J. V. CULLINEY.

NUTTING MACHINE.

APPLICATION FILED APR. 29, 1907.

914,807.

Patented Mar. 9, 1909.

4 SHEETS—SHEET 1.

Fig. 1.

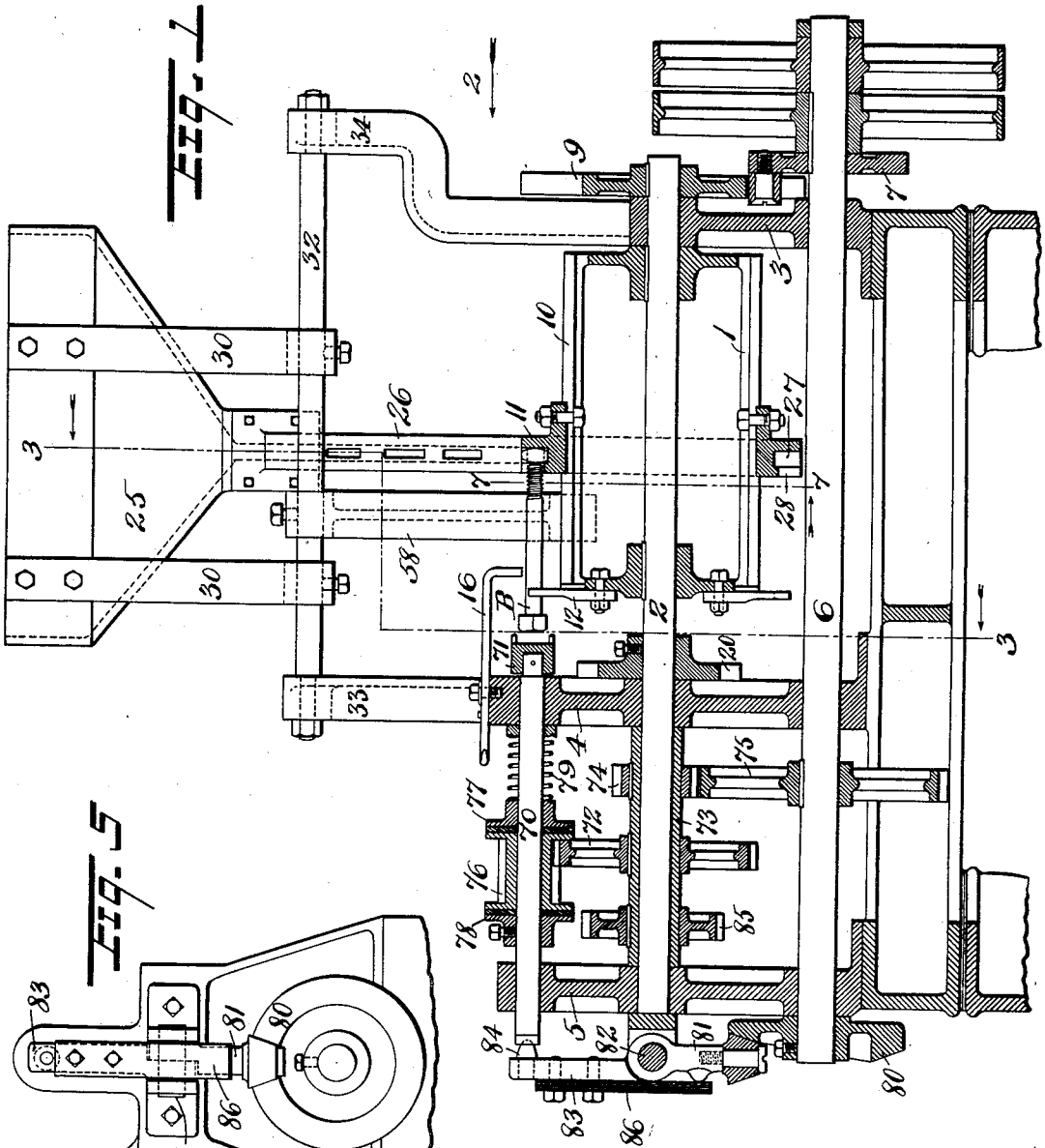

Fig. 5.

Witnesses

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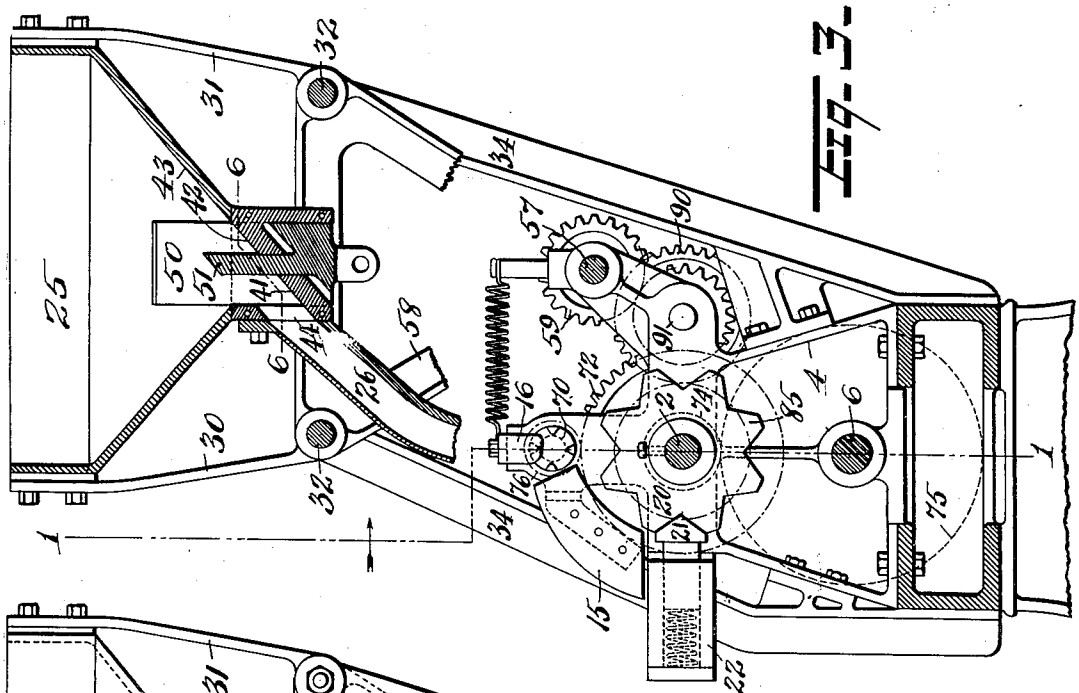

Fig. 3.

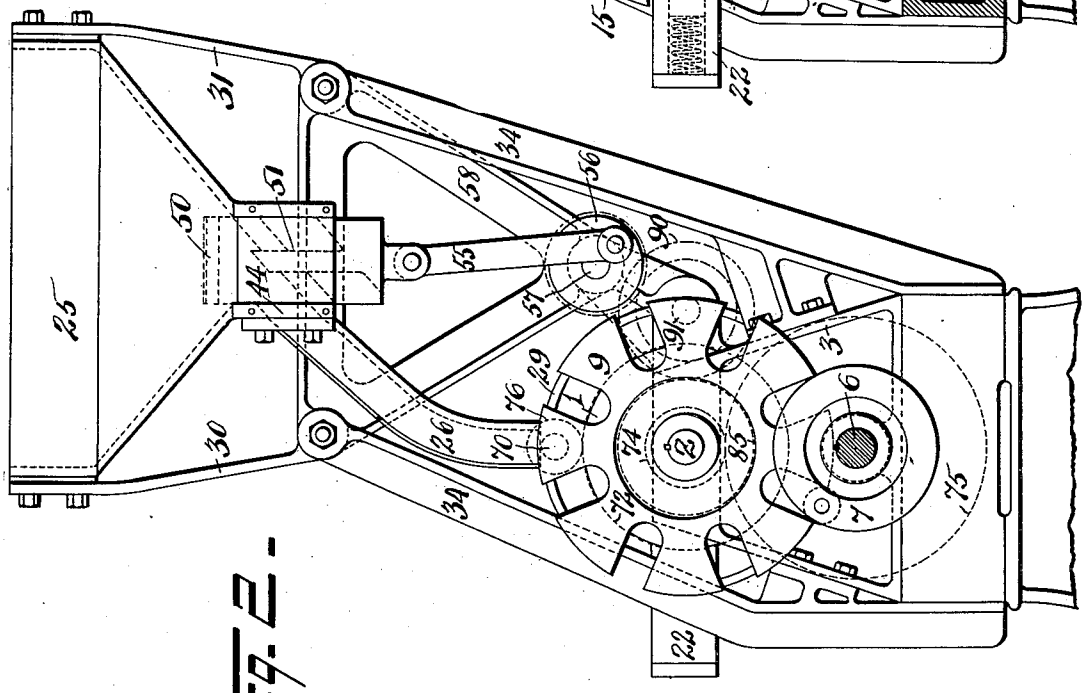

Fig. 2.

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4 SHEETS—SHEET 3.

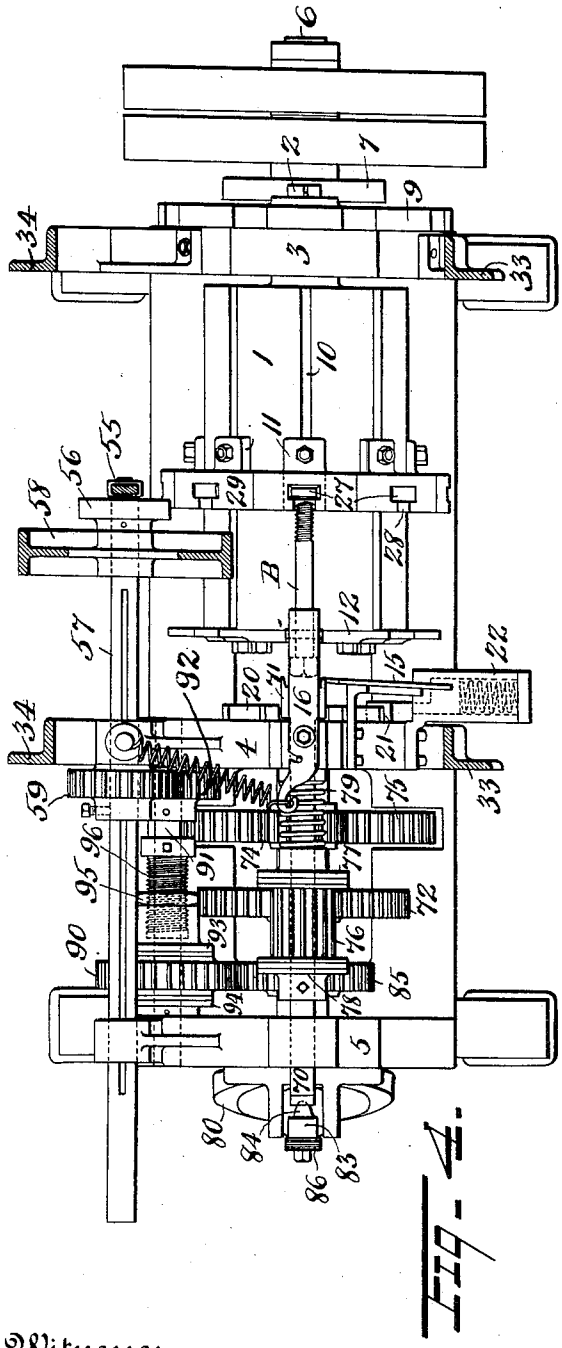

Fig. 4.

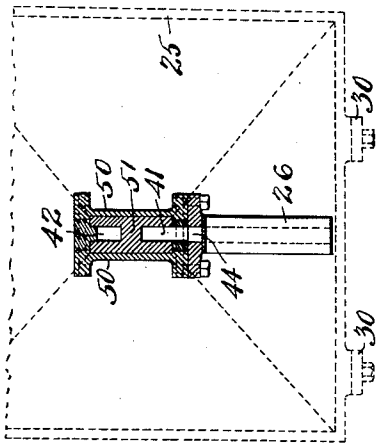

Fig. 5.

Witnesses

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4 SHEETS—SHEET 4.

Fig. 8.

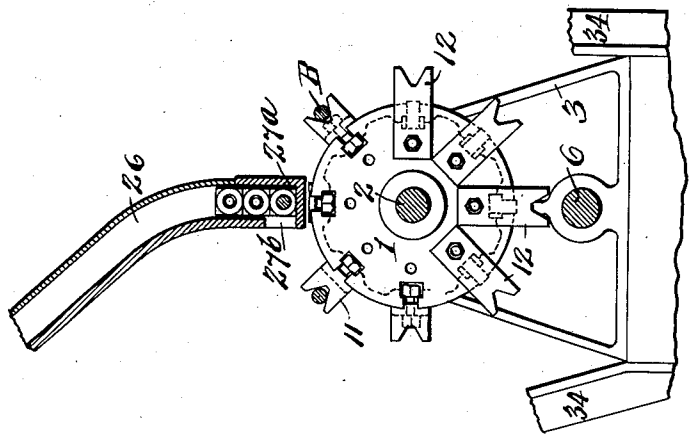
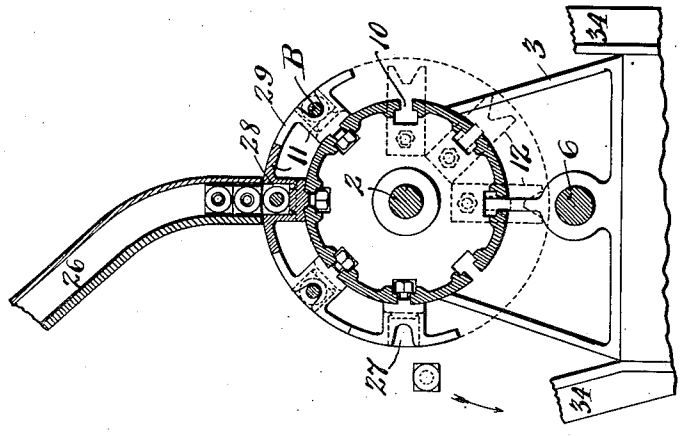


Fig. 7.



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UNITED STATES PATENT OFFICE.

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NUTTING-MACHINE.

No. 914,807. Specification of Letters Patent. Patented March 9, 1909.

Application filed April 29, 1907. Serial No. 370,795.

To all whom it may concern:

Be it known that I, JOHN V. CULLINEY, a citizen of the United States, and a resident of Lebanon, in the county of Lebanon, State of Pennsylvania, have invented certain new and useful Improvements in Nutting-Machines, of which the following is a specification.

My invention relates to an improved nutting machine adapted more particularly for mechanically applying nuts to comparatively large-size bolts of varying lengths and diameters, and it consists in certain novel features and combinations of coöperating parts as hereafter fully described in connection with the accompanying drawing and specifically pointed out in the claims.

Figure 1 is a sectional elevation of a machine embodying my complete invention, taken on the line 1—1 of Fig. 3 and looking in the direction of arrow 1. Fig. 2 is a right-side elevation of the same. Fig. 3 is a cross-sectional elevation taken on the line 3—3 of Fig. 1. Fig. 4 is a plan view, the hopper mechanism being cut away. Fig. 5 is an end view of the cam-operated mechanism for effecting the axial movement of the nutting shaft. Fig. 6 is a sectional plan view of the hopper and nut agitator. Fig. 7 is a cross-sectional view of the bolt-carrying drum, showing certain of the carrier-devices applied thereto and the adjacent portion of the nut chute. Fig. 8 is a similar view to Fig. 7 indicating a modified construction.

The complete machine, as shown, comprises an intermittently rotated drum adapted for carrying varying sizes of bolts, a nut hopper with chute and agitator mechanism all adjustably positioned to suit any particular length of bolts to be operated upon, and a nutting shaft with endwise movement for turning the bolts into the nuts, all cooperatively arranged in connection with minor features of construction as hereafter fully described.

The bolt drum 1 is fixed to a drum shaft 2 mounted in the frame housings 3, 4, 5 parallel with the drive shaft 6, by which latter it is turned, as indicated, one-eighth of a revolution for each rotation of the drive-shaft; this intermittent movement being effected by means of a crank disk 7 on the drive shaft which engages an eight-armed spider 9 on the drum shaft. The drum 1 is provided with a series of longitudinal slideways 10 in which are adjustably secured a circular series of carrying devices 11 which coöperate with a corresponding series of fixed carrier arms 12 on the head of the drum to properly support the bolts B placed therein by the operator. To insure proper placing of the bolts in the carrying means on the drum, I employ a fixed guide plate 15, (Figs. 3 and 4) located in front of the retracted nutting shaft head hereafter referred to, and against which the head of each bolt is positioned in placing it upon the drum; and as each bolt is carried to nutting position it is passed under a laterally yielding pivoted guard or clamp 16 which securely holds it in properly seated position in the carrying means during the nutting operation but which is capable of moving laterally with the bolt when the drum is turned, so as to easily free the bolt and then return laterally to its normal position as hereafter referred to. To accurately fix the drum in position for each successive nutting action, I provide a locking disk 20 on the drum shaft, having V-shaped peripheral notches corresponding with the different nutting positions of the drum, in connection with a spring-pressed locking pin 21 sliding in a guide 22 so that its wedge-shaped end is normally seated in each notch during the nutting periods.

The nuts are stored in a hopper 25 having a chute 26 through which they are fed to the means for holding them during the nutting operations. As shown the lower end of the chute is open, and is so set as to register successively with each of the circumferentially spaced nut-holding pockets 27 formed respectively in the carrying devices 11 rearward of the bolt supporting pocket 28 of the latter; so that a nut will be delivered to each of said carrier pockets 27 in axial alinement with an adjacently carried bolt. Excepting when one or other of these pockets 27 is turned into register with the hopper chute, the open end of the latter is closed, so as to retain the nuts therein, by the circumferential plates 29 of the carrier devices 11, which plates, as shown, abut one against another so as to form a chute-closure band around the drum formed with the circumferentially spaced bolt and nut pockets.

To provide for setting the nut hopper and its chute to correspond with the adjusted position of the carrier devices 11 on the drum, the rigid hopper-carrying arms 30, 31 are

arranged to slide on guide-rods 32 fixed between frame brackets 33, 34, so that the hopper may be readily set to proper position for delivering the nuts from the chute to the successive carrier pockets 27.

In order that the nuts may be properly fed from the hopper to the chute it is necessary that an agitator be employed to prevent any blocking of the chute entrance, and to properly present the nuts thereto; and that such agitator mechanism be operative in all positions to which the hopper may be adjusted. The bottom opening of the hopper is rectangular in form and is provided with changeable nut-supporting fingers 41 and 42 projecting toward each other from opposite walls and forming jointly an inclined way in line with the inclined wall 43 of the hopper and leading to the lateral chute inlet 44. These fingers are sligthly wider than the thickness of the nuts to be handled, and their projected ends are separated for the passage of an agitator plunger of H-shaped cross-section, the side-plates 50, 50 of which loosely fill the spaces between the fingers and the side walls of the hopper opening, while the cross-bar 51 passes between the separated finger ends. The top surface 52 of this cross-bar is inclined to correspond with the incline of the fingers, and the two side plates 50 extend unequal distances above it, so that the constant up and down movement of the agitator in the chute opening operates upon the stored nuts to turn them until they are properly passed in succession to the chute. Reciprocating vertical movement is imparted to the agitator through a connecting rod 55 to a crank disk 56 on the end of an agitator shaft 57 (Fig. 4); said shaft being mounted at the crank-disk end in a sliding bracket 58 (Fig. 1) adjustable on the guide bars 32 to correspond with the adjustment of the hopper, and being slidable axially in the housings 4 and 5 as indicated, with its feathered drive-gear 59 locked by a set screw after proper adjustment has been made.

The nutting shaft 70, mounted in the housings 4, 5, and having a chucking head 71 for engaging the bolt, is rotated, as shown, by a gear wheel 72 fixed to a sleeve 73 rotatably mounted on the drum shaft 2 between the housings 4 and 5; said sleeve having a gear wheel 74 in mesh with a gear 75 on the driving shaft 6. The pinion 76 on the nutting shaft, which meshes with the sleeve gear 72, is frictionally held, as shown, between collars 77 and 78 fixed to said shaft, so as to serve as a safety device by slipping upon the shaft in case the normal rotating action of the nutting shaft is interfered with, for instance, by the accidental placing of a defective bolt or nut. And said shaft is also adapted to be moved axially, for the purpose of pressing each bolt into screwing engagement with its nut, against the tension of a returning spring 79. This forward movement of the nutting shaft is effected, as shown, by the action of a spring-tension cam mechanism comprising a cam wheel 80 on the end of the drive shaft, which acts upon a rollered arm 81 of a shaft 82 having a second arm 83, the end 84 of which latter is pressed against the end of the nutting shaft 70. This pressing action, as shown, is effected through a suitable interposed spring 86 which is adapted to simply yield to the action of the cam wheel 80 in case the forward movement of the nutting shaft is prevented, as for instance by the accidental placing of an unthreaded bolt or nut.

As shown, the rotation of the agitator shaft 57 is effected by a gear wheel 85 on the rotary sleeve 73 of the drum shaft, said gear wheel 85 meshing with a gear wheel 90 (Fig. 4) on an interposed idler shaft 91 having a second gear 92 meshing with the feathered gear 59 on the agitator shaft. To prevent breakage in case of the possible blocking of the nut agitator, the gear wheel 90 is shown frictionally secured to the idler shaft 91 between friction collars 93 and 94 on the latter, the degree of friction being regulated by a clamping nut 95 upon a screw-threaded sleeve 96 fixed to said shaft.

To adapt the hopper mechanism to different sizes of nuts, corresponding sizes of chutes, nut agitators, and of inclined fingers 41 and 42 may be interchangeably applied, and the other manipulating devices may be changed also as required, the operation of the machine in each case being the same.

The nuts in the hopper 25 are successively passed to the chute 26 by the agitator mechanism so as to be delivered uniformly into the nut-holder pocket 27 with the threaded opening in alinement with the nutting shaft 70. The bolts B are placed longitudinally upon the drum and successively carried, by the intermittent rotation of the latter, into alinement with the nutting shaft; the proper position of the bolt head being fixed by the guide plate 15, and its screw-threaded end being supported in the bearing or pocket 28 of the properly adjusted carrier device 11, while the bolt-clamp 16 presses it firmly upon said carrier bearing 28, and the fixed carrier arm 12, when the bolt is brought into alinement with the nutting shaft and with the nut in pocket 27; thereby retaining it in such alinement when it is engaged and operated by said shaft. While held in this position the rotary nutting shaft is advanced and quickly screws it into the nut held in pocket 27, after which the shaft is retracted and the drum rotated to bring another bolt into nutting position; this further rotation of the drum at the same time carrying the nutted bolt past the clamp 16, which is made yielding so as to insure its passage, and discharging it to the rear of the machine. In case

unthreaded or defective bolts or nuts are inadvertently placed in the machine, its operation is continued without damage or interference with the proper timing of the coöperating parts, owing to the frictional rotation of the agitator and nutting shafts and the spring-tensioned axial movement of the latter, the defective piece being simply discharged in each case without affecting the nutting operation.

The preferred construction above specifically described may obviously be varied in many respects without departing from the main features of my invention. For instance, the nut holder or pocket 27, instead of being formed integral with the adjustable bolt-carrier device 11 on the drum as shown, may be attached to or made part of the chute 26 as indicated in the modified arrangement indicated in Fig. 8, where a chute is shown having its lower end closed to form a nut-holding pocket 27^a having a lateral outlet 27^b through which the nut is discharged with the bolt after the nutting operation, by the further rotation of the drum; said pocket receiving the nuts in succession from the chute and holding the same in axial alinement with the bolts B and nutting shaft 70, and each bolt being successively carried in front of the pocket and pushed into screwing engagement with its nut by the axial movement of the nutting shaft as in the preferred construction previously described.

What I claim is:—

1. In a nutting machine substantially as described, an intermittently rotatable drum having a series of circumferentially spaced fixed supports for the headed ends of the bolts and a corresponding series of independently adjustable supports for the threaded ends thereof substantially as set forth.

2. In a nutting machine comprising a nut chute and an axially movable shaft with means for intermittently moving the same, a drum having circumferentially spaced bolt-carrying devices, means for turning said devices successively into alinement with said shaft, and nut-holding means communicating with said chute and bolt carrying devices, and each provided with a side opening adapted to permit delivery of a nutted bolt laterally of the drum, substantially as set forth.

3. In a nutting machine the combination with the nutting shaft and intermittently rotatable bolt-carrying drum, of the laterally yielding bolt clamp arranged in the path of the drum-carried bolts above the axis of the nutting shaft and adapted to move a limited distance with the drum-carried bolts substantially as set forth.

4. In a nutting machine substantially as described, an intermittently rotatable drum having a circumferentially spaced series of fixed holders for the ends of the bolts, and coöperating bolt-carrying and nut-holding devices each of which is adjustable longitudinally of the drum.

5. In a nutting machine substantially as described, an intermittently rotatable drum having fixed holders for the headed ends of the bolts and longitudinally adjustable devices adapted to carry both the threaded end of a bolt and a nut therefor during a nutting operation.

6. In a nutting machine comprising a nut chute and an axially movable nutting shaft with means for intermittently moving the same, a drum having circumferentially spaced bolt-carrying devices provided with nut-holding pockets, and means for turning said devices successively into alinement with said shaft and into simultaneous communication with said nut chute, said nut chute and devices being adjustable longitudinally of the drum, substantially as set forth.

7. In a nutting machine substantially as described, an intermittently rotatable drum having longitudinally adjustable devices each formed to carry both a threaded end of a bolt and a nut therefor during a nutting operation and provided with a lateral opening for releasing the threaded bolt during further rotation of the drum.

8. In a nutting machine substantially as described, a nut chute and an intermittently rotatable drum having a chute-closure band secured thereto with nut-holding pockets in said band.

9. In a nutting machine substantially as described, a nut chute and an intermittently rotatable drum having a series of longitudinally adjustable nut engaging devices adapted to jointly form a chute-closure band about the drum.

10. In a nutting machine the combination of a drive shaft, a drum shaft with bolt-carrying drum intermittently rotated thereby, an axially movable nutting shaft, an idler sleeve on said drum shaft in gear with said drive shaft and nutting shafts, and a cam-operated mechanism between said drive shaft and nutting shaft whereby intermittent axial movement is imparted to the latter substantially as set forth.

11. In a nutting machine the combination of an intermittently rotatable bolt-carrying drum, an axially movable nutting shaft, and a fixed guide plate located in front of the nutting shaft head and against which the head of each bolt is positioned in placing it on the drum, substantially as set forth.

In testimony whereof, I affix my signature, in the presence of two witnesses.

JOHN V. CULLINEY.

Witnesses.

THOS. S. BRENHOLTZ,

DAVID M. FRY.