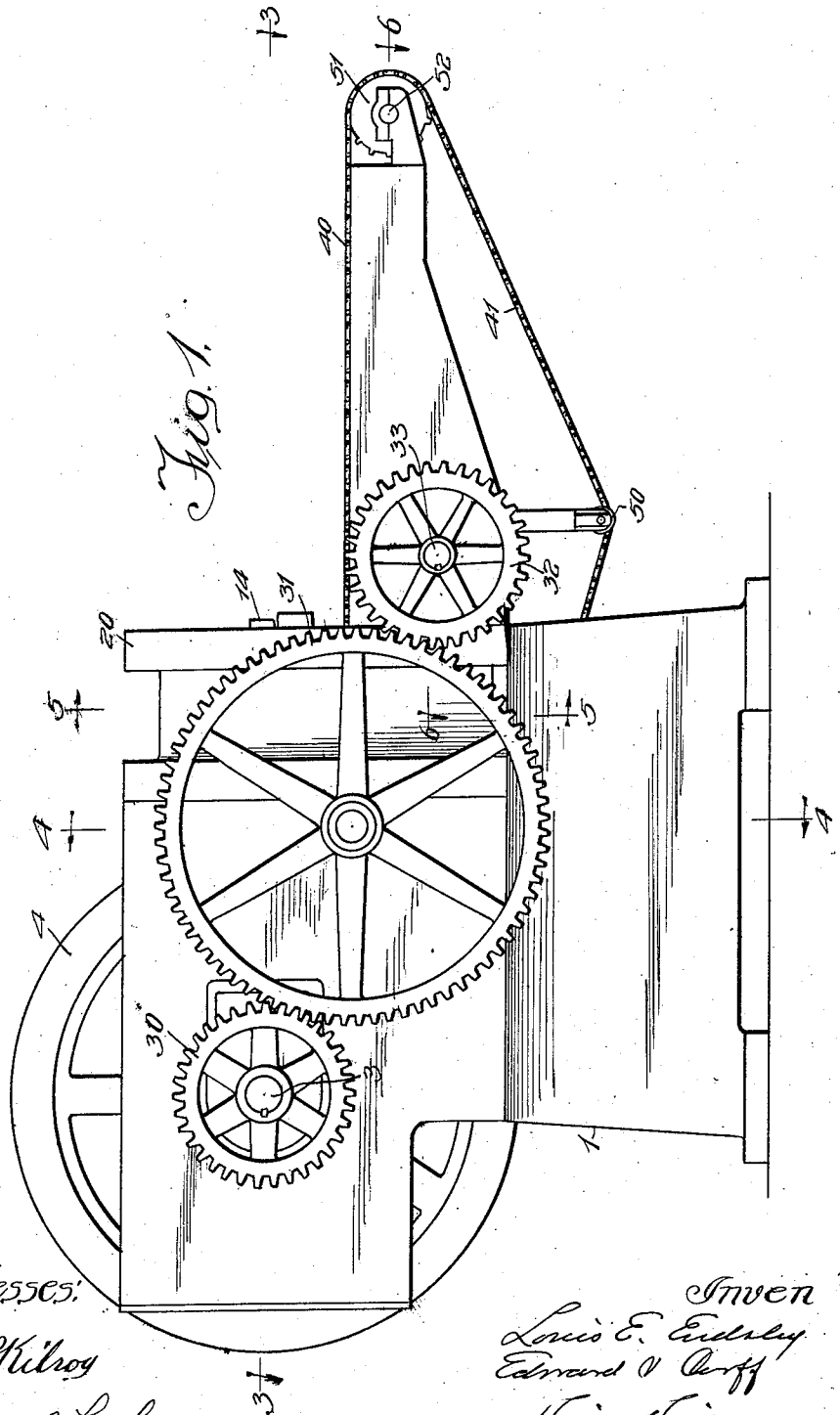
April 8, 1930. L. E. ENDSLEY ET AL 1,753,238

COMPRESSING MACHINE

Filed June 9, 1922 6 Sheets-Sheet 1

Fig. 1.



Witnesses:
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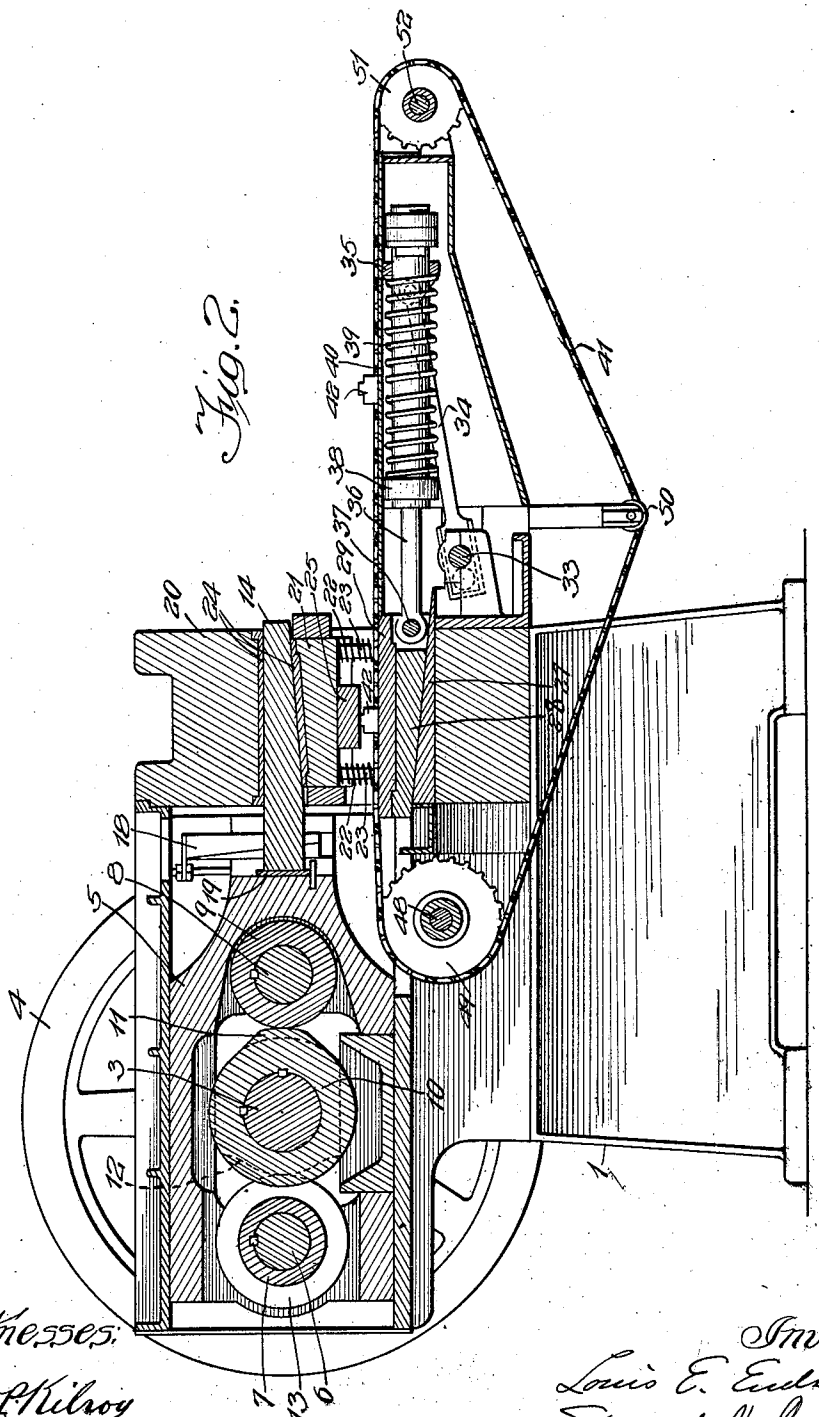
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COMPRESSING MACHINE

Filed June 9, 1922 6 Sheets-Sheet 2

Fig. 2.



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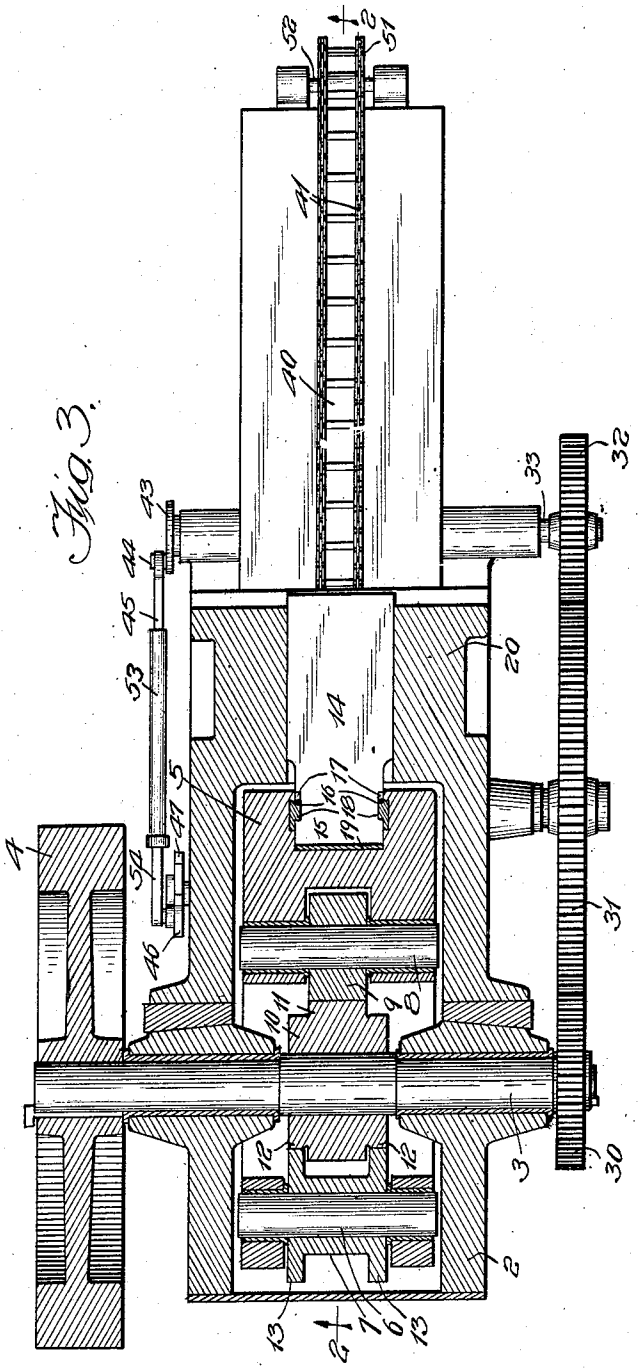
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COMPRESSING MACHINE

Filed June 9, 1922 6 Sheets-Sheet 3

Fig. 3.



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COMPRESSING MACHINE

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Fig. 4.

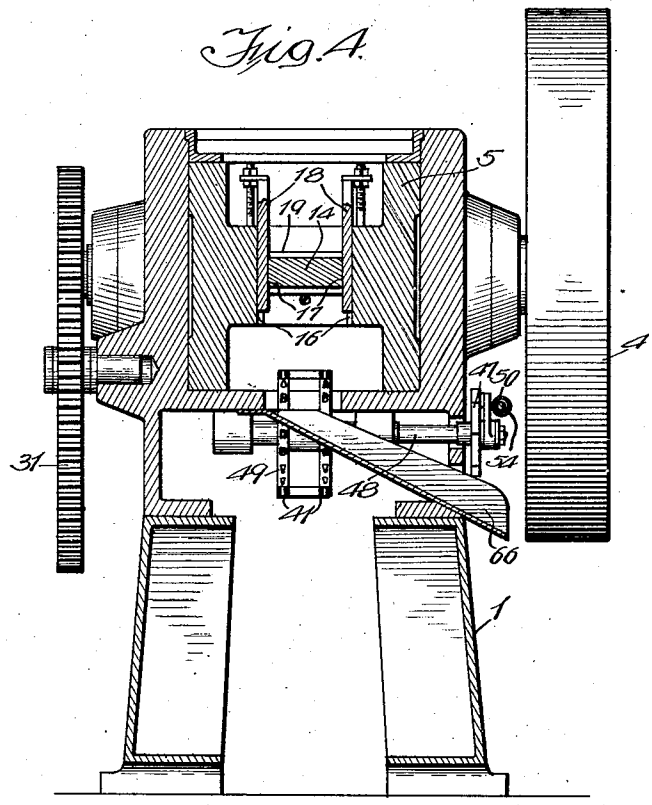
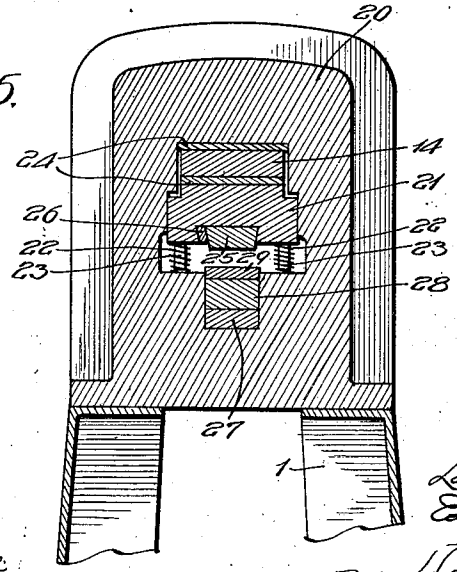


Fig. 5.



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COMPRESSING MACHINE

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Fig. 6.

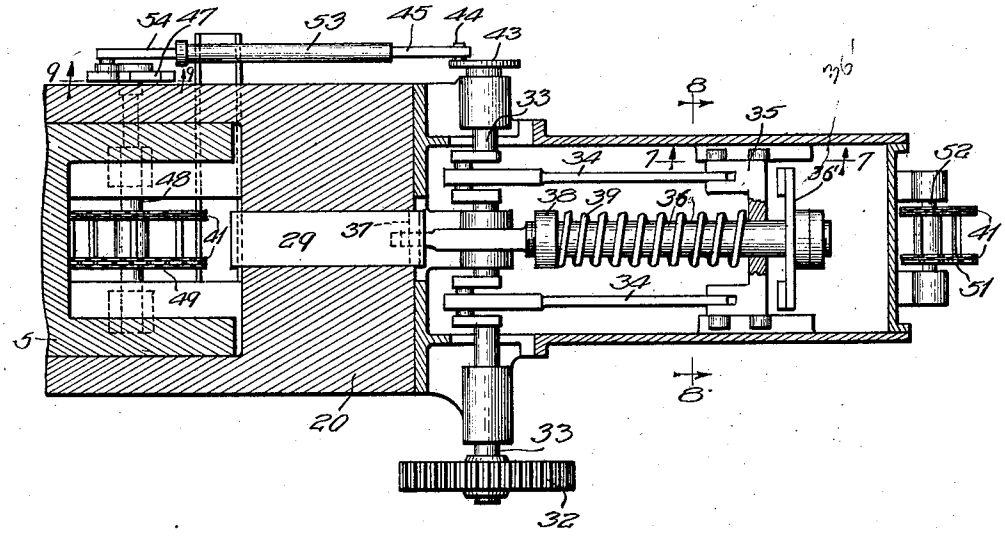


Fig. 7.

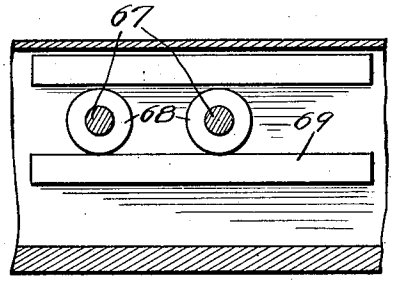


Fig. 8.

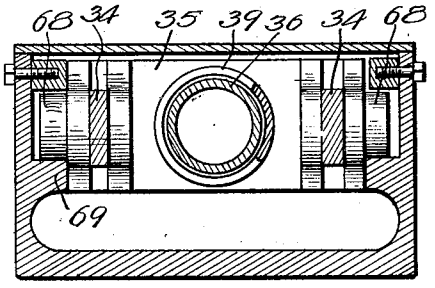
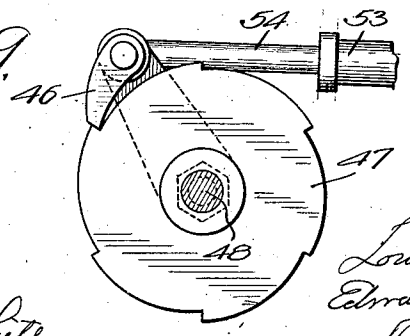


Fig. 9.



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COMPRESSING MACHINE

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Fig. 10.

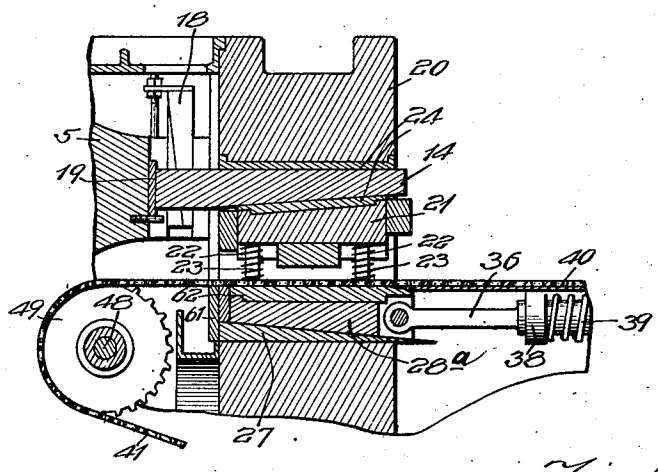


Fig. 12.

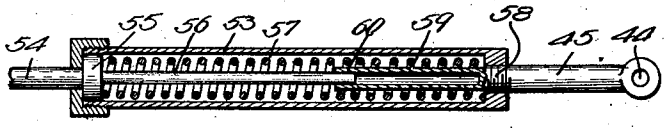
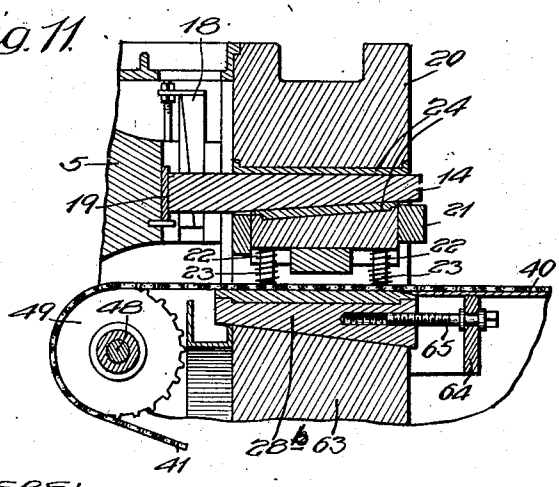


Fig. 11.



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UNITED STATES PATENT OFFICE

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COMPRESSING MACHINE

Application filed June 9, 1922. Serial No. 566,955.

Our invention particularly beyongs to that class of devices designed to accurately and reliably compress certain materials or articles, either as a step in the process of manufacture or for the purpose of bringing them to substantially uniform size or thickness.

As illustrated in the preferred form shown in the drawings, it is particularly designed for use in the manufacture of lock nuts, in which by means of pressure a part or all of the threads of the nut are caused to assume an abnormal form, by means of which the nut is adapted to more reliably engage the threads of a cooperating bolt without danger of accidental disengagement by reason of vibration, jar or use. In such devices it is found in actual practice that the nuts, as they are delivered to the press may vary slightly in thickness, varying from one to perhaps five or more hundredths of an inch, depending upon the care and accuracy with which blanks are manufactured.

However, it is desirable that notwithstanding this difference in the thickness of the nut, the amount of deflection, whether by metal flowing upon itself or by a slight distortion otherwise, should be uniform. This is made desirable for the reason that in order to secure the most satisfactory results, the change in the thread of the nut from the normal is so slight, being but a fraction of the distance between the threads, that any undue pressure caused by one blank being thicker than the other may cause the deflection in the thicker blank to be too great, in which difficulty would be found in threading the nut upon its cooperating bolt, while on the other hand, if the blank be too thin, the deflection might not be sufficient to insure reliability of the engagement of the nut with its cooperating bolt as contemplated.

Such being the case in the preferred form illustrated, the process consists in accurately and reliably placing the nuts upon an operably rigid anvil in such position that the deflecting effect upon each and every nut, regardless of its thickness, will be substantially the same in every instance.

The object of our invention, therefore, is to insure the accuracy of such a process on the one hand and on the other hand to produce a machine that will accurately and reliably operate upon the nut in substantially the manner set forth.

In the drawings, wherein like reference characters indicate like or corresponding parts,

Fig. 1 is a side elevation of our improved machine,

Fig. 2 is a central vertical section substantially on line 2—2 of Fig. 3;

Fig. 3 is a horizontal section substantially on line 3—3 of Fig. 1;

Fig. 4 is a transverse vertical section substantially on line 4—4 of Fig. 1;

Fig. 5 is a similar section substantially on line 5—5 of Fig. 1.

Fig. 6 is a horizontal section on line 6—6 of Fig. 1;

Fig. 7 is a vertical section on line 7—7 of Fig. 6;

Fig. 8 is a transverse section on line 8—8 of Fig. 6;

Fig. 9 is a vertical section on line 9—9 of Fig. 6;

Fig. 10 is a partial vertical section substantially on the line, indicated in Fig. 2 illustrating a modification;

Fig. 11 is a similar section showing another modification; and

Fig. 12 is a longitudinal central section of the link operating the chain mechanism.

In the drawings, 1 represents any suitable base for supporting the machine, having suitably mounted and secured thereto a supporting frame-work 2. 3 is a transverse shaft driven in any suitable manner, for illustration, by the driven fly and belt wheel 4. Slidably mounted within the frame-work 2, so as to permit a longitudinal movement, is a frame 5, shown in Figs. 2 and 3. Near the rear of the frame 5 is a transverse shaft 6 provided with a rotatable roller 7. In front of the shaft 3 is a cooperating transverse shaft 8 provided with a roller 9. The shaft 3 has secured thereto a cam member 10, which in the preferred form shown is formed with a section 11 adapted to cooperate with the roller 9 on the shaft 8, and with two sections 12—12 adapted to cooperate with the two sections

13—13 on roller 7. These parts may be modified to a considerable extent to secure substantially the same result.

As thus described, the rotation of the shaft 3 with its cam 10 will alternately drive the reciprocating member 5 forward and then backward. In the preferred construction as shown in Fig. 2 the rollers 7 and 9, as well as the cam 10, are keyed or otherwise secured to their shafts so as to rotate therewith.

Secured to the reciprocating part 5 at its forward end in such manner that it may be detached or adjusted in relation thereto, is a wedge member 14, which therefore reciprocates with the part 5. As shown in Figs. 3 and 4, we have secured satisfactory engagement of the wedge member 14 with the reciprocating member 5 by forming a deep recess in the forward end of the part 5, into which the extension 15 extends, as shown. Suitable recesses, as at 16, on the sides of this recess are provided with cooperating slots 17 formed in the wedge member 14, and wedge members 18 forced into the pocketed recesses thus formed, force the wedge member 14 backward firmly into engagement with the reciprocating member 5. In operation we have found it desirable to arrange for a certain range of adjustment in the longitudinal engagement of the wedge member 14 with the movable block 5. As shown, this is secured by means of a filling member 19 positioned between the end of the wedge member 14 and the end of the recess into which the end 15 extends.

Other means of adjustment may be employed if desired, but for the purpose described the means illustrated will be sufficient in describing our device.

By this means it will be seen that the wedge member 14 is caused to reciprocate forward and backward and this movement is employed for the purpose of securing the desired movement to secure the compressive force.

Referring now particularly to Figs. 2 and 5, it will be seen that the wedge member 14 is positioned in a strongly constructed part or yoke 20, within which is a cooperating movable block 21 normally maintained at the upper limit of its movement by resilient members 22, which in the present instance are illustrated by coiled springs maintained in position by the pins or studs 23. Suitable lining members 24 are placed on the top and bottom of the wedge member 14, the same being of any preferred material that will serve to reduce friction and will withstand the necessary frictional effect. For convenience in assembling the studs 23 are carried by the block 21 with a clearance at the lower end. The lower portion of the springs 22 rest against the yoke 20 and the upper ends bear against the block 21.

A compression block 25 is secured to the movable member 21, preferably in any satisfactory manner so that it may be removed for renewal or adjusted as desired. Simple means for these purposes are illustrated in Fig. 5, in which the block 25 is seated within a dove-tail recess formed in the lower face of the part 21 with the wedge member 26 locking the part in such position.

At a lower plane and in suitable vertical alignment with the parts just described, the yoke 20 is formed for the reception of a suitable part to cooperate with those portions just described. As shown, the yoke is formed with an opening, in the bottom of which is placed a preferably wedge-shaped member 27, which is firmly supported as illustrated. Slidably mounted upon this is a cooperating member 28, which is reciprocated in cooperation with the movement of the wedge member 14. In the preferred form a face plate or member 29 is suitably mounted upon the part 28 so as to move therewith, and in such manner that it may be readily removed and replaced when worn or for any other purpose.

The reciprocation of the part 28 may be secured by any suitable means, the movement being timed to suitably cooperate with the movement of the cooperating parts 14, 21 and 25, as described. In the form shown, (Fig. 3) a suitable gear wheel 30 is splined or otherwise secured to the shaft 3 so as to be driven thereby. A cooperating gear wheel 31, which in the form shown serves as an idler to engage with and drive a gear wheel 32. The gear wheel 32, Figs. 3 and 6, rotates a crank shaft 33 to which it is attached in any suitable manner, which crank shaft is provided with the links 34, which are reciprocated thereby, which links at their forward end carry the cross-head 35. The cross-head has loosely mounted therein a rod 36, which at its forward end is extended to and is suitably engaged with the reciprocating wedge 28, as at 37. The rod 36 has mounted upon it an adjustable collar 38, and extending from the collar to the cross-head 35 is a suitable spring 39 or equivalent means, serving as an intermediate member in the form shown, to regulate and cushion the movement of the rod 36. Thus, as the cross-head is carried forward by the rotation of the crank shaft as described, its contact with the spring 39 will serve to compress the same and resiliently force the wedge member 28 longitudinally as far as it may be permitted by the position of the contiguous parts cooperating therewith. As the cross-head is returned upon further rotation of the crank shaft, it engages the stop element 36′ on the outer end of the rod 36 to effect a positive return of said rod to its former position.

Located in a suitable plane just above the parts last described is a suitable table or equivalent part 40, upon which is carried in the preferred form a suitable carrying chain 41 of the sprocket or similar type. This

chain is suitably mounted to produce a step by step motion, and is designed to carry the nuts 42 forward one by one into position to be operated upon by the device as described to secure the compression desired.

In the form shown in the drawings and particularly illustrated in Fig. 3 and 6, the crank shaft 33 is extended beyond the opposite side of the machine and has secured thereto a crank or face plate 43, carrying a wrist pin 44. A link 45 is extended to engage with a pawl 46, (Figs. 9 and 3) arranged to cooperate with a ratchet wheel 47 mounted upon a shaft 48. The shaft is extended toward the center of the machine and has mounted upon it in the preferred form a pair of sprocket wheels 49 formed to suitably carry the sprocket chain 41. The sprocket chain from the sprocket wheel 49, in the form shown, is carried downward beneath a suitable idler 50 and thus to the end of the machine, where cooperating sprocket wheels 51 are carried upon a shaft 52. It will thus be seen that at each rotation of the crank shaft 33 and the reciprocation of the cooperating parts, the sprocket shaft 48 will be rotated with a step by step movement, moving the chain 41 forward in the same way, carrying therewith the nuts 42 which are successively delivered to the compressing means described.

In the preferred construction the link 45 driving the ratchet 47 is constructed in such manner that if for any reason the sprocket chain should become caught in such manner that it could not be moved forward, it would not break the chain. This we accomplish by making the operation of the link 45 also resilient in something of the same manner as is shown with the reciprocating rod 36. As shown in Fig. 12, this link can be made of two parts housed in a casing 53. Within the housing is slidably mounted a section 54, which, for illustration, may be extended forward to engage the pawl 46. Upon this section a shoulder or collar 55 may be provided with the reduced portion 56. Upon this reduced portion a suitable spring 57 may be mounted. The rear portion of the link, as 58 shown in said figure, is secured to said housing with the forwardly projecting part 59 provided with a socket in which the rear end 60 of the part 56 is seated. It will thus be seen that the push of the link is cushioned in such manner that any stoppage of the sprocket chain will not result in the breaking of the parts, but will be absorbed within the link.

The operation of the device as thus described is substantially as follows, referring for convenience to Fig. 2 of the drawings:

In the step-by-step movement of the chain 41 described, the nuts 42 are successively carried forward and positioned beneath the compressing mechanism, substantially as shown in Fig. 2. The parts are so timed that the initial movement forces the anvil block 28 forward until a nut 42 is reliably and operatively maintained in position between the plate 29 and block 25 at a relative elevation dependent upon the varying thicknesses of the several nuts. Beyond this point the anvil 28 does not move, the nut sufficing to prevent further movement and the spring 39 yielding to the forward movement of the crosshead, as described. When the nut is thus suitably positioned, the compression wedge 14 is then driven forward by the operation of the machine, forcing the block 21 with its compression block 25 downward an exactly measured distance and this action exactly measures the compression upon each successive nut as described. As the machine continues its operation, the compression member 14 is drawn backward, allowing the block 21 to be moved upward to release the nut, and the anvil wedge 28 is drawn backward by engagement of the cross-head 35 with the stop element 36' on the end of the rod 36. As the chain moves forward, the next successive nut is brought in position and the same operation is repeated, while the nut treated is discharged from the machine. It will thus be seen that the movement of the anvil member 28 is limited by the thicknesses of various nuts, while the compression is measured and the same in every instance.

If the machine is operated simply for lock nuts, as just described, this is the preferred operation.

There may, however, be other articles that it is desired to compress to bring them to a uniform thickness, in which case the anvil block may move forward at each operation the same distance, and the compression member moving forward the same measured distance, the articles operated upon will all be brought to the same uniform thickness.

In the form shown in Fig. 10, the forward movement of the anvil member 28^a may be limited by a suitable stop member 61 in connection with a filler 62, if desired, for varying the movement of the part. In this form the part 28^a will be permitted to always move forward the same measured distance, the cooperating parts being adjusted for that purpose, and the compressing member 14 with its associated parts always moving the same measured distance, the articles, as heretofore described, will all be compressed and brought to a uniform thickness.

In the form shown in Fig. 11 the anvil block 28^b is stationary, and is placed upon a part 63 having an inclined fall corresponding to the wedge member 27. The bridge 64, provided with an adjusting bolt 65, which at its forward end engages the anvil 28^b, permits adjustment of the said member backward and forward to the desired point. Again, the articles positioned upon the anvil block will be rigidly supported and the movement of the wedge member 14 being uniform,

the various articles will be brought to the same uniform thickness, as before described.

Referring to Fig. 4, 66 is a chute or trough into which the nuts are carried by the movement of the chain after they are compressed and are conveyed away from the machine by gravity.

Fig. 7 illustrates one simple means for supporting the crosshead in a manner permitting an easy reciprocation of the same. As here shown, the crosshead is provided with stud shafts 67, upon which are mounted antifriction rollers 68, which roll upon a support 69.

It will thus be seen that our improved machine is adapted, first to produce the same amount of movement to secure uniform compression upon articles irrespective of any variation in thickness of the articles, and, second, that it is adapted to bring articles of varying thickness to the same or a uniform thickness.

Having thus described our invention, it is obvious that various immaterial modifications may be made in the same without departing from the spirit of our invention; hence we do not wish to be understood as limiting ourselves to the exact form, construction, arrangement and combination of parts herein shown and described or uses mentioned.

What we claim as new and desire to secure by Letters Patent is:

1. In a device of the kind described, a compression block, a cooperating wedge member, means for positively reciprocating said wedge member, an anvil member adapted to cooperate with said block, means for vertically lifting the anvil member a predetermined distance, resilient means for operating the lifting member, and positive means for retracting said lifting member.

2. In a device of the kind described, a compression member, a frame and wedging means mounted therein for moving the compression member a measured distance, spaced rollers mounted on said frame, and cam means mounted between said rollers for reciprocating said frame, in combination with a cooperating anvil member, and automatic means for delivering the article to be operated upon between said members with a step by step movement.

3. In a device of the kind described, a compression block, a cooperating wedge member therefor, and means for positively reciprocating said wedge member, in combination with a cooperating anvil member, means for vertically lifting the anvil member a distance measured by the thickness of the article operated upon, resilient means for so operating the lifting member, positive means for retracting the lifting member, a conveyor arranged to deliver the articles between the block and the anvil, and means for operating the conveyor with a step by step movement.

4. In a device of the kind described, a compression member and means for operating the same, comprising a driven cam member, a reciprocating member engaging the cam member on opposite edges thereof, and actuating the compression member, a driven crank shaft, a cooperating reciprocating anvil member actuated thereby, and automatic means for positioning the article to be operated upon between the compression member and the anvil member.

5. In a device of the kind described, a compression member, mechanism for operating the same comprising a driven cam member, a reciprocating member provided with cooperating rollers engaging the cam member on opposite edges thereof, for actuating the compression member, a driven crank shaft, a reciprocating anvil member actuated by said crank shaft, and means for positioning the article to be operated upon between the compression member and the anvil member.

6. In a device of the kind described, a compression member, and means for actuating the same, comprising a driven cam member, a reciprocating member provided with means for engaging the cam member on opposite edges thereof for actuating the compression member, a driven crank shaft, a reciprocatory anvil member actuated by said crank shaft, automatic means for positioning the article to be operated upon between the compression member and the anvil member, the reciprocating anvil member being resiliently driven forward, but positively retracted to its normal position.

7. In a device of the kind described, a compression member, a cam member for actuating said compression member, a reciprocating member operated in both directions by said cam member and actuating the compression member, an anvil member cooperating with said compression member, and a driven crank shaft for reciprocating said anvil member.

8. In a device of the kind described, a compression member provided with a cooperating wedge member for actuating the same, a driven cam member, a reciprocating member engaging the cam member on opposite edges thereof, and means for adjustably connecting the wedge member thereto, in combination with a driven crank shaft actuating a cooperating reciprocating anvil member, and means for positioning the article to be operated upon between the compression member and the anvil member.

9. In a device of the kind described, an anvil member, a wedge member adapted to regulate the position of the anvil member, in combination with a driven crank shaft, a cross-head therefor, link members connecting the crank shaft with the crosshead, a rod loosely extending through the crosshead, and engaging the wedge member, resilient means

for cushioning the forward movement of the rod, and positive means for retracting the same.

10. A device of the character described including a compression member, resilient means for normally holding the compression member in raised position, wedging means for lowering the compression member a predetermined distance, a reciprocating frame holding said wedging means and carrying a pair of rollers, cam means disposed between said rollers for actuating said frame, a cooperating anvil member, means for raising the cooperating anvil member, and automatic means for delivering an article to be operated upon between said members.

11. In a device of the kind described, a compression member, a cooperating wedge member adapted to actuate said compression member, a cam member, a reciprocating member engaged by the cam member, means for adjustably connecting the wedge and reciprocating member, an anvil member cooperating with said compression member, and a crank shaft for reciprocating said anvil member.

12. In a device of the kind described, an anvil member, a wedge member movable to regulate the position of the anvil member, a driven crank shaft, a cross-head, link members connecting said crank shaft and cross-head, and a rod extending through the cross-head and engaging the wedge member for actuating the same.

13. A machine of the character described including a fixed frame, opposed compression members mounted therein, one of which is normally retained in a given position, means for positioning an article on the other of said members, means for moving the member containing the article to bring the article into contact with the other member, the movement of the member being controlled by the thickness of the article, a reciprocating frame mounted in said fixed frame and carrying wedging means for operating the normally retained member to compress the article between the two members, rollers mounted in said reciprocating frame, and cam means between said rollers for moving said frame.

14. A machine of the character described including a fixed frame, opposed compression members mounted therein, one of which is normally retained in a given position, means for positioning an article on the other of said members, means for moving the member containing the article to bring the article into contact with the other member, the movement of the member being controlled by the thickness of the article, a movable frame mounted in said fixed frame and carrying reciprocating wedge means for operating the normally retained member a measured distance to compress the article between the two members, roller means mounted in said movable frame, and a cam disposed between and engaging said rollers for moving said frame.

In testimony whereof, we have hereunto signed our names.

LOUIS E. ENDSLEY.
EDWARD V. CORFF.