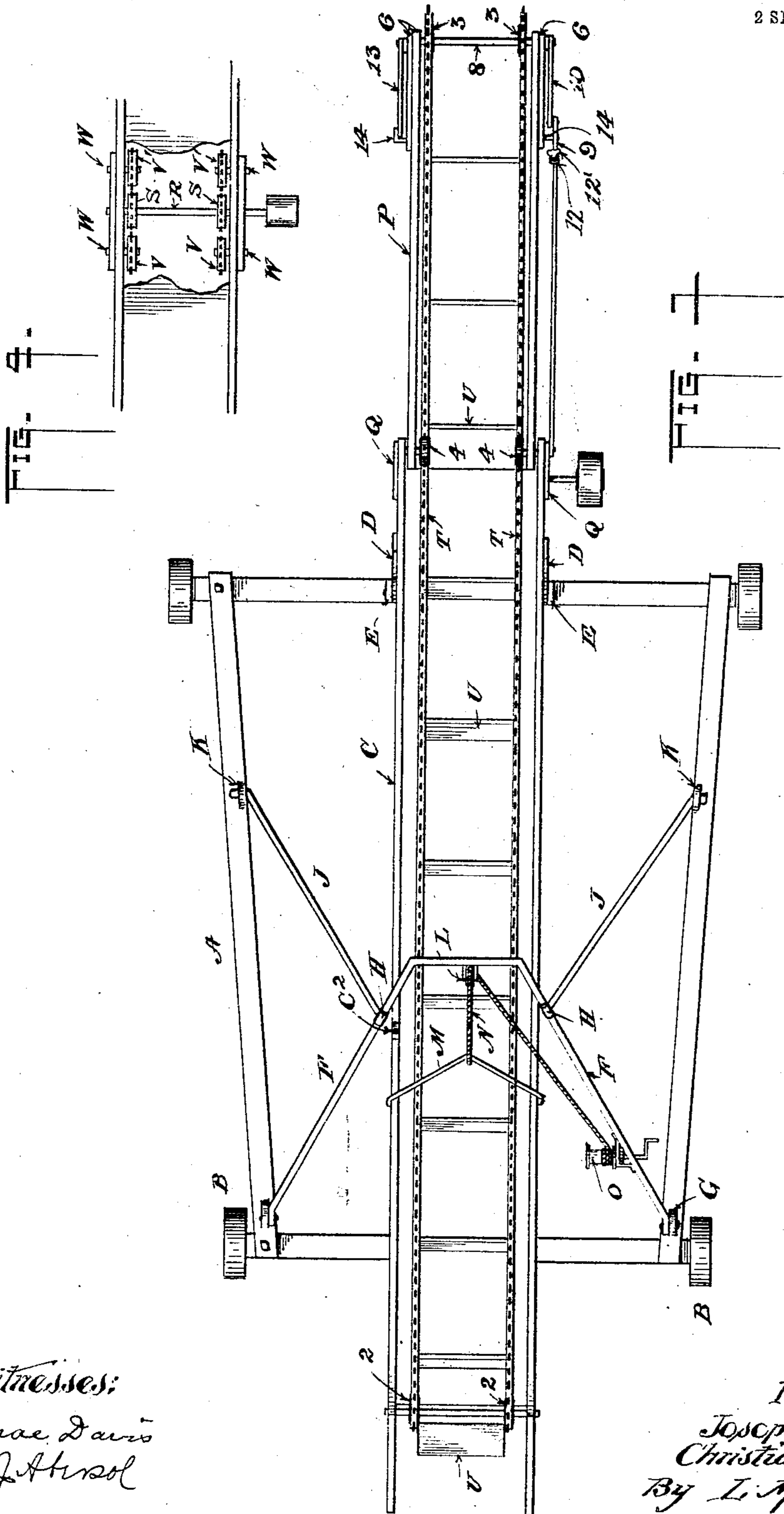


J. E. & C. W. CAMP.
 PORTABLE GRAIN ELEVATOR.
 APPLICATION FILED OCT. 5, 1905.

898,552.

Patented Sept. 15, 1908.

2 SHEETS—SHEET 1.



Witnesses:
 Mae Davis
 E. H. H. Sol

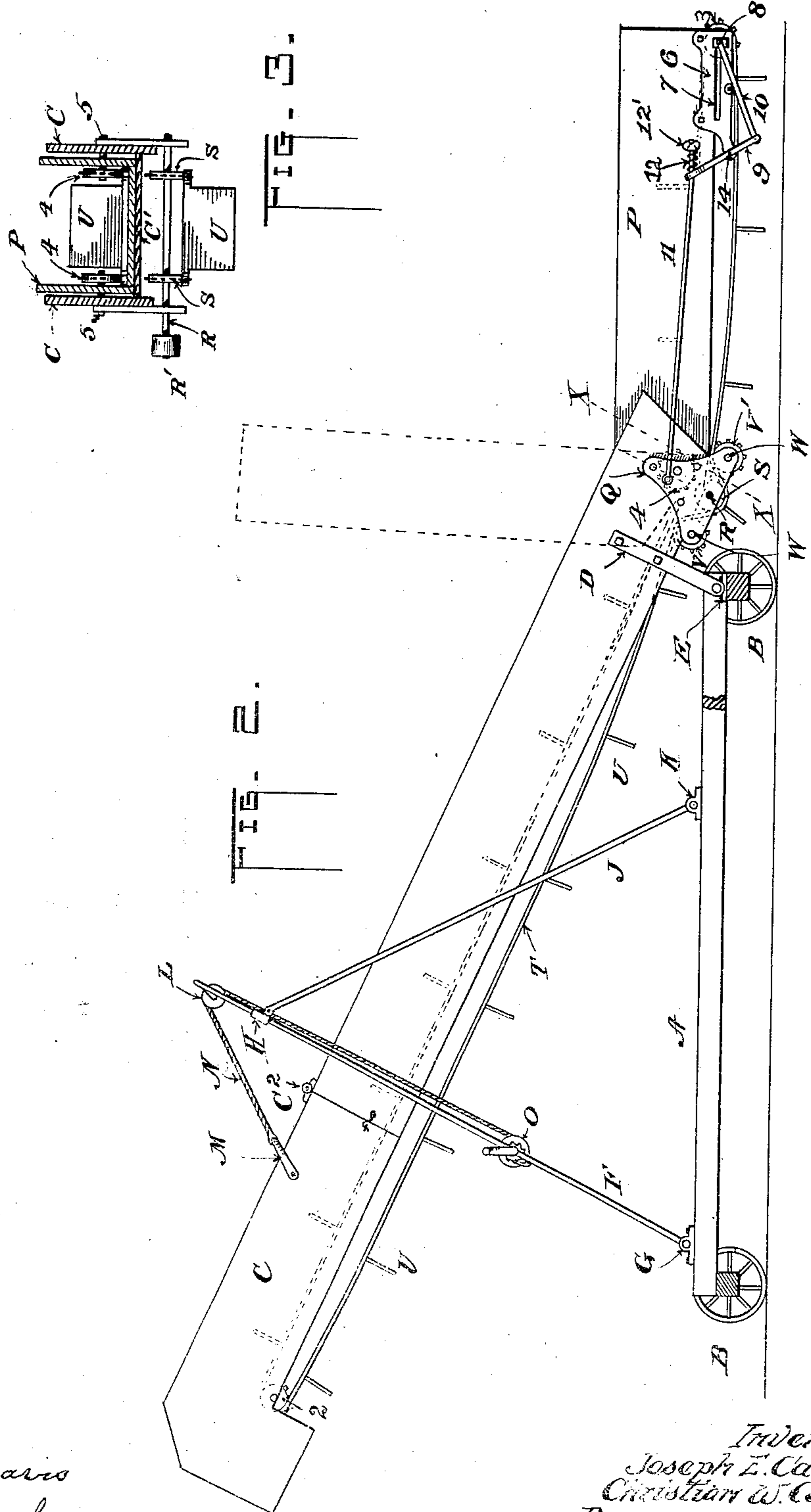
Inventors:
 Joseph E. Camp,
 Christian W. Camp,
 By L. M. Thurlow,
 Atty.

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Witnesses:
 Mae Davis
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Inventors:
 Joseph E. Camp,
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UNITED STATES PATENT OFFICE.

JOSEPH E. CAMP, OF WASHINGTON, AND CHRISTIAN W. CAMP, OF METAMORA, ILLINOIS,
ASSIGNORS TO CAMP BROS. & CO., OF METAMORA, ILLINOIS, A CORPORATION OF
ILLINOIS.

PORTABLE GRAIN-ELEVATOR.

No. 898,552.

Specification of Letters Patent.

Patented Sept. 15, 1908.

Application filed October 5, 1905. Serial No. 281,448.

To all whom it may concern:

Be it known that we, JOSEPH E. CAMP and CHRISTIAN W. CAMP, citizens of the United States, residing, respectively, at Washington and Metamora, in the counties of Tazewell and Woodford, respectively, and State of Illinois, have invented certain new and useful Improvements in Portable Grain-Elevators; and we do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

This invention pertains to improvements in portable grain elevators.

The object of the invention is to simplify the construction of the elevating mechanism so that it can be more cheaply produced than has been possible heretofore.

A further object is to provide a mechanism for the elevator that will require less power to drive it.

A still further object is to provide a mechanism to which the power can be more directly applied to the drag chain.

Another object is to make a peculiar disposition of a power wheel used for driving the elevator chains, with reference to the point of pivotal connection of the elevator and its conveyer; also of certain idler wheels for keeping the chain in mesh with said power wheel; also of idler wheels within the elevator at the said point of pivotal connection all of which will presently appear.

The invention also consists in certain details of construction as will be pointed out in the following specification and incorporated in the claims.

In the appended drawings, Figure 1 is a top view of the elevator. Fig. 2 is a side elevation of the same showing gearing mechanism for driving the drag-chain. Fig. 3 is a transverse section of the conveyer and elevator on line X X, Fig. 2. Fig. 4 is a top view of a portion of the elevator with part of its bottom broken away to show certain sprocket wheels thereunder which comprise the driving gearing for the drag-chains.

The reference letter A indicates a supporting and carrying-frame which may be of any desired form having the carrying wheels B on which the said frame is transportable.

C is an elevator of any approved construction pivotally mounted near its lower end on

the rear end of the carrying-frame A by means of an arm D at each side of and secured to the elevator, and ears E mounted on the rear reach of the frame.

Mounted on the frame A is a derrick for supporting the upper end of the elevator. It comprises an A-shaped iron frame F pivoted at each extremity to a suitable bearing member G. Carried near the top of the said frame F on each limb is a fitting H to each of which is pivotally attached a rod J the lower end of each of which is bent and adapted to enter a member K secured to each side member of the frame A as shown, by which the frame F is rigidly supported and capable of sustaining considerable weight.

It is to be noted that the frame, just described is designed to straddle the elevator and that the latter rises and lowers thereunder. In order to provide for this a pulley L is suspended from the top of the said frame and at M on the elevator is a bail to which a rope N is attached, the latter extending over said pulley and attached to and adapted to wind upon a drum or windlass O as shown. To this construction, however, we attach no broad claim since it has been described and shown in Letters Patent No. 741,108 issued to Joseph E. Camp on the 13th day of October, 1903. As a matter of convenience in the use of the elevator we provide a horizontal portion P termed a drag or conveyer which is pivoted to the lower end of the elevator and is designed to tilt on end on said pivot whereby it is removed from the path of a wagon to be unloaded as in other devices of this character and all of which is well known.

The portion of the elevator which we consider important may now be explained. Secured to each side of the elevator at its lower end is a plate Q near the lower edge of which is a transverse shaft R carrying two sprocket wheels S located under the bottom C' of the elevator and beneath which run the two lower stretches of the sprocket chains T, the latter having the drag-plates U carried between them. At each side of each sprocket S is stationed similar sprockets V and V' all of which are carried on studs W secured in the said castings Q. A pair of sprocket wheels 2 are carried at the head of the elevator and a pair 3 at the outer or rear end of the conveyer P over which the said chains T are designed to travel. In the working posi-

tion shown in Fig. 2 the chains unless held down to place on the bottom of the conveyer and elevator would tend to take up a straight line between the sprockets 2 and 3 and in order to prevent this idler wheels 4 are stationed within the conveyer at each side thereof beneath which the chains run said idlers serving to hold said chains down on the bottom in proper working position. The studs upon which the wheels are carried are represented by 5 and extend through the conveyer sides and the elevator sides and are secured in the castings Q. Said studs serve a double purpose, first, as the means for carrying the wheels and second as the pivots for the conveyer to tilt upon. By mounting the wheels on studs the drag members U can pass between them as shown in Fig. 3 so that there will be no interference. The lower stretches of the chains first pass over the sprockets V, then under the sprockets S and over sprockets V'. Here again it is to be seen that the wheels V and V' are carried on studs so that the drag members can pass between them but this is unnecessary as regards the wheels S since the chains pass under them and the drags pass around and below them instead of between them as in the case of the said wheels V and V'. By providing the shaft R entirely across the elevator the sprockets S become the driving members motion being imparted thereto by means of the pulley R' which is to be driven from the horse-power or other means that may be employed. By this means the power is applied at the most convenient point and at the most advantageous place as well since the pull upon the load within the elevator is and should be from the upper sprocket wheels 2 and the slack in the chain is beneath the conveyer or between the wheels V' and the wheels 3 allowing the said conveyer to be raised without unduly tightening the chains.

Contrary to some devices of which we are aware we locate the driving or power-sprocket S on one end of the elevator and place idler wheels quite close thereto at each side and relatively fixed in position, the shafts of the wheels being substantially in line with one another in order that the arrangement shall be compact and therefore adapted for use on an elevator, and, farther, that there will not be a distance between the idlers and power wheel sufficient to allow flapping of the chain or drag between said idlers and power wheel. Furthermore, that there will not be a distance between the wheels sufficient to allow the said chain or drag to ride upon the power wheel and thereby tighten and strain the chain, nor break it as sometimes happens.

In no other elevator of pivotally connected sections is the power applied to a center wheel with an idler fixed in position at each side to hold the chain in positive engagement with said power wheel. We are

aware of a rigid one-member conveyer with rollers mounted in substantially the same relation as we describe for carrying a belt but this is not a jointed member. In some other devices a single idler is stationed beside a chain-drive power wheel for keeping the chain in engagement with the said power wheel at one side, the other side of the chain being loose. In our improved construction the use of an idler at each side of the power wheel positively prevents a flapping and shaking chain from riding upon the power wheel at either side while also permitting a very loose chain if desired so that the elevator sections can be given a wide range of movement relatively without tightening or binding said chain, the wheels always remaining relatively fixed in position.

In connection with the chains, we provide an automatic tension device which we will describe although it forms the subject matter of an application of Joseph E. Camp filed on April 8, 1905, Serial Number 254,998, for grain elevator and is not broadly claimed herein for that reason.

Secured at each side of the free end of the conveyer is a plate 6 in each of which is a horizontal slot 7, but one of which is shown, through which extends the shaft 8 carrying the sprockets 3. Pivoted at its middle to one end of the plate shown in Fig. 2 is an arm 9 whose lower end is connected by a link 10 to the end of the said shaft 8. Through the upper end of the said arm 9 extends a rod 11 having thereon a spring 12 and an adjusting nut 12', the opposite end of the rod having pivotal connection with the casting Q of the elevator as shown. When properly adjusted the spring keeps a steady tension on the arm 9 and holds the shaft 8 outward and away from the wheels V' so as to keep the chains free of too much slack. If, however, the conveyer is raised to the dotted line position to permit a wagon to pass the rod 11, which is pivoted above and forward of the pivot of the elevator at 5, will shift its position with relation to the conveyer thereby slackening the tension of the spring and allowing the shaft 8 to approach nearer the elevator and thus loosen the chain; this action taking place while the conveyer is being raised. This, as has been stated, forms the subject matter of the application above referred to and needs no further description. The elevator is jointed near its upper end and has a hinge at C² so that the head can be folded back upon the main portion for transportation purposes. Also, the conveyer may be raised as described and the derrick frame members F and J collapsed upon the carrying platform thereby making a very compact implement that can be easily drawn from place to place and stored in a small space.

By our peculiar arrangement of sprocket chains and drive wheels we are enabled to

construct a portable or stationary elevator at small cost and one that will require much less power than other devices of its kind.

As already intimated we are aware of some other such devices as that described herein but we are not apprised of a device which combines the particular arrangement herein described and shown with jointed members, *i. e.* the conveyer and elevator. It will be noted that the idlers 4 within the elevator at the place of pivotal connection of the said elevator and the conveyer are fixed, and also that the power wheels S are almost immediately below them, as viewed in Fig. 2, so that as the conveyer is lifted or tilted on its pivot the stretches of chain will partially wrap upon them. In thus wrapping upon the wheels S the lower stretches of the chain which have extended over a portion of the periphery of the idlers V' are almost, if not entirely, removed therefrom thus creating considerable slack in said chains which slack is transferred to the upper stretch around the wheels 3 and through the conveyer to the said idlers 4 where it is taken up by wrapping upon said idlers as will be understood. By reason of this the automatic means at the outer end of the conveyer is called upon but little to relax the chains and in this connection it will be seen the relative positions of the wheels V' and 4 and their relative sizes could be such as to provide all the slack necessary to readily permit the conveyer to be raised and also that the slack would be taken up sufficiently by said wheel V' when the conveyer is in the normal position for work without calling upon the automatic means above referred to.

The idlers 4 within the conveyer are permanently located in position it not being necessary to provide for lifting them or changing the position in any way relative to the elevator member carrying them when raising the pivotally connected conveyer. Equivalent means may be used in place of said idlers since they need not necessarily be wheels. The mechanism can be used at joints of elevator sections of course, as well as at the joint between the conveyer and elevator as herein described and shown.

We do not confine ourselves to the mechanism shown and described nor to the exact arrangement thereof since equivalents may be readily supplied.

1. An elevator, a tiltable raisable conveyer section pivoted thereto, a chain-driving power-wheel in the vicinity of and substantially beneath the pivot and carried by the elevator, a drag chain of a single length extending through both the elevator and conveyer and in engagement with and driven by said power-wheel, an idler wheel adjacent to the power wheel at each side thereof and carried by the elevator and in fixed positive relation to the power wheel, and a per-

manently positioned idler carried by the elevator for holding the drag chain in operative position upon the bottom of and at the juncture of the said elevator and conveyer.

2. In a device of the class described, an elevator, a raisable conveyer pivoted thereto, a one-piece endless drag-chain extending through the entire conveyer and elevator, a chain-driving power wheel carried by the elevator substantially beneath the pivot point of the two sections and fixed in position with reference to said pivot and in engagement with and for driving the said drag-chain, an idler wheel at each side of said drive-wheel and also carried by the elevator and permanently fixed in position relative to said wheel, said drag-chain passing between the idlers and the power wheel and idler wheels within and at the juncture of the sections substantially as and for the purposes described.

3. In a device of the class described, an elevator, a vertically raisable conveyer pivoted thereto, a one-piece drag-chain therefor, a power wheel carried by the elevator in the vicinity of the connecting pivot for driving the drag, an idler wheel at each side of the power wheel each said idlers being permanently fixed in position relatively to the power wheel and also carried by the elevator and adapted for keeping the chain in positive engagement therewith, and an idler wheel within the elevator at the pivot thereof for holding the drag in operative position upon the bottoms of the sections.

4. In a device of the class described, an elevator section, a vertically movable section pivoted thereto, a drag-chain extending through both sections, a power wheel carried by the elevator engaging the chain and for driving the under stretch thereof, and positioned beneath the connecting pivot of the sections, means at each side of the said power wheel and also carried by the elevator for holding the chain in positive engagement therewith, such means receiving slack in the chain, and means for holding the chain in operative position within the sections and receiving the slack from the first said means when the conveyer section is raised as described.

5. In a device of the class described, the combination of a pivotally carried elevator adapted to raise and lower on its pivot, a conveyer pivoted to the elevator and adapted also to be raised and lowered on its pivot, an endless drag member extending through both the elevator and conveyer, a power wheel for the under stretch of the drag, an idler at each side of the wheel, all three wheels being carried by the elevator and fixed in position relatively, the under stretch of the drag member running alternately over one and beneath the other, and an idler within and also carried by the elevator and fixed relative to the power wheel and its idlers

for holding the inner stretch of the drag member in an operative position on the bottom of said elevator and conveyer at the juncture of the latter two members substantially as shown.

6. An elevator, an endless drag therefor, a power wheel located between the extremities of the drag and in engagement therewith, and an idler wheel positioned at each side of said power wheel to hold the drag in positive engagement therewith at each side thereof, the position of the wheels being relatively fixed and their axes being in close relation to one another for the purposes described, and means in connection with the drag for permitting it to yield under tension and also to take up the slack therein.

7. An elevator comprising two pivotally connected sections, a drag therefor, a power wheel in the vicinity of the connecting pivot, in engagement with and for driving the drag, an idler wheel at each side of the power wheel both said idlers being permanently fixed in position relatively to the power wheel, all three wheels being carried by but one of the elevator sections, and automatic means in connection with the drag for permitting it to yield under tension by the tilting of the elevator sections relatively.

8. In a device of the class described, the combination of a pivotally carried elevator adapted to be raised and lowered on its pivot, a conveyer pivoted to the elevator and adapted to be raised and lowered on its pivot, an endless drag member extending through both the elevator and conveyer, a power wheel, an idler at each side thereof, all three being carried by the elevator and fixed in position relatively, the under stretch of the drag member running alternately over one and beneath the other, an idler within and also carried by the elevator and fixed in position relatively to the power wheel and its idlers for holding the inner stretch of the drag member in an operative position on the bottom of said elevator and conveyer at the juncture of the two, and yielding means at the outer end of the conveyer permitting the drag to retract and for positively taking up the slack therein at the times and for the purposes set forth.

9. A device of the character described, comprising the elevator body, a conveyer pivoted thereto, a drag extending through both of the members, driving wheels substantially at the pivots of the conveyer and elevator for imparting motion to the drag, idlers adjacent to the driving wheel for keeping the drag in engagement with the said driving wheels, the latter and the idlers permitting the drag to flex, during the vertical adjustments of the elevator.

10. A device of the character described, comprising the elevator body, a conveyer

pivoted thereto, a drag extending through both of the members, driving wheels substantially at the pivots of the conveyer and elevator for imparting motion to the drag, idlers adjacent to the driving wheels for keeping the drag in engagement therewith, the latter and the idlers permitting the drag to flex during the vertical adjustments of the elevator, and idlers also within the elevator at the pivot thereof for retaining the upper stretch of the drag in operative position.

11. In a device of the character described, an elevator, a conveyer pivoted thereto, a drag for running through both of them, driving sprockets substantially at the point of pivotal connection of the elevator and conveyer for driving the drag, the latter flexing at said sprockets as the elevator or conveyer are moved on the connecting pivot and means for automatically taking up the slack in the drag, such means also permitting the drag to extend as set forth.

12. In a device of the character described, an elevator, a conveyer pivoted thereto, a drag for running through both the elevator and conveyer, a driving wheel beneath and substantially at the point of pivotal connection of the elevator and conveyer, an idler wheel at each side of the driving wheel, and fixed in position relative to said driving wheel, the lower stretch of the drag running over an idler, thence under the driving wheel and then over the remaining idler, and idler wheels within the elevator having their axes substantially coincident with the pivot of the conveyer and elevator, and beneath which the upper stretch of the drag runs in the manner and for the purposes stated.

13. In a device of the class described, an elevator, a conveyer pivoted thereto and adapted to be raised on end on its pivot, a drag running through both the elevator and conveyer, wheels at the outer extremity of the latter members for carrying said drag, driving wheels for the drag at the point of connection of the elevator and conveyer, idler wheels at each side of the driving wheels for holding the drag in positive engagement with the driving wheels, the latter and the idlers being relatively fixed in position, idler wheels within the conveyer at the pivot thereof, beneath which the upper stretch of the drag runs and by which the latter is held down upon the bottom of the elevator, and means for automatically keeping the drag at a uniform tension in any position of the conveyer with relation to the elevator.

14. An elevator comprising the elevator member, a short conveyer pivoted to one end thereof, a drag member extending through both conveyer and elevator, carrying wheels for the drag, driving wheels for imparting movement to the drag, idler wheels for causing the drag to positively engage the driving

wheels, and automatic means for slackening or tightening the chains of the drag when and as the elevator or conveyer is moved.

15. An elevator comprising the elevator
5 member, a short conveyer pivoted thereto, a drag member running through both, wheels for carrying it, a driving wheel engaging each chain of the drag, an idler wheel at each side of the driving wheel over each of which the
10 chain passes while passing beneath the driving wheel, all of the wheels being in the region of the pivotal connection between the

elevator and conveyer and means for automatically slackening or tightening the chains as the conveyer or elevator are moved relatively to each other. 15

In testimony whereof we affix our signatures, in presence of two witnesses.

JOSEPH E. CAMP.
CHRISTIAN W. CAMP.

Witnesses:

J. C. IRVING,
B. F. NAFZIGER.