Nov. 29, 1938. S. C. GEBERT 2,138,576

CONVEYER FEED SCREW

Filed April 23, 1937

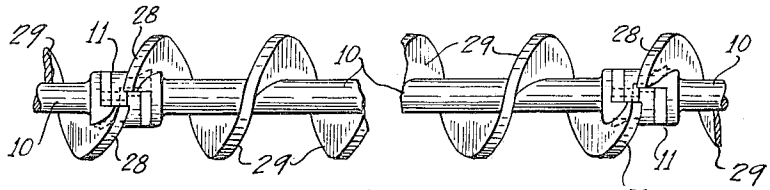
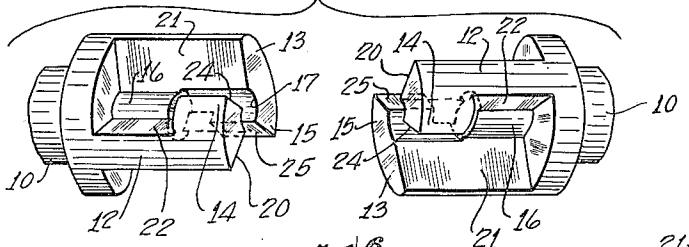


Fig. 1.

Fig. 2.



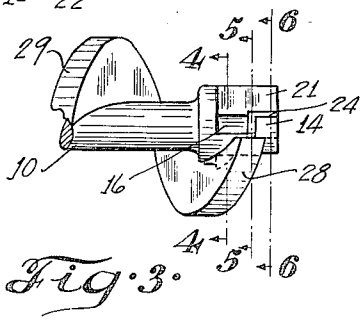


Fig. 3.

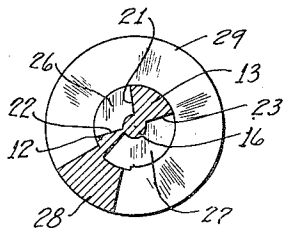


Fig. 4.

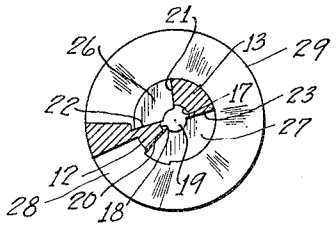


Fig. 5.

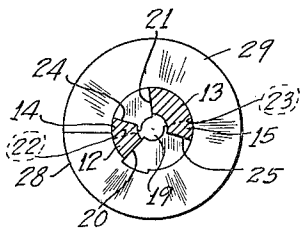


Fig. 6.

INVENTOR
Sever C. Gebert.

BY Paul L. Kosher
ATTORNEY

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CONVEYER FEED SCREW

Sever C. Gebert, Chicago, Ill., assignor to Fairbanks, Morse & Co., Chicago, Ill., a corporation of Illinois

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2 Claims. (Cl. 198—213)

This invention relates to feed screws for conveying granular material, and more particularly to a feed screw section having improved means for coupling the same to other, similar sections.

An object of the invention is to provide an improved feed screw section or unit which is adapted to be interconnected with other, similar units in the formation of a feed screw conveyer for handling granulated coal, grain and like materials. The conveyer section herein set forth is especially adapted for use in a string wherein the sections operate under tension, as for example in a certain improved type of automatic stoker in which coal is conveyed through a tube from a bin to the burner. In the type of conveyer referred to, the thrust bearing for the string of screw sections is advantageously located in, and protected by a casing which forms a part of the burner mechanism, instead of being disposed in the coal bin at the opposite end of the conveyer. Thus the coal is drawn, instead of being pushed toward the burner, and the force imparted to the individual sections and their couplings is one of tension.

An object of the invention is to provide a feed screw section having improved coupling means which permits the section to be easily removed from, and replaced in a string of similar sections without requiring the use of tools.

An other object is to provide a screw section of the character described having coupling means so constructed that the section may be placed in a string without regard to polarity, either end being adapted to mate with an end of any other section, and yet which requires proper angular relationship of adjacent sections, hence continuity of the flight of the worm, before the sections can be connected and interlocked for operation.

A further object is to provide a screw section of this character having improved coupling means which permit of angular misalignment of the connected sections, within a limited range, without causing undue mechanical stresses therein, or otherwise adversely effecting the operation of the conveyer.

These and other objects and advantages will appear from the following description and accompanying drawing, in which:

Fig. 1 is a side view showing a feed screw section and fragmental portions of adjacent sections coupled thereto; Fig. 2 shows in perspective, mating ends of adjacent screw sections relatively positioned to be coupled together, portions of the worm flights formed on these ends not being shown; Fig. 3 is a fragmentary side view showing one end of the screw section, and Figs. 4, 5 and 6 are sectional views taken at lines 4—4, 5—5 and 6—6 respectively, of Fig. 3.

Referring now by characters of reference to the drawing, 10 denotes the shaft of the screw section, the shaft being provided at its ends with integral fittings or coupling members 11. The members 11 are cylindrical blocks, recessed in a manner hereinafter described to form studs 12 and 13 which are adapted to fit and interlock with similar studs formed on an adjacent screw section. When a pair of the members 11 are coupled together as shown in Fig. 1, the spaces or recesses of one member accommodate the studs of the companion member, resulting in a substantially solid coupling assembly of cylindrical form. However, the studs are suitably dimensioned to avoid a snug fit between the same, it being desirable to provide for a limited amount of play in the coupling assembly to allow for misalignment of the shafts, and to facilitate coupling and uncoupling operations.

The member 11 may best be described as being formed from a collar of relatively thick wall section, portions of which have been removed to result in the formation of the circumferentially spaced studs 12 and 13, and lugs 14 and 15 which project laterally or circumferentially from the outer extremities of the studs. Filling the central space at the inner end of the collar, and extending a distance less than half the length thereof, is an integral cylindrical plug 16. The inner cylindrical surfaces 17 and 18 of the studs and lugs define a space or opening 19 (Fig. 5), which extends axially from the end of plug 16 to the outer end of the coupling member. As best appears from a comparison of Figs. 4 and 5, the diametral distance between stud faces 17 and 18 is greater than the diameter of plug 16, and since plug 16 of one coupling member is adapted to fit within the opening 19 of a companion member, an appreciable clearance exists which permits of lateral play, to a limited extent, between the members.

As appears from Figs. 4 and 5, stud 13 is larger in circumferential extent than stud 12. The face 20 of stud 12 is spaced from and confronted by faces 23 and 25, respectively, of stud 13 and its lug 15. The opposite face 21 of stud 13 is spaced from and confronted by faces 22 and 24, respectively, of stud 12 and its lug 14. All of the recited stud and lug faces are disposed in radial planes which pass through the longitudinal axis of the coupling. The studs 12 and 13 are asym-

metrically spaced about the circumference of the fitting, the angle defining the space **26** between faces **21** and **22** being less than the angle defining the space **27** between faces **20** and **23**. As an example of suitable angular extent and spacings of the studs, studs **12** and **13** may extend circumferentially through arcs of 30 degrees and 80 degrees respectively, and spaces **26** and **27** separating the studs may extend through arcs of 100 degrees and 150 degrees respectively. In order to provide for an appreciable amount of clearance between the interfitting portions of companion coupling members, the studs are slightly less, and the spaces slightly greater in angular extent than the figures indicate in the above concrete example.

Stud **13** and its projecting lug **15** are approximately equal in angular extent to the space between faces **20** and **25**, but greater than the space between faces **21** and **24** (see Fig. 6). Accordingly, a definite angular relationship must exist between adjacent screw sections before the end projections of one can be introduced into the spaces of the other. When adjacent sections are coupled together, their worm flights are substantially continuous.

The length, or axial dimension, of the lugs **14** and **15** are appreciably less than the axial dimension of the spaces accommodating the same, which, with other clearance provisions heretofore mentioned, permits of axial misalignment of the shafts to a minor degree to avoid undue stresses therein, and facilitates coupling and uncoupling operations.

With the provision of coupling studs of unequal cross-section, as in the present fitting, and particularly where space requirements impose limitations on the cross-sectional area of the studs, there is a tendency for the smaller, hence weaker stud to break under severe operating conditions. In my improved screw section the end portions **28** of the worm flight **29** extend over and terminate at the smaller studs **12**, serving to reinforce these elements. In this manner the smaller studs are rendered as strong or stronger than their companion studs **13** which have sufficient metal therein to resist breakage.

Adjacent sections of a conveyer are coupled together by registering the studs of one fitting with the complementary openings or recesses in its companion fitting, moving the studs axially into the recesses, and rotating one section relative to the other to cause interlocking engagement of the lugs. This operation may be readily accomplished solely by taction, and improper mating of the fittings is precluded by reason of the asymmetrical arrangement of the studs and recesses. The driving force on the sections tend to maintain the same in the recited, interlocked condition.

Having described my invention, I claim:

1. A conveyer feed screw section adapted to be coupled to and between screw sections similar thereto, including a shaft, a worm flight winding spirally around said shaft, and substantially identical coupling members at the ends of the shaft, each comprising a pair of asymmetrically spaced studs of unequal circumferential extent, projecting axially from the end of the shaft, said studs having side faces disposed in a common diametral plane, and lugs projecting circumferentially from said faces, at the ends of said studs, said worm flight terminating over, and being integrally united with the studs of lesser circumferential extent whereby to reenforce such studs.

2. A conveyer feed screw section adapted to be coupled with a like section, including a shaft having a worm flight extending spirally therearound and a coupling member at the end of the shaft, said coupling comprising a pair of asymmetrically spaced studs projecting axially from the end of the shaft, said studs being spaced circumferentially about the end of the shaft and being unequal in circumferential extent, lugs projecting laterally from the ends of said studs, said worm flight terminating over, and serving to reenforce the smaller of said studs, said studs and lugs being adapted to fit and interlock with corresponding elements of an adjacent screw section only when the sections are angularly related with their worm flights relatively continuous.

SEVER C. GEBERT.