

No. 649,700.

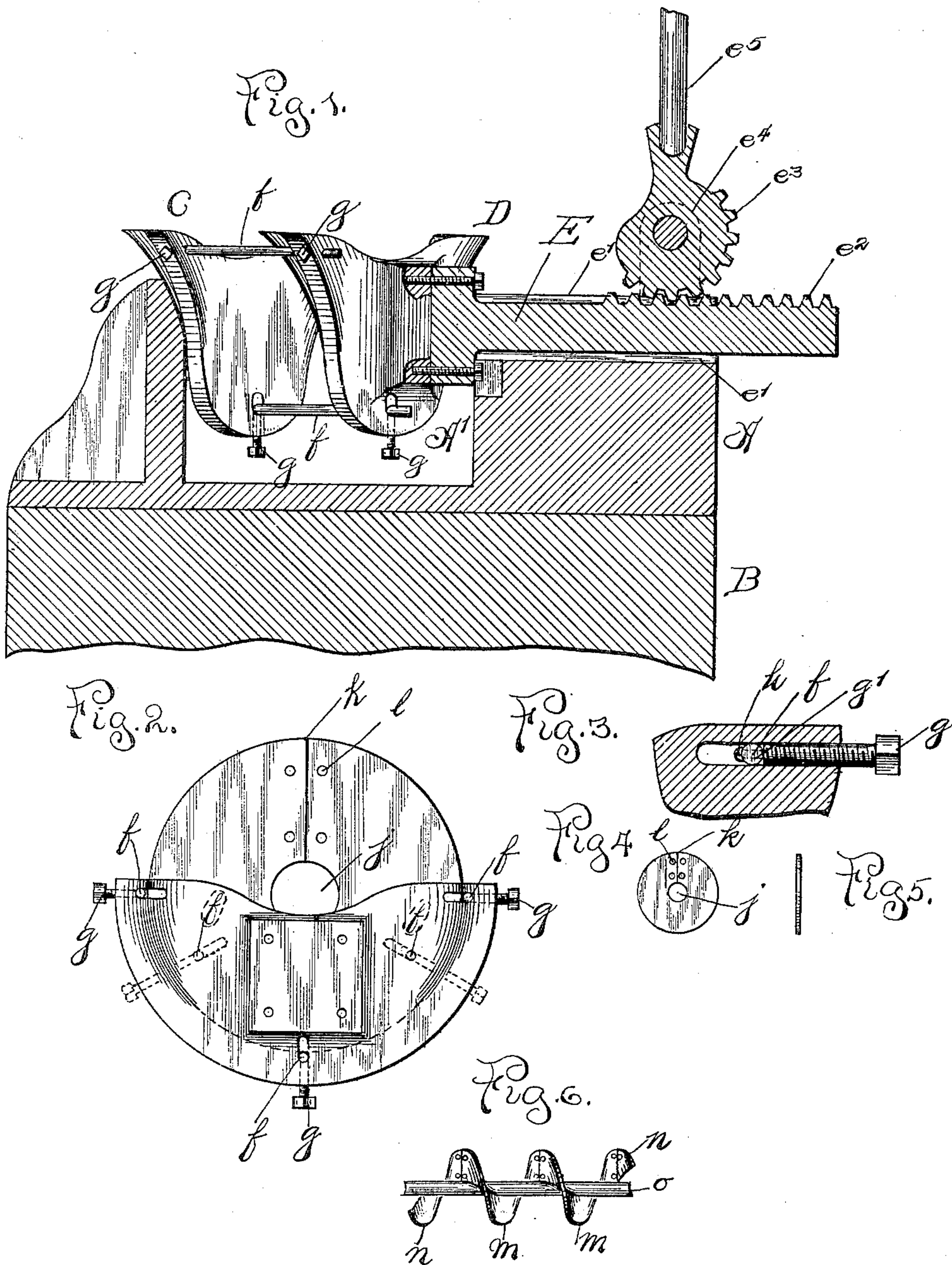
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P. A. LORENZ.

MACHINERY FOR FORMING SPIRAL FLANGES.

(Application filed Feb. 20, 1899.)

(No Model.)



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# UNITED STATES PATENT OFFICE.

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## MACHINERY FOR FORMING SPIRAL FLANGES.

SPECIFICATION forming part of Letters Patent No. 649,700, dated May 15, 1900.

Application filed February 20, 1899. Serial No. 706,283. (No model.)

*To all whom it may concern:*

Be it known that I, PETER A. LORENZ, a citizen of the United States; and a resident of the city of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Machinery for Forming Spiral Flanges, of which the following is a specification.

My invention relates to machinery and devices for forming spiral flanging or "flights" which are attached to a central revoluble shaft, the same being wholly or partially inclosed in a casing, for the purpose of moving grain or other material from one point to another. It is of the greatest importance that a screw of accurate and uniform pitch be obtained, not only for symmetrical appearance, but to obtain certain mechanical advantages in operating the conveyer. These are reduction of friction and consequent gain of power and also a much decreased liability to clogging of the material operated on, for even a slight change of pitch in the screw at any given point of the conveyer casing or trough causes increased friction and creates a liability to bunching or clogging of the conveyed material at that point. It is therefore of great importance that accurate and uniform pitch of the screw-forming flanges should be obtained. This has been in the past a difficult and costly process and imperfectly done at the best.

It is the object of my invention to furnish means whereby the desired accuracy of formation can be secured in an effective, simple, speedy, and inexpensive manner; and my invention for the attainment of these ends embraces forming-dies of peculiar construction, guides or stops to control the material when being operated on, with adjustments therefor and operating mechanism, all of which are more fully and accurately described with reference to the accompanying drawings, in which—

Figure 1 is a longitudinal section of my machine, the flange-forming dies being shown in perspective. Fig. 2 shows the dies D and C removed from the machine when viewed in the line of their longitudinal axis, an annular disk or blank being placed in position between the dies ready for forming. Fig. 3 is an enlarged view of a portion of one of the

dies in transverse section, showing one of the guides in place and a means of adjusting the same. Fig. 4 is an annular disk or blank of metal, in reduced size, cut and punched ready for forming. Fig. 5 is an edge view of the same. Fig. 6 shows a series of such disks after being formed by the action of my machine, riveted together and attached to a central shaft.

Further referring to the drawings, in which like characters of reference denote like parts throughout, A is the bed of a machine, being one practicable form of device embodying the principles of my invention, set on a substantial support or foundation B.

C is a die whose forming-face covers the segment of a circle and corresponds to the form and pitch of any segment of the desired flange. The die C is rigidly attached to one end of the bed A, so as to depend within the opening A'.

D is a die having a forming-face identical with that of C, and, as shown, it is identical with it in all other respects, though this may be varied to suit convenience of construction. The said die D is attached to the traveler E, which moves back and forth in the guideways  $e' e'$ . The traveler E is provided with a toothed rack  $e^2$ , into which mesh the cogs of the pinion  $e^3$ , the latter being pivoted to the upright  $e^4$  and actuated by the handle  $e^5$ . The method shown of actuating the movable die is only to be considered typical of any convenient means of effecting the same result.

To support the blanks when being formed under the action of the dies, stops must be provided, which will lie within the perimeters of the dies and practically extend at all times between the two, and yet not interfere with the play of the movable die, and to vary the support of the blanks according to the character of the work to be turned out such stops should be adjustable. As a means to this end guide rods or stops  $f$  are placed substantially parallel to the longitudinal axis of the dies C D and equidistant therefrom and set-screws  $g$  are arranged to adjust the said guides at the proper distance from the said axial point. The set-screw shown in enlarged detail in Fig. 3 has a turned-down neck  $g'$ , which passes through the stop  $f$  and the end



of which is formed into the retaining-head *h*; but this form of construction is only applicable to the adjustment of one end of the said stops and the securing of the same to one of the said dies. If one end of the stop is secured, as shown, the other end should be free to allow proper longitudinal movement of the movable die. This freedom of movement and also suitable adjustment can be had by omitting the turned-down neck of the set-screw and allowing the same to bear directly on the guide, which will in turn move freely thereover. It is not necessary for set-screws, as shown, to be used. Any guide or stop which will perform the office of that shown, of retaining the blank to be formed for the operation of the dies thereon so that the edges of the blank are substantially equidistant from the longitudinal axis of the dies and within their perimeter, will fulfil the spirit and object of my invention.

The operation of my machine is as follows: The drops having been properly adjusted and the dies opened, an annular disk or blank of metal of suitable thickness and the desired size and formed as shown in Fig. 4, having a central opening *j*, the rivet-holes *l*, and the separating-slot *k*, is placed in a heated condition within the jaws of the dies, resting on the stops *f*, and the dies are then closed thereon. The form of the dies is thus impressed upon a portion of the disk. The dies are then opened and the disk is rotated to bring the next adjacent unformed part within the faces of the dies, by which this portion is then formed uniformly with the portion already operated upon. The operation is repeated on any remaining unformed portion of the blank or disk until the spiral is continuous and a segment is formed, as shown at *m m* in Fig. 6. In the latter figure the two segments *m m* are shown complete, formed as described and riveted together and attached to the central shaft *o*. *n n* in the same figure are like segments broken away together with extensions of the shaft.

The advantages of my invention, among others, are: Absolutely accurate and uniform pitch can be given to the spiral flanges made up of the segments formed thereby and as described. The spiral-forming segments may be adjusted to slight differences of diameter of the shafting around which they are placed and to which they are attached by adjustments of the guides. The same dies can be used to form different sizes of spiral. This

is done either by adjustment of the guides to operate within the same openings, as shown, or in other openings provided in the dies therefor, as shown by dotted lines in Fig. 2, so long as the several guides are mutually equidistant from the longitudinal axis of the dies and the resulting spiral to be formed.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. Two dies operating together, their forming-faces covering the segment of a circle and being identically shaped to form a section of spiral flanging of uniform pitch, and spacing-stops radially arranged about the longitudinal axis of the said dies and having their guiding-faces parallel thereto, substantially as shown and described.

2. Two dies operating together, their forming-faces covering the segment of a circle and being identically shaped to form a section of spiral flanging of uniform pitch, and spacing-stops one end of which is attached to one end of the said dies and the other end of which is free to move in an opening in the other die, the said stops being radially arranged about the longitudinal axis of the said dies and having their guiding-faces parallel thereto, substantially as shown and described.

3. Two dies operating together, their forming-faces covering the segment of a circle and being identically shaped to form a section of spiral flanging of desired pitch, and adjustable spacing-stops, one end of which is attached to one of the said dies and the other end of which is free to move in an opening in the other die, the said stops being radially arranged about the longitudinal axis of the said dies and having their guiding-faces parallel thereto, substantially as described.

4. A machine for forming annular metallic plates into spiral conveyer-sections, said machine consisting of dies whose faces are adapted to form a segment of a continuous spiral of uniform pitch, guides or stops arranged radially about the longitudinal axis of the said dies at equal distance therefrom and with their guiding-faces parallel thereto so that a rotary motion of the said annular plates exposes successive portions thereof to the uniform action of the said dies, and mechanism for closing the said dies toward each other, substantially as shown and described.

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