

Nov. 26, 1935.

E. H. OLIVER ET AL

2,022,321

BELT CONVEYER

Filed Feb. 15, 1935

2 Sheets-Sheet 1

Fig. 1.

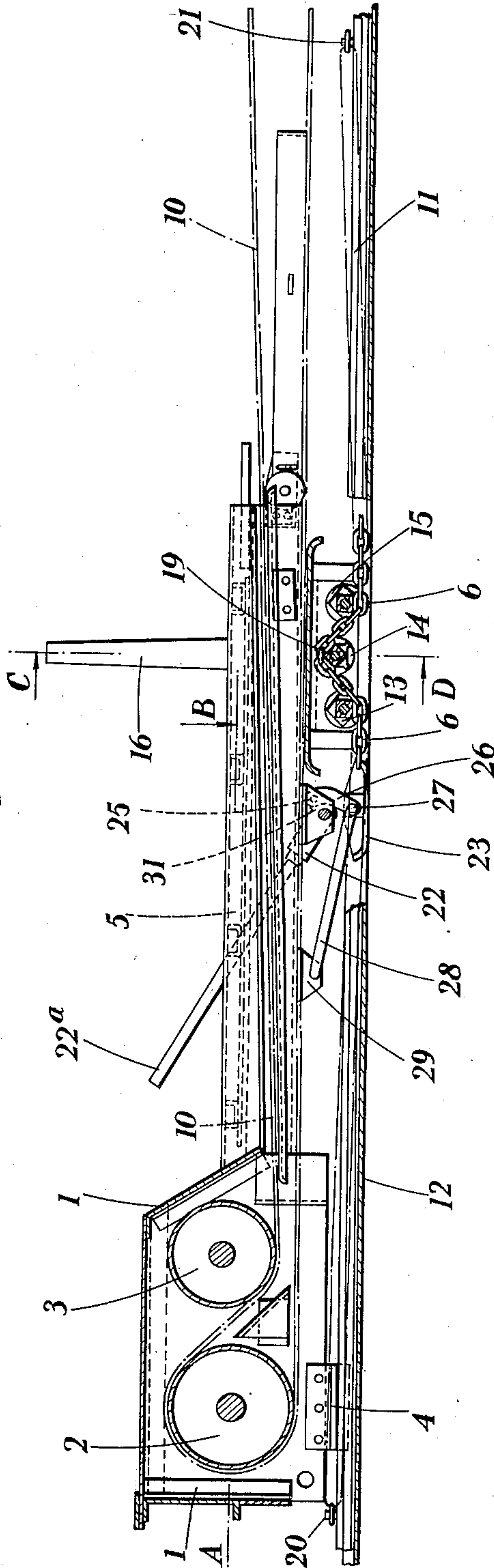
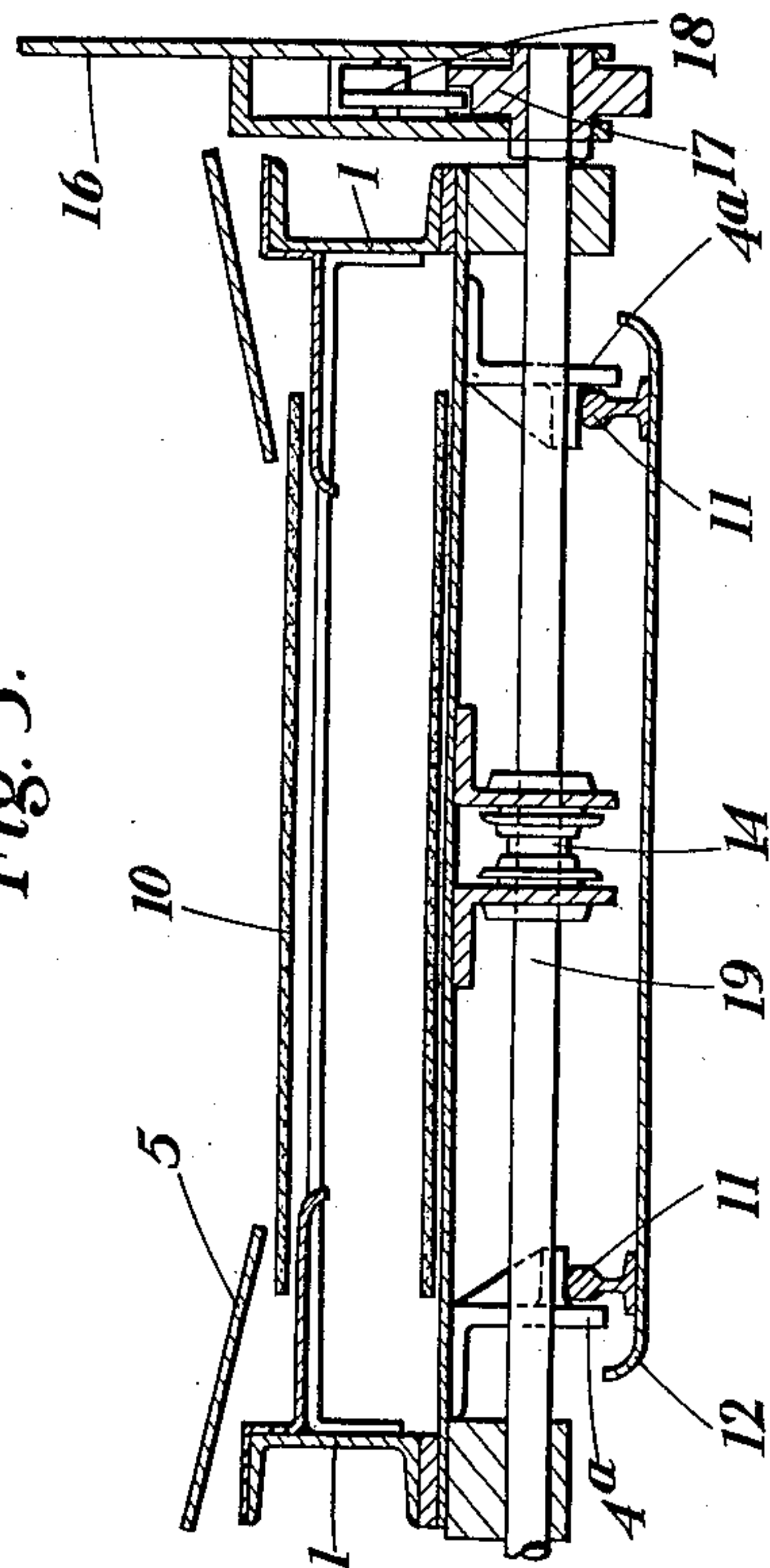


Fig. 3.



INVENTORS  
ERNEST H. OLIVER  
ROBERT F. ROBSON  
BY  
*Robson*  
ATTORNEY

**Nov. 26, 1935.**

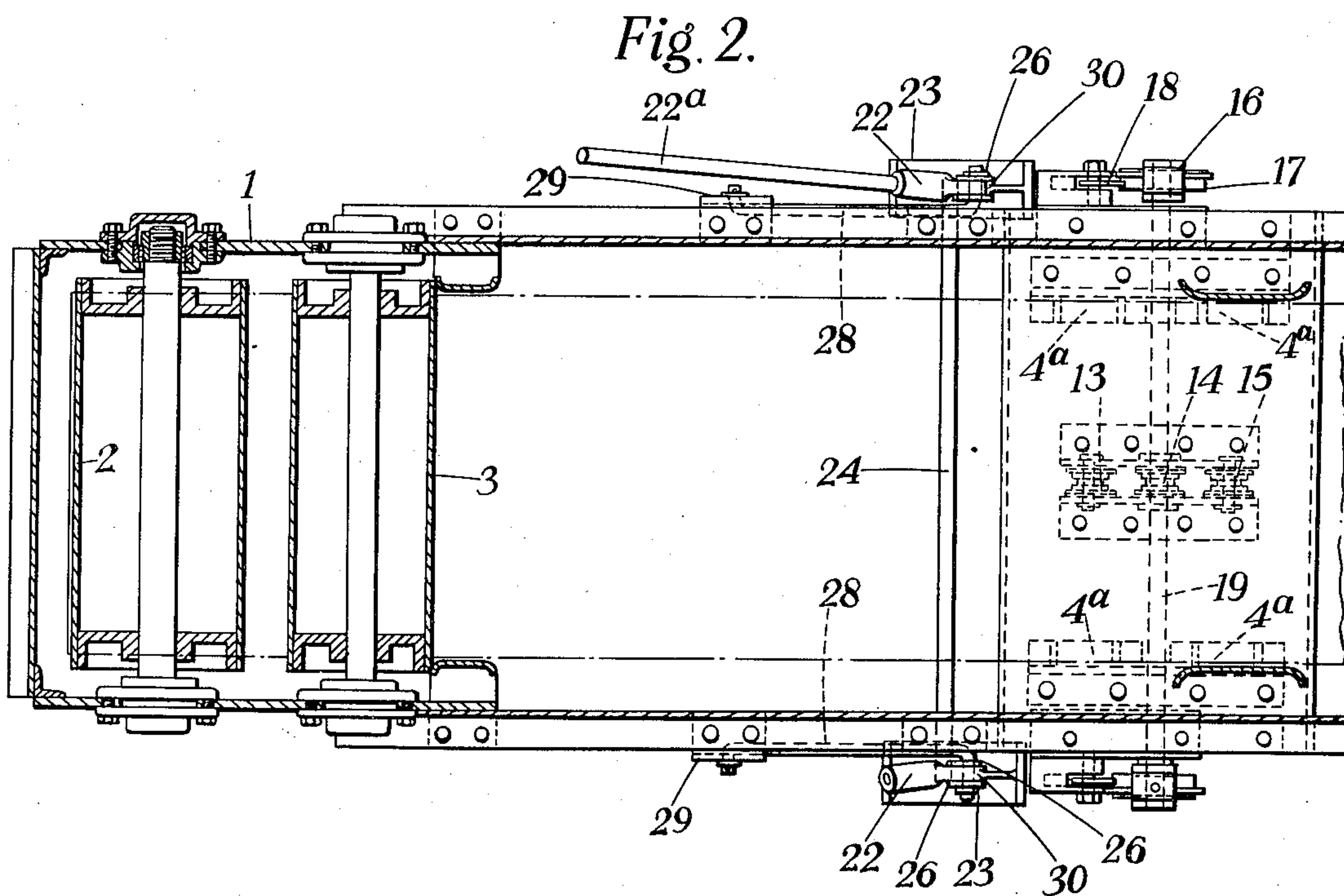
E. H. OLIVER ET AL


**2,022,321**

Belt Conveyer

Filed Feb. 15, 1935

2 Sheets-Sheet 2



INVENTORS  
ERNEST H. OLIVER  
ROBERT F. ROBSON  
BY   
ATTORNEY



## UNITED STATES PATENT OFFICE

2,022,321

## BELT CONVEYER

Ernest Hunter Oliver, Dalton-Le-Dale, and Robert Forster Robson, Murton, England, assignors of one-half to The Mining Engineering Company Limited, Worcester, England

Application February 15, 1935, Serial No. 6,732  
In Great Britain March 15, 1934

9 Claims. (Cl. 198—208)

This invention relates to belt conveyers and especially to conveyers in which the position of the tension drum end has to be advanced or withdrawn from time to time.

5 When a belt conveyer is used in a gate road underground it is necessary to advance or retreat the tension drum end of the conveyer as the face conveyers advance or retreat to enable the face conveyers to load on the tension drum hopper.  
10 It is also often necessary to withdraw the tension drum a short distance down the gate road to permit the passage of the coal cutter, this being particularly the case when working retreating.

15 Under certain conditions, particularly when retreating, the gob side of the face is unsafe, and it is further desirable to enable the tension drum to be moved easily and rapidly and also to enable the belt to be put under tension without having to go behind the tension drum.

20 It is an object of the present invention to provide a belt conveyer comprising the combination of a tension drum mounting movable on a base unit or slideway with mechanism for producing relative movement between them and means to transfer weight normally supported by the base to the ground when the drum is to remain stationary and the base is to be moved by the mechanism. It is a further object to provide a hopper assembly supported on the base and carrying the tension drum, and to provide means for transferring the main weight of the hopper assembly from the base to the ground so that the hopper assembly can be caused to remain stationary and the base to move along the ground.

35 Another object of the invention is the provision of a belt conveyer having a movable tension drum supported in a mounting at one end of the conveyer, and mechanism operable from either side of the conveyer and some way from the end thereof for moving the mounting relatively to the ground.

40 It is a further object of the invention to provide in a belt conveyer a mechanism capable of moving a belt tension device and adjusting the belt tension and a second mechanism which can be set to cause the first to operate alternatively to move the base while the tension device remains stationary: as will appear the operations can all be performed from positions in front of the tension drum.

45 It is a further object of the invention to provide a belt conveyer having a hopper assembly supported on a base and carrying a movable

tension drum, the hopper assembly and the base being movable relatively to one another in either direction and means being provided for holding the hopper assembly stationary when the base is to be moved.

5 It is now proposed to describe by way of example the preferred form of the invention shown upon the accompanying drawings, wherein:—

Figure 1 shows a side elevation of the rear end of a conveyer,

10 Figure 2 shows a sectional plan view on the line A—B of Figure 1, and

Figure 3 is a cross section on the line C—D of Figure 1 drawn to a larger scale than Figures 1 and 2.

15 A hopper 5 is carried by a frame 1 which also supports a tension roller 2 and an idle guide roller 3 for the rear end of a belt 10 of a belt conveyer. This hopper assembly is mounted on slide rails 11 and is provided with slide plates 20 4 which serve to guide the rear end of it over the rails. The rails 11 are carried by a base plate 12 which rests upon the ground. The hopper 5 extends some distance forward over the conveyer belt, its weight being normally slid- 25 ably supported from the base at the front end by the feet 4a.

The mechanism for moving the frame 1 in relation to the base plate 12 to adjust belt-tension or to advance or retreat the tension drum 30 end of the conveyer comprises chain pulleys 13, 14, 15 chain 6 operating lever 16 and a ratchet wheel 17 provided with a double ended reversible pawl 18. The ratchet wheel 17 is rigidly mounted upon a transverse shaft 19 upon which is 35 keyed the pulley 14. The chain is anchored at 20 and 21 at the ends of the base plate 12 and passes between the chain pulleys 13, 14, 15 as shown in Figure 1.

40 When the pulley wheel 14 is rotated by turning the shaft 19 by means of the lever 16 the chain 6 will pass between the three pulley wheels and so move the frame 1 over the rails 11. The direction of this movement will, of course, be determined by the setting of the pawl 18. Although the lever 16, pawl 18 and ratchet 17 are only shown on one side of the conveyer it is intended to provide a similar device on the other side so that the mechanism is operable from either side.

50 When the conveyer end is moved backwards to tension the belt 10 the base plate 12 is preferably fixed in relation to the ground by propping down or other suitable means.

The means for holding the conveyer end when 55



it is desired to move the base plate 12 along the ground comprise self locking toggle levers 22 which may be operated to lift the weight of the front end of the hopper frame from the rails and support it on shoes 23 which are arranged one on each side of the conveyer. The two toggle levers 22 are rigidly mounted on a transverse shaft 24 and are socketed in order that the mechanism may be operated from either side by means of a tommy bar 22a. Both levers operate the shoes 23 in the same manner which will now be described with reference to that one of them shown in Figure 1. A short length 25 at the end of the lever is curved, thus forming the shorter arm of a kind of bell crank lever. The end of this arm 25 is pivotally connected to and engaged between the ends of a curved double link 26 thus forming a toggle. The other end of this double link 26 is pivotally connected to the shoe 23 by means of a pivot 27 which also passes through one end of a radius arm 28. This latter serves to locate the shoe, and is pivotally attached at its other end to a bracket 29 carried by the frame. A bridge piece 30 connects the two parts of the double link 26 and when the toggle has just passed its dead centre the upper end of this bridge piece abuts against the arm 25 at the point 31, thus locking the toggle and holding the conveyer frame up on the shoes 23. The curve of the double link permits this action.

When the forward end of the hopper frame is thus raised the back end remains in contact with the rails 11 and the slide plates 4 will serve as a guide. Operation of the levers 16 will now move the base plate along the ground in a direction determined by the setting of the reversible ratchet device. Finally the operation is, of course, completed by transferring the weight of the hopper assembly back to the base, moving the assembly along to the required position and shortening or lengthening the belt 10 as the case may be.

A telescopic section of the conveyer may allow of the movement or if necessary one or more trough or belt supporting sections may be added or removed.

The terms "gate road", "working retreating" and "gob side" are well known technical terms in the art of mining but in order to provide against a misunderstanding in connection with this disclosure, they may be defined as follows: "gate road" is the roadway or tunnel driven into the coal seam, generally at right angles to the coal face. In working, the coal is conveyed along the coal face and deposited on a conveyer in the gate road. "Working retreating" is the method of working in which the roads are driven and the coal cut backward to the shaft. The headings need not necessarily be driven to the boundary; they may only go out 100 yards, and this 100 yard tunnel worked retreating in the direction of the pit bottom. "Gob side". The gob is the space from which the coal has already been extracted, thus the "gob side" of the conveyer is the side remote from the coal face.

We claim:—

1. A belt conveyer including a movable tension drum, a mounting for said tension drum, a base on which said mounting is slidably supported, means for producing longitudinal movement of said mounting relatively to said base and the ground, and means operable to relieve said base of weight normally supported thereby, said weight-relieving means being effective to retain

said mounting stationary when said means producing longitudinal movement are operated to move said base relatively to said mounting and the ground.

2. A belt conveyer comprising a movable tension drum, a hopper assembly carrying said tension drum, a base normally supporting said hopper assembly, means for relieving said base of at least a portion of the weight of said hopper assembly and means for normally producing movement of said hopper assembly relatively to said base but producing movement of said base relatively to said hopper assembly when said base has been relieved of weight of said hopper assembly.

3. A belt conveyer having a tension drum at one end, a mounting for said tension drum, a base upon which said mounting is normally supported from the ground, a toggle device associated with said mounting and operable to raise said mounting and transfer at least a portion of its weight from the base to the ground, and means for producing longitudinal movement of said mounting relatively to said base and the ground when said mounting is supported on said base and movement of said base relatively to said mounting and the ground when the support of said mounting has been moved from said base to the ground.

4. A tension drum end assembly for a belt conveyer comprising a base, a mounting for supporting said tension drum on said base, mechanism for moving said tension drum and mounting relatively to said base to adjust belt tension and a second mechanism operable to cause said first mentioned mechanism to operate alternatively to move said base while said tension drum remains stationary.

5. A tension drum end assembly for a belt conveyer comprising a base, a mounting for said tension drum, means for moving said tension drum mounting relatively to said base to adjust belt tension comprising a chain having its ends anchored to said base, chain pulleys carried by said tension drum mounting, a ratchet mechanism with reversible pawls and means operable through said ratchet mechanism for rotating one of said chain pulleys, and means operable to cause said first mentioned means to operate alternatively to move said base while said tension drum mounting remains stationary.

6. A tension drum end assembly for a belt conveyer comprising a base, a hopper assembly supported from the ground upon said base, a tension drum carried by said hopper assembly, means for moving said hopper assembly relatively to said base when said hopper assembly is supported on said base comprising a chain having its ends anchored to said base, chain pulleys carried by said hopper assembly, a ratchet mechanism with reversible pawls and means operable through said ratchet mechanism for rotating one of said chain pulleys, and a self-locking toggle device, associated with said hopper assembly and supported on the ground, operative to transfer at least a proportion of the weight of said hopper assembly from said base to the ground to cause said first-mentioned means to be operative alternatively to move said base relatively to said hopper assembly.

7. A belt conveyer having a tension drum at one end, a mounting for said tension drum, a base upon which said mounting is normally supported from the ground, a toggle device associated with said mounting and operable to raise



said mounting and transfer at least a portion of its weight from the base to the ground, and mechanism for moving at will either said base or said mounting relatively to the other comprising a chain having its ends anchored to said base, chain pulleys carried by said frame mounting, a ratchet mechanism with reversible pawls and means operable through said ratchet mechanism for rotating one of said chain pulleys, said ratchet mechanism operating to produce movement of said mounting relatively to said base when said mounting is supported on said base and movement of said base relatively to said mounting when said mounting has been raised by said toggle device.

8. A belt conveyer including a movable tension drum, a hopper assembly carrying said tension drum, a base upon which said hopper assembly is normally supported from the ground, means for raising one end of said hopper assembly and transferring its weight to the ground comprising a transverse shaft supported by said hopper assembly, a toggle device at each end of said transverse shaft, a shoe associated with the lower end of each toggle device and means operating both of said toggle devices provided at each

side of said conveyer, and means for normally producing movement of said hopper assembly relatively to said base but producing movement of said base relatively to said hopper assembly when one end of said hopper assembly has been raised by means of said toggle devices comprising a chain having its ends anchored to said base, chain pulleys carried by said hopper assembly, a transverse shaft rigidly secured to one of said pulleys, a ratchet wheel secured to each end of said transverse shaft, reversible pawls for said ratchet wheel and operating means for said ratchet wheels provided at each side of said conveyer.

9. A tension drum end assembly for a belt conveyer, comprising a base, a mounting for supporting said tension drum on said base, mechanism operable from either side of said conveyer near said tension drum end for moving said tension drum and mounting relatively to said base to adjust belt tension, and a second mechanism operable to cause said first mentioned mechanism to operate alternatively to move said base while said tension drum remains stationary.

E. H. OLIVER.

ROBERT F. ROBSON.