April 9, 1957 C. L. HARPER 2,788,117

CONVEYERS

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FIG. 1.

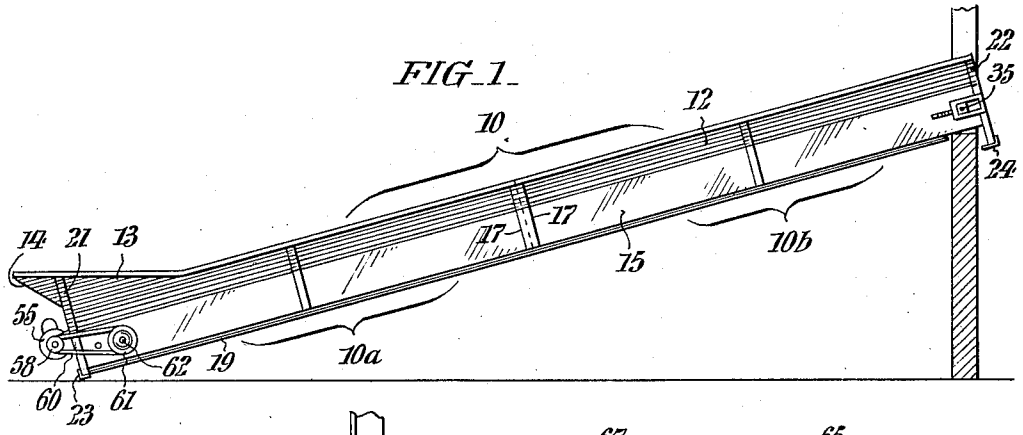


FIG. 5.

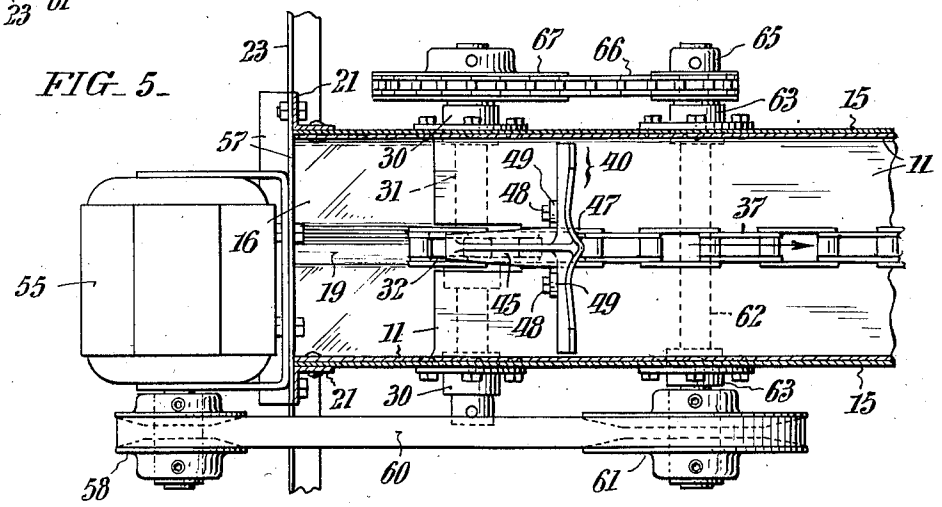
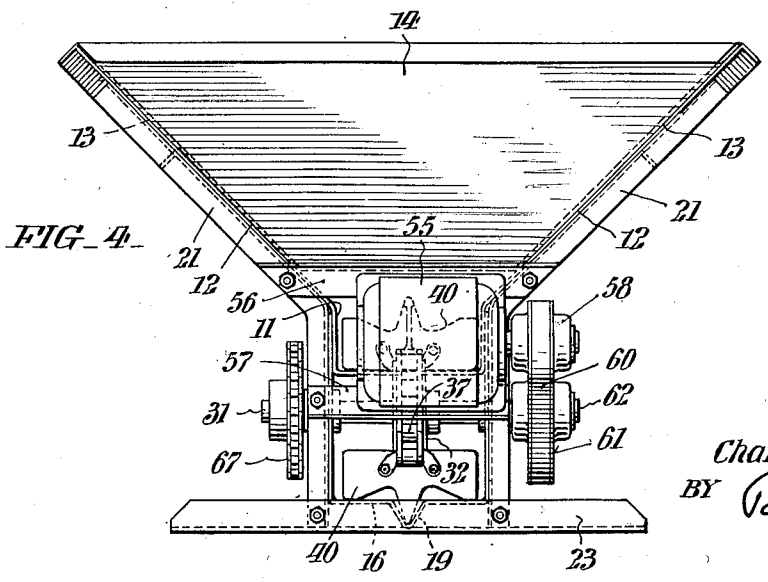


FIG. 4.



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CONVEYERS

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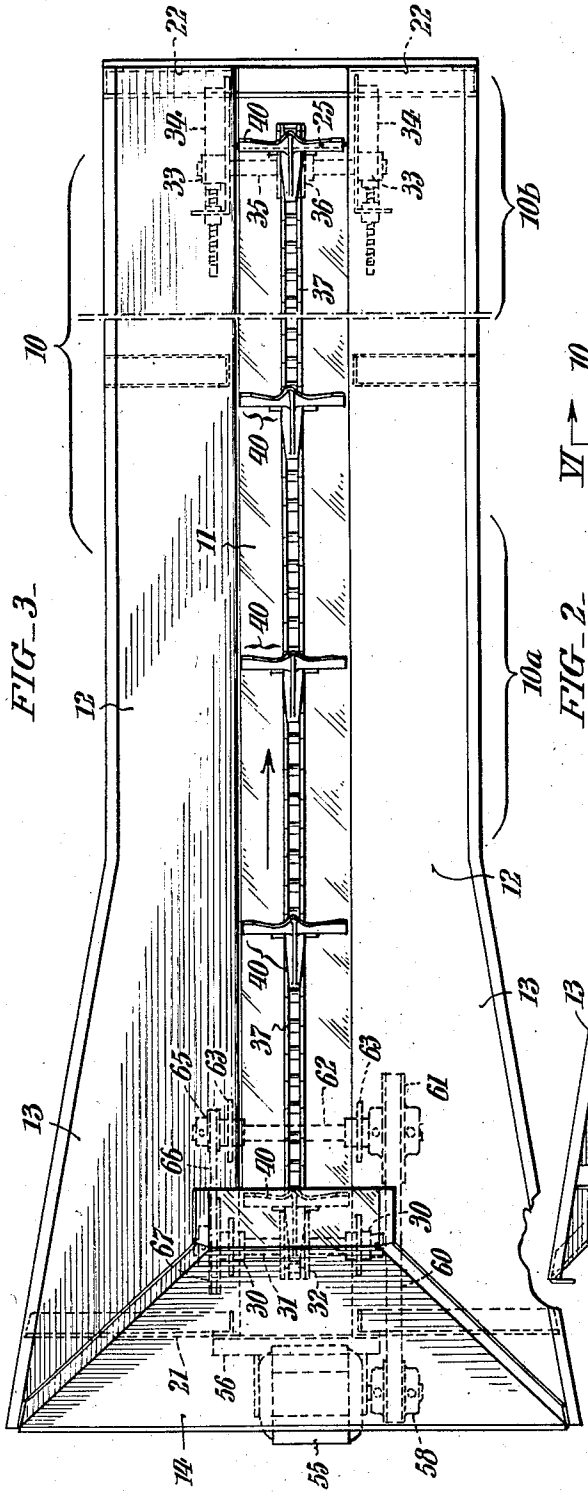


FIG. 3

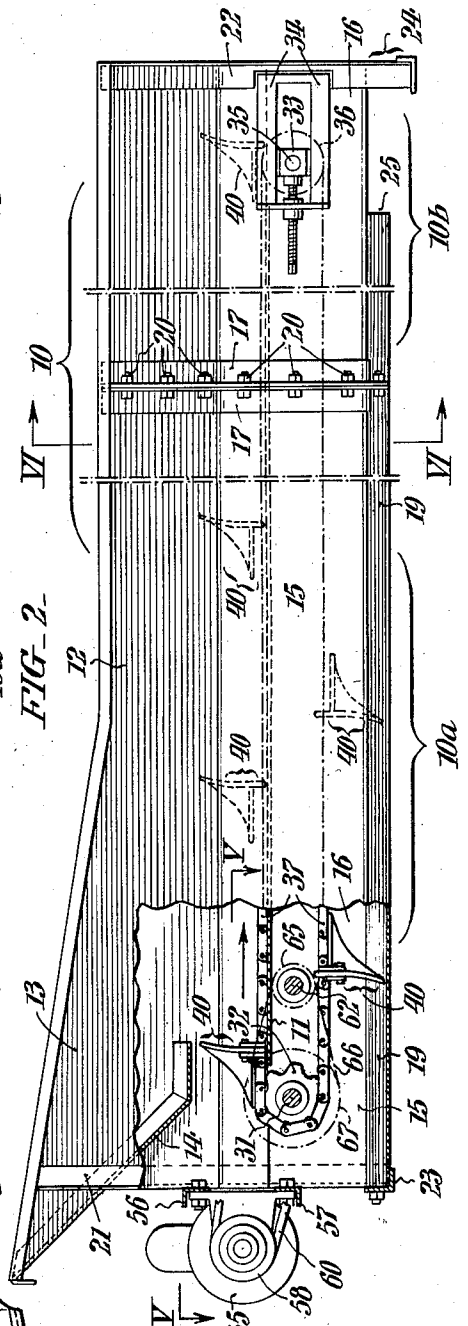


FIG. 2

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CONVEYERS

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FIG_8_

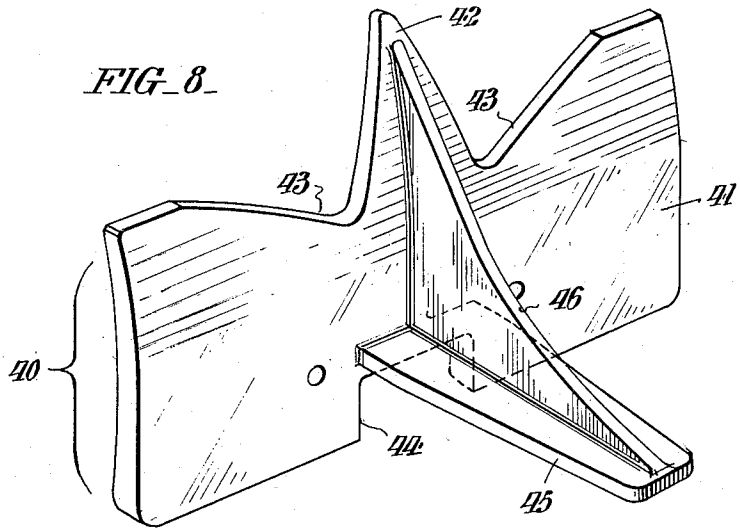


FIG_6_

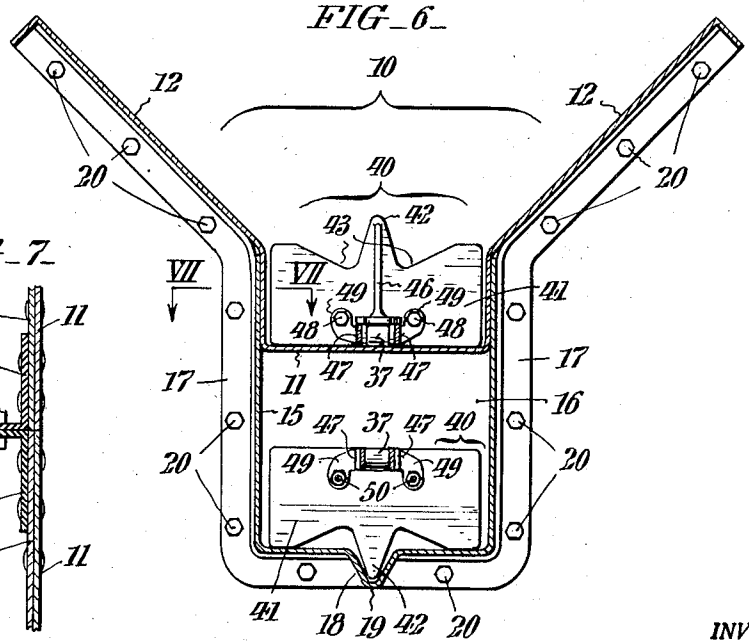
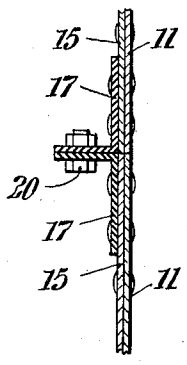


FIG_7_



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United States Patent Office 2,788,117 Patented Apr. 9, 1957

2,788,117

CONVEYERS

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Application September 14, 1954, Serial No. 455,837

4 Claims. (Cl. 198—173)

This invention relates to conveyers. More especially, it is concerned with sprocket chain elevating conveyers of a portable type useful for example on farms to elevate loose or baled materials such as hay, straw, silage, etc. into bins, trucks, or barns.

The chief aim of my invention is to provide a conveyer of the kind referred to which is sturdy and strong and yet relatively light in weight and compact so as to be readily transported and maneuvered in setting it up, and which moreover is highly efficient from the standpoint of its capacity to move large quantities of materials in a short space of time.

Other objects and attendant advantages will appear from the following detailed description of the attached drawings, wherein:

Fig. 1 shows, in side elevation, a portable conveyer constructed in accordance with my invention set up in readiness for use.

Fig. 2 is a view, partly in side elevation and partly in broken out section, of the conveyer drawn to a larger scale.

Fig. 3 is a view corresponding to Fig. 2 showing the conveyer in top plan.

Fig. 4 shows, in elevation, the receiving end of the conveyer, i. e., as it appears when viewed from the left of Figs. 2 and 3.

Fig. 5 is a fragmentary view in horizontal section taken as indicated by angled arrows V—V in Fig. 2.

Fig. 6 is a cross section of the conveyer taken as indicated by angled arrows VI—VI in Fig. 2.

Fig. 7 is a fragmentary detail section drawn to a still larger scale and taken as indicated by angled arrows VII—VII in Fig. 6; and

Fig. 8 is a large scale perspective view of one of the specially designed flights of the sprocket chain of the conveyer.

As herein exemplified, my improved elevating conveyer comprises an elongate sheet metal trough **10** whereof the bottom portion **11** is relatively narrow and square U-shaped in cross section, and whereof the side walls are extended upwardly and outwardly at complemental angles as at **12**. At the left hand or receiving end of the trough **10**, the angular portions **12** of the side walls are further prolonged upwardly as at **13** to form, in conjunction with a downwardly and inwardly sloped end wall **14**, a receiving hopper. Beneath the trough is a channel **15** which is likewise fashioned from sheet metal to square U-shaped cross section, and which is engaged upwardly over the bottom portion **11** of the trough as best seen in Fig. 6. It will be noted that the channel **15** is somewhat deeper than the bottom portion **11** of the trough **10**, with consequent formation of a longitudinally-extending underlying hollow or tunnel **16**.

The trough **10** and the channel **15** are composed in this instance of two aligned end-abutted components or units **10***a* and **10***b*. Welded or otherwise permanently affixed to confronting ends of the units **10***a* and **10***b* are transversely-arranged reinforcing and connecting members **17** which are fashioned from angle bar stock, the face of one flange of each such member being flush with the crosswise edge of the unit to which it is affixed. From Fig. 6 it will be noted that the members **17** have portions which are sloped to conform with the angularly-disposed portions **12** of the side walls of the trough components of the units, vertical portions to conform with the side wall of the channel components of said units, and horizontal portions which extend crosswise of the bottoms of the channel components, the horizontal portions being V notched centrally as at **18** to clear longitudinal groove depressions **19** centrally in said channel components. By means of screw bolts **20**, the abutting flanges of the reinforcing members **17** are rigidly secured together to firmly unite the units **10***a* and **10***b* in assembled relation. Generally similar reinforcing members **21** and **22** provided at the remote ends of the units **10***a* and **10***b*, these being of multi-partite construction. From Fig. 4 it will be noted that the member **21** has a cross bar **23** at the bottom to serve as a foot for supporting the conveyer at the receiving end, and from Fig. 2, that the member **22** extends below the channel **16** as at **24**, the bottom of said channel being cut away as at **25** at the delivery end of the conveyer. As a consequence of this construction, it will be seen that the delivery end of the conveyer can be hooked over the side wall of a bin or over the sill of a window as shown in Fig. 1.

Journalled in bearings **30** affixed to opposite side walls of the channel component of the trough unit **10***a* at the receiving end of the conveyer (Fig. 5) is a cross shaft **31** to which a sprocket wheel **32** is secured at the center; and journalled in bearing blocks **33** adjustable along guideways **34** at opposite sides of the channel component of the unit **10***b* adjacent the delivery or discharge end of the conveyer is a cross shaft **35** whereto is secured, at the center, a similar sprocket wheel **36**. A chain **37** trained about the sprocket wheels **32** and **36** is provided at spaced intervals with flights **40** whereof one is separately illustrated in perspective in Fig. 8.

As shown, each flight **40** has a transverse web **41** which is slightly curved forwardly in the direction of movement of the chain **37** indicated by the arrow in Fig. 2. Except for having an upwardly projecting tapered tongue **42** at the center, angular depressions **43** in its top edge at opposite sides of said tongue, and a chain clearing notch **44** centrally of its bottom edge, the transverse web **41** of the flight **40** is oblong in configuration. Extending rearwardly from the web **41**, directly above the notch **44** is an integral tail prolongation **45** which is joined to said web by a buttressing brace web **46**. The flights **40** are secured to special links **47** of the chain **37** by means of headed screw bolts **48** to the shanks of which, after being passed through holes in eye lugs **49** at opposite sides of said special links and correspondingly-spaced holes (Fig. 8) in the webs **41** of said flights, clamp nuts **50** are applied. It is to be particularly noted from Figs. 2 and 6, that the location of the sprocket wheels **32** and **36** is such that the upper run of the chain **37** is slidingly supported upon the bottom of the trough proper **15**, and that the free edges of the transverse webs **41** of the flights **40** bear slidingly upon the bottom of the tunnel **16** with the tongues of said flights, cleared within the longitudinal central groove in the tunnel bottom. In this way, the chain **37** is effectively sustained against sagging under a load.

For driving the conveyer chain, I have provided means including an electric motor **55** which is bolted fast to structural bars **56** and **57** secured crosswise of the member **21** at the feeding end of the conveyer. Affixed to the shaft of the motor is a pulley **58** which, by means

of a belt **60** imparts rotary motion to a pulley **61** at one end of a transverse countershaft **62**. The countershaft **62** is journalled in bearings **63** secured to the side walls of the trough structure, and fast upon its other end is a sprocket pinion **65** which, through a chain **66** is connected to a sprocket wheel **67** at the corresponding end of the shaft **31**. The belt **60** is of the V type and the pulleys **58** and **61** are shown as being of the laterally adjustable flange type for variation of their effective diameter and regulation of the speed of the conveyer chain **37**.

From the foregoing, it will be seen that I have provided a simple and sturdy portable elevating conveyer. During operation of the conveyer, the forwardly curved tongues **42** of the flights **40** effectively penetrate into the material placed into the hopper at the receiving end of the trough **11** to carry along relatively large charges for release at the delivery end of the trough as the chain **37** rounds the sprocket wheel **36**, in a manner readily understood. Sagging of the chain **37** is precluded since its upper run is slidingly supported on the bottom of the trough **15**, and its lower run sustained as the flights **40** slidingly bear upon the bottom of the channel **16**, with the tongues **42** cleared in the central longitudinal groove **19** in the channel bottom as best shown in Fig. 6. It is to be particularly noted from Figs. 2 and 6, that the tails **45** of the flights bear directly upon the chain **37** as the upper run thereof traverses the trough **11**, said flights being thereby prevented from tilting under the weight pressure of the charges advanced by them. The conveyer of my invention is thus highly efficient in its operation from the standpoint of material displacement per unit of time.

Having thus described my invention, I claim:

1. An elevating conveyor for use in inclined or upright position, comprising an elongate trough having relatively spaced side walls converging downwardly toward each other; a channel extending longitudinally beneath the trough; an endless conveyor element having upstanding flights at spaced intervals; sprocket wheels, about which the chain is trained, rotatively supported respectively adjacent opposite ends of the trough and arranged so that the upper run of the chain slidingly bears upon the bottom of the trough and the flights on the lower run slidingly bear upon the bottom of the channel; powered transmission means for driving one of the sprocket wheels; wherein each flight on the chain has a transverse upright web with an upwardly and forwardly-extending tapered tongue at the center; and wherein the channel bottom is formed with a longitudinal clearance groove for the tongue projections of the flights on the conveyor chain, whereby said tongue projections are guided in said groove on return and the flights are prevented from engaging the walls of the channel.

2. An elevating conveyor according to claim 1, wherein each flight includes a tail portion extending rearwardly from the bottom of the transfer web at the center to bear upon the chain during traverse of the latter in the trough.

3. An elevating conveyor according to claim 1, wherein each flight on the chain includes a tail portion extending rearwardly from the bottom of the transverse web at the center to bear upon the chain during the traverse of the latter in the trough, and a central buttressing web integrally connecting the tail with the transverse web.

4. A conveyor for bales of material such as hay, comprising an elongate trough having relatively spaced side walls converging downwardly at right angles to each other; a channel extending longitudinally beneath the trough; an endless conveyor element having upstanding flights at spaced intervals; sprocket wheels, about which the chain is trained, rotatively supported respectively adjacent opposite ends of the trough and arranged so that the upper run of the chain slidingly bears upon the bottom of the trough and the flights on the lower run slidingly bear upon the bottom of the channel; powered transmission means for driving one of the sprocket wheels; wherein each flight on the chain has a transverse upright web with an upwardly and forwardly extending tapered tongue at the center; said tongue projecting above the line of intersection of the projection of said side walls, whereby said conveyor side walls position and support said bales for penetration by and movement with said tongues; and wherein the channel bottom is formed with a longitudinal clearance groove for the tongue projections of the flights on the conveyor chain, whereby said tongue projections are guided in said groove on return to position the chain centrally between the walls of the channel and to prevent the flights from engaging said walls.

References Cited in the file of this patent

UNITED STATES PATENTS

751,885	Webster	Feb. 9, 1904
811,190	Webster	Jan. 30, 1906
1,174,965	Brown	Mar. 14, 1916
2,047,589	Levin	July 14, 1936
2,420,085	Long et al.	May 6, 1947
2,446,472	Graf	Aug. 3, 1948
2,446,660	Mulkey et al.	Aug. 10, 1948
2,621,777	Tintes	Dec. 16, 1952
2,644,570	Russell	July 7, 1953
2,646,157	Belt	July 21, 1953
2,682,945	Harrer et al.	July 6, 1954
2,682,947	Belt	July 6, 1954