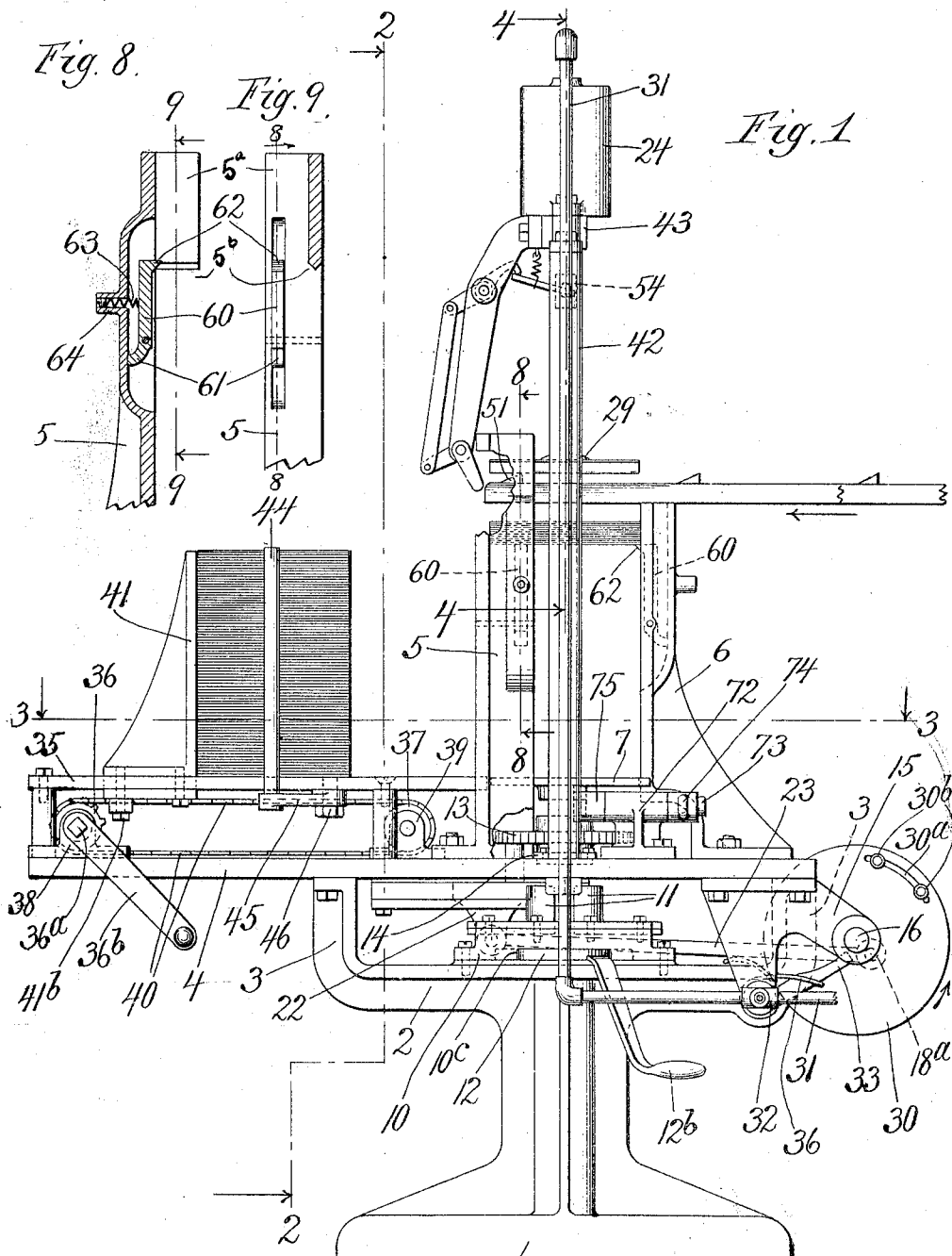


No. 845,907.

PATENTED MAR. 5, 1907.

E. TYDEN.
SHEET FEEDING DEVICE.
APPLICATION FILED JUNE 8, 1905.

4 SHEETS--SHEET 1



Witnesses,
Edward T. Wray,
J S Abbott

Inventor,
1 Emil Dyers
by Benton & Benton
his Attys.

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4 SHEETS—SHEET 2.

Fig. 11.

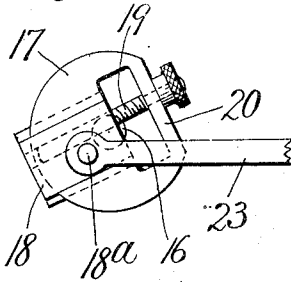


Fig. 2.

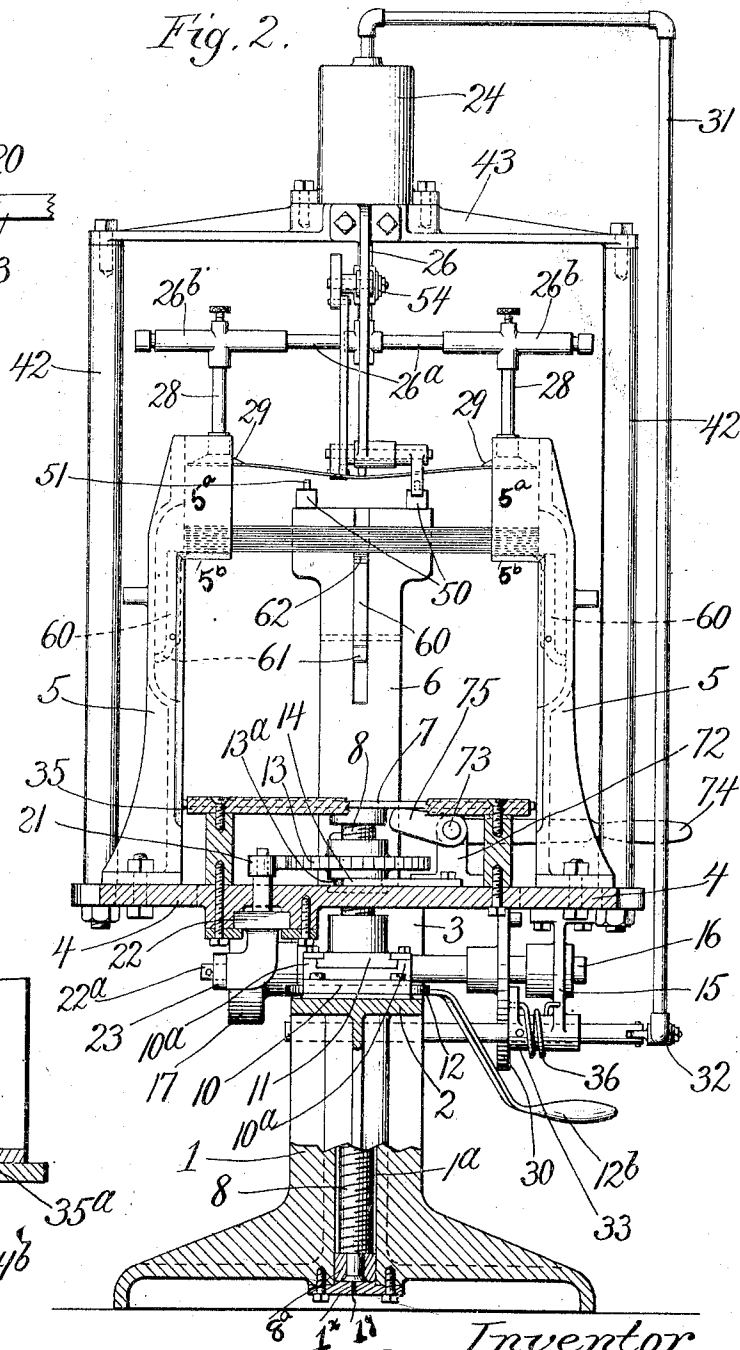
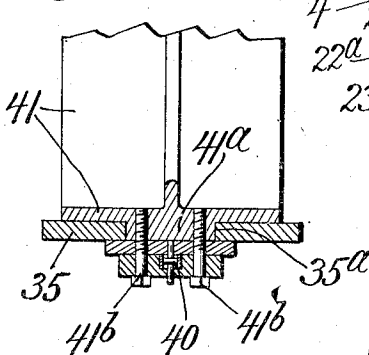


Fig. 10.



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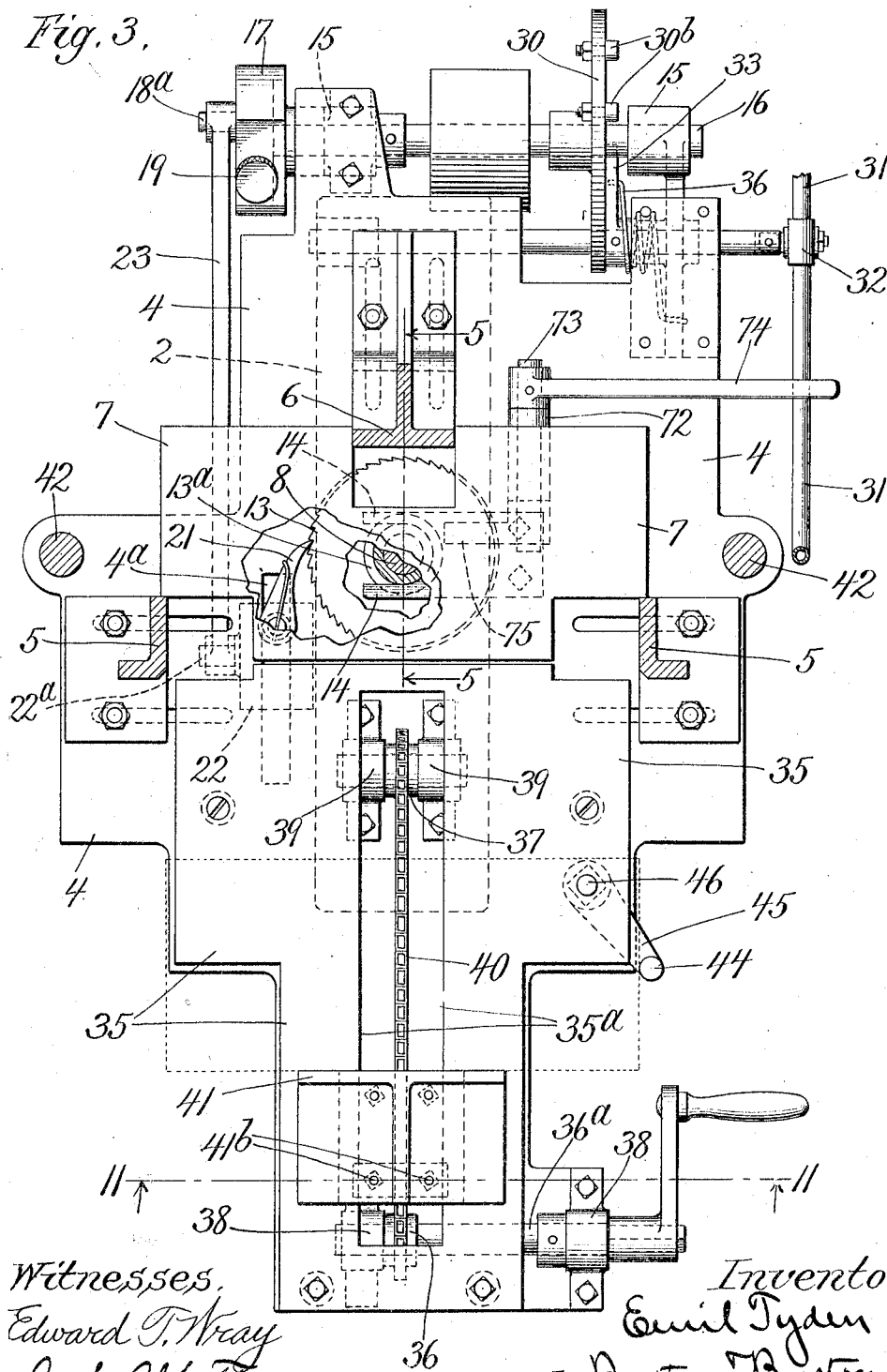
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4 SHEETS—SHEET 3.



Witnesses.
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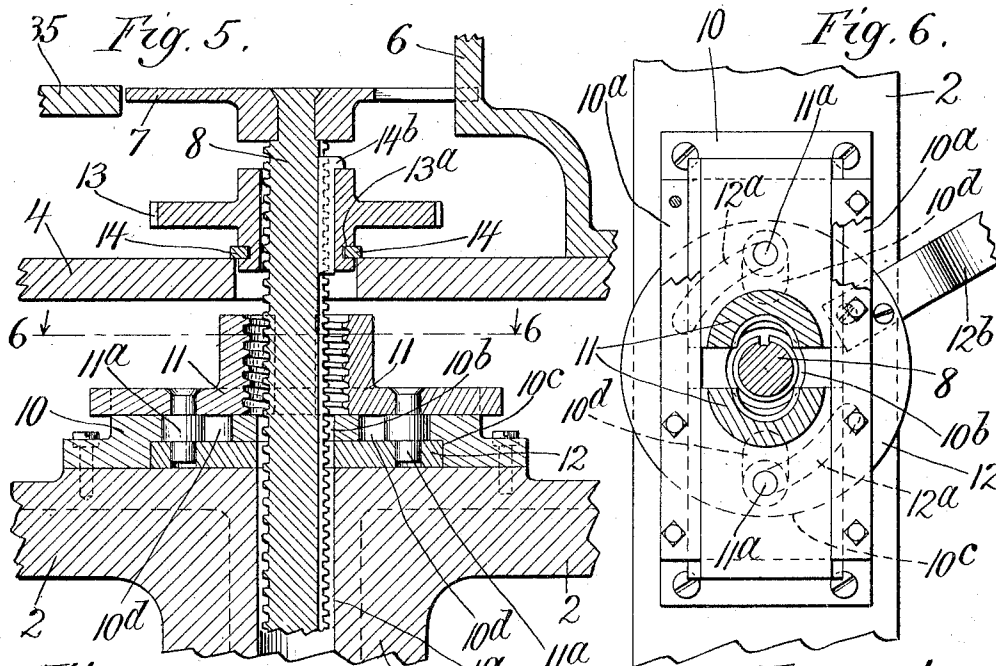
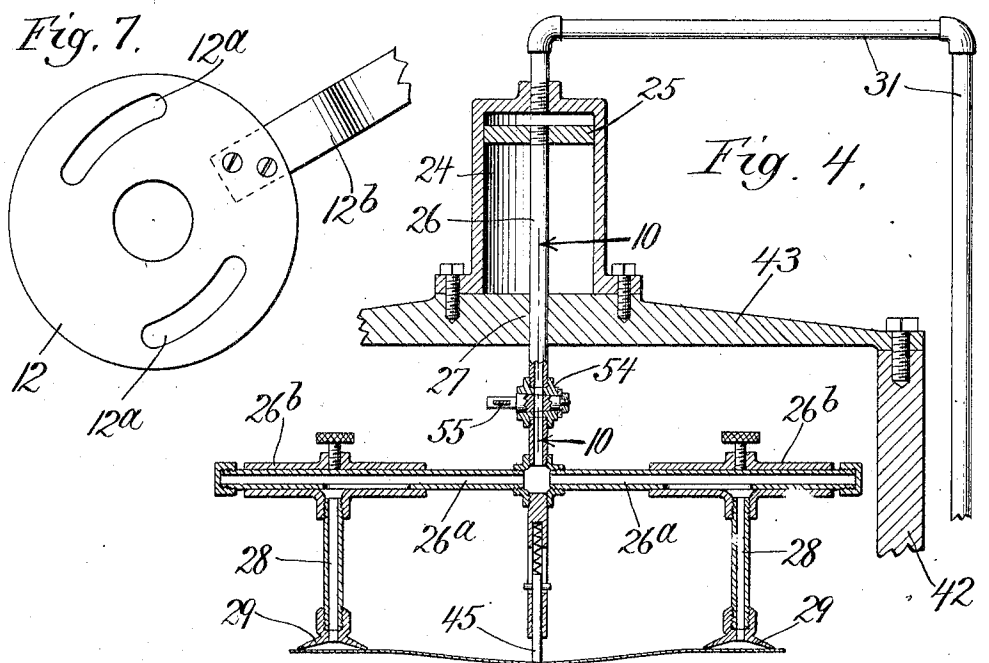
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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

EMIL TYDEN, OF HASTINGS, MICHIGAN.

SHEET-FEEDING DEVICE.

No. 845,907.

Specification of Letters Patent.

Patented March 5, 1907.

Application filed June 8, 1905. Serial No. 264,217.

To all whom it may concern:

Be it known that I, EMIL TYDEN, a citizen of the United States, residing at Hastings, in the county of Barry and State of Michigan, have invented new and useful Improvements in Sheet-Feeding Devices, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

The purpose of this invention is to provide a machine for feeding sheets of metal, paper, card, or other sheet material to any mechanism by which it is to be operated upon, as for printing, forming, or cutting, such machine being adapted to separate an individual sheet from a pile, avoiding the risk of taking more than one by reason either of the close packing of the pile or of adhesion of the surfaces or engagement at the edges by burs formed in cutting or other cause.

It consists of the features of the elements and features of construction set out in the claims.

In the drawings, Figure 1 is a side elevation of such machine. Fig. 2 is a section at the line 2 2 on Fig. 1. Fig. 3 is a section at the line 3 3 on Fig. 1. Fig. 4 is a detail section at the line 4 4 on Fig. 1. Fig. 5 is a detail section at the line 5 5 on Fig. 3. Fig. 6 is a section at the line 6 6 on Fig. 5. Fig. 7 is a plan view of a cam for closing up the divided nut concerned in the raising and lowering operation. Fig. 8 is a detail section at the line 8 8 on Fig. 9. Fig. 9 is a section at the line 9 9 on Fig. 8. Fig. 10 is a detail section at the line 11 11 on Fig. 3. Fig. 11 is a detail elevation of an adjustable crank for varying the stroke of the dog which operates the table-elevating devices.

The machine shown in the drawings comprises a standard 1, having a cross-head 2, with upwardly-projecting arms 3 3 at the ends of the cross-head, and upon the upper ends of these arms there is mounted rigidly the bed 4. Upon the bed 4 there are mounted with capacity for adjustment toward and from the longitudinal-center line lateral guide-posts 5 5, and extending across the center line and adjustable longitudinally with respect to the table at the middle of its width the front guiding-post 6. A platen or blank-carrying table 7 is guided in its vertical movement between these three guide-posts, such table being swiveled on the upper end of a screw-shaft or spindle 8, which extends

down through the bed 4 and telescopes within the standard 1, which has the vertical bore 1^a to receive said screw-shaft. Upon the top of the cross-head 2 of the standard 1 there is bolted fast a guide-chair 10, between whose lateral flanges 10^a 10^a the two similar halves 11 11 of the divided nut are lodged and guided for movement toward and from each other to open and close the nut. The chair 10, having a central aperture 10^b for the screw-shaft, is counterbored about said aperture on the under side at 10^c to afford a seat for the cam-plate 12. Each half of the nut 11 has a stud 11^a, which extends down through a slot 10^d in the chair 10 and below the chair is reduced in diameter and engages an eccentric cam-slot 12^a in the cam-plate 12, the two slots 12^a for engagement of the two studs 11^a, having like eccentricity, so that when the cam-plate is turned about the shaft in one direction the two halves of the divided nut are forced apart in their guideways on the chair, and when the cam is turned in the other direction they are drawn together. The diameter of the cam-plate is greater than the width of the chair, so that a segment of cam-plate protrudes laterally beyond the chair, and a handle 12^b, secured to such protruding segment of the cam-plate, has a sufficient range of movement outside the latter for operating the cam-plate as indicated to open and close the nut. The nut, it will be understood, is threaded for engagement with the screw-shaft or spindle 8 of the platen or table 7.

Above the bed 4 there is mounted on the shaft 8 a ratchet-plate 13, which has a hub provided with an annular groove 13^a, said groove being engaged by the two prongs 14 14 of a forked retaining-plate, which are bolted fast to the top of the bed with their facing semicircular recessed edges engaging the annular groove of the hub for retaining the ratchet-plate on the top of the bed rotatable about the axis of the shaft or spindle 8. The shaft has a longitudinal groove with which a spline or feather 14^b of the ratchet-plate engages for adapting the ratchet-plate to rotate the shaft while permitting the latter to slide longitudinally through it. In brackets 15 15, made fast to the under side of the bed 4, there is journaled a shaft 16, having at one end a crank-plate 17, on which there is mounted for radial movement a slide 18, from which projects a crank-pin 18^a, which is by this

means made adjustable in respect to its distance from the center of the shaft for modifying the stroke which it may give to any part which it actuates. The means for adjusting the crank-pin consists of a threaded bolt 19, journaled and longitudinally stopped in the lug 20 of the crank-plate, said threaded bolt taking through a threaded aperture in the slide 18. A dog 21 for engaging the ratchet-plate 13 is pivotally mounted upon the upper side of a slide 22, which extends through a slot 4^a in the bed 4 and is guided therein for longitudinal movement. From the lower side of the slide a pivot-stud 22^a projects outwardly, and a pitman 23 connects the crank-pin 18^a with the stud 22^a, and thereby the dog 21 is reciprocated to give step-by-step movement to the ratchet-disk as the shaft 16 rotates, one-step movement of the dog being produced by each full rotation of the shaft, the length of the step being dependent upon the adjustment of the crank-pin toward and from the center of the shaft.

It will be understood that the mechanism thus far described will feed the screw-shaft 8 and the platen 7, which it carries, up between the guides 5 5 and 6 a uniform distance for each rotation of the shaft 16, and the adjustment of the crank-pin for governing the feed-stroke of the dog may equalize the lift of the platen at each stroke with the thickness of the individual blanks which are carried on the platen and are to be taken therefrom one by one by the feeding devices hereinafter mentioned.

In the vertical transverse plane of the axis of the screw-shaft 8 two posts 42 42 are erected rigidly from the bed 4 at opposite sides and at equal distances from the center. These posts are connected at their upper end by a cross-head 43, upon the upper side of which there is mounted the downwardly-open cylinder 24, having a piston 25, with its stem 26 projecting out at the lower end of the cylinder and through a guide-bearing 27, rigid with the cross-head. The stem of the piston is hollow and opens above the piston into the cavity of the cylinder. At the lower end below the cross-head it has oppositely-projecting horizontal tubular arms 26^a 26^a, on which respectively are sleeved the horizontal members of the T-fittings 26^b 26^b, whose vertical members are connected by pipe-sections 28 28 with suction-mouths 29 29, mounted at the lower ends of said pipe-sections, for the purpose of grasping by suction the blanks upon whose surface they may press for lifting them from the pile. A pipe 31, leading from any source of rarefied air (not shown) for the purpose of producing suction, is mounted on the standard 1 and extends with proper elbows up alongside one of the standards 42 and is connected into the top of the cylinder 24 for producing suction therein above the piston to cause the latter to

be withdrawn into the cylinder. It will be seen that the same connection affords communication with the suction-mouths or suckers 29 29 through the hollow stem 26 of the piston and connections above described. It will be seen, therefore, that the lifting of the sucker-mouths by the piston occurs simultaneously with the production of a partial vacuum in said mouths to cause them to engage the sheet to be lifted, and that the said mouths have a range of operative position for such engagement of the sheets nearly equal to the entire stroke of the piston 25 in the cylinder 24—that is, the mouths will engage a sheet upon their encounter therewith, and their descending movement will be limited by such encounter, and the lifting movement will be equal only to the descending movement actually performed in each case, so that the position of the top of the pile may vary to the amount of the full possible stroke of the piston less the minimum lift necessary for separating the blank from the pile. It will be understood that suitable valve or valves will be provided to control the suction and venting of the mouths. Such valves are shown at 32 on Figs. 1 and 2 and at 54 on Fig. 4; but their specific construction and operation need not be described for the purpose of the present application.

Each of the guide-posts 5 5 and 6 has a chamber opening back from its guide-face in which there is pivotally mounted a dog 60, having a tail 61 below its pivot stopped against the bottom or back of the recess and a nose 62, which protrudes past the guide-face when the dog is thus stopped, a spring 63 being provided lodged in a socket formed in a boss 64, pressing against the dog to hold the nose protruded and the tail stopped, as described. The noses 62 of the three dogs are on the same level and are adapted to afford support at three sides for a blank or pile of blanks which may be lodged above them. When the platen 7, having a full pile of blanks thereon, is advanced upward between the guide-posts, the pile of blanks engaging the under sloping side of the dogs forces them back and holds them back in the recesses in which they are lodged until the bottom blank of the pile passes the upper corner of the dogs, and thereupon the dogs thrust their noses forward under said bottom blank and are in position to support the remainder of the pile, while the platen 7 is allowed to descend to receive another pile. The range of movement of the lifting devices which is afforded by the length of the cylinder 24 is sufficient to bring the presser and suckers down to the top blank without any further lifting of the pile after they are lodged on the noses of the dogs, and during the time occupied in picking up and feeding away the remnant of the pile which is thus left lodged upon the dogs a new pile may be

lodged on the platen ready to be fed up under any that may still remain lodged on the dogs.

Upon the bed 4 there is mounted a fixed table 35, which has its upper surface substantially at the level of the upper surface of the platen or blank-support 7 when the latter is at its lowest position and which extends from the front end of the machine to the forward edge of said platen, making, with said platen, a practically continuous table when the platen is at said lowermost position. Between the bed 4 and the fixed table 35 there is a carrier comprising sprocket-wheels 36 and 37, suitably journaled in brackets 38 and 39, respectively, projecting upward from the bed 4, and an endless chain 40, propelled about said sprocket-wheels. Upon the upper side of the table 35 there is mounted an upright bracket 41, guided longitudinally with respect to the table by means of a vertical flange 41^a, which extends through a slot 35^a in the table, and said bracket is attached to the upper ply of the chain 40 by bolts 41^b, taking into the lower edge of said guide-flange. The bracket 41 has a plain vertical surface facing toward the position occupied by a pile of blanks on the platen 7.

44 is a vertical gage-rod which projects upward from a horizontal arm 45, which is fastened by a bolt 46 to the under side of the table 35, so that by swinging said arm 45 about the bolt the distance of the gage-rod laterally from the longitudinal center line of the table may be modified at will.

The shaft 36^a of the rear sprocket-wheel 36 is provided with a crank-handle 36^b for rotating it to propel the bracket 41 forward and to retract it. The purpose of this provision is that during the time during which the pile of blanks on the platen 7 is being reduced one by one the attendant may have accumulated a new pile on the fixed table with the lateral edge defined by the gage-rod 44 and the rear edge defined by the bracket 41, and when the platen has been fed up to the position at which the dogs 60 engage under the bottom of the remnant of the pile remaining on the platen and the operator opening the divided nut has caused the platen to be released and to drop to its lower position the pile which has been accumulated on the fixed table may be moved forward by the carrier and lodged upon the platen underneath the remnant of the former pile, which is at this stage lodged on the dogs, and the divided nut being then closed up the step-by-step upward-feeding movement of the platen will be resumed, the new pile will be carried up against any remnant remaining of the old pile, and all will be carried up as before, step by step, for engagement and removal, blank by blank, from the top of the pile.

In order that the new pile of blanks may

invariably be only of such height as to enter under the noses 62 of the dogs 60, as described, even though the operator through inattention may have accumulated a higher pile than can thus enter, the posts 5 5 are formed with guard-flanges 5^a 5^a, projecting toward each other from the two opposite posts, said flanges having V-shaped lower edges 5^b, which overhang the path of the pile of blanks as it is carried forward onto the platen, and if the pile is higher than the lower edges of the guard the blanks constituting the excess will encounter said guards and be scraped off the pile, leaving it of the proper height.

It is desirable that the descent of the platen when the threaded stem is released by opening the divided nut should be cushioned or checked somewhat, so as to prevent undue jarring of the entire machine and possible injury to the parts immediately subject to the shock, and for this purpose preferably the lower end of the tubular bore 1^a in the standard 1 is closed by a plate 1^x, having a small air-vent aperture 1^y, which by limiting the escape of the air will cause the descent of the platen to be checked somewhat, notwithstanding the escape which can occur around the stem through the thread and the slight space that may be left even outside the thread; but in order to more effectually check and cushion the descent the end of the threaded stem 8 may be provided with a piston-like head 8^a, fitting somewhat accurately in the bore 1^a and practically limiting the escape of air to the aperture 1^y.

Upon the upper side of the bed 4 there is mounted in a suitable bearing-bracket 72 a rock-shaft 73, having an operating-handle 74 projecting outward from one end and a lever-arm 75 projecting inward from the other end for engaging under the hub or central boss of the platen or blank carrying table 7 in position to be forced up against the latter when the handle-lever 74 is depressed for lifting the table a short distance. This rock-shaft and its lever-arm serves the purpose of lifting the table after it has descended by gravity for receiving a new pile of blanks, first, so that the thread of the threaded spindle or stem 8 may engage properly with the divided nut for permitting the latter to be closed up; and, second, so that the top of the new pile of blanks lodged on the platen may be lifted up against the under side of the remnant of the former pile lying upon the dogs and lift the whole quantity, including the new pile and the remnant of the former pile, up to the most desirable position for encounter of the blank-separating devices with the top blank, so as not to require any greater descending and lifting movement of the piston 25 and the parts carried thereby than necessary during the feeding out of the blanks while they are carried

and advanced upward step by step on the platen. After advancing a new pile onto the platen by rotating the crank-handle 36^b the operator will depress the lever-handle 74 and at the same time operate the devices for closing up the divided nut, so as to engage the nut properly with the threaded stem 8 of the platen when the latter has been lifted to the proper point by means of the lever-arm 75 of the rock-shaft 73.

I claim—

1. In a machine for the purpose indicated, in combination with a fixed table, a vertically-movable platen for supporting a pile of blanks at the end of the fixed table; means for lifting the platen; vertical guides between which it is lifted; dogs on said guides adapted to engage under the edges of the pile of blanks and to yield back to permit the pile to pass them, and means on the fixed table for advancing a pile of blanks on the platen below the level at which the dogs thus engage.

2. In a machine for the purpose indicated, in combination with a vertically-movable platen for carrying a pile of blanks; supports at the sides of the pile and dogs on said supports adapted to engage under the pile at a distance above the lower limit of the movement of the platen; a fixed table adjacent to one edge of the platen at said lower limit, and means mounted on said fixed table for moving the pile from the latter onto the platen when it is at said lower limit.

3. In a machine for the purpose indicated, in combination with a vertically-movable platen for carrying a pile of blanks, means for lifting it to feed the blanks upward; means for engaging under the lower edges of the pile when it is thus lifted; means for permitting the platen to be lowered away from the pile when the latter is thus engaged; a fixed table adjacent to one edge of the platen at the lower limit of the latter, and means on said fixed table for advancing the pile of blanks therefrom onto the platen under the elevated pile.

4. In a machine for the purpose indicated, in combination with a platen for carrying a pile of blanks, means for lifting the platen to elevate the pile; means for engaging the pile underneath its lower edges when thus elevated to uphold it independently of the platen; a fixed table adjacent to one edge of the platen at depressed or lowered position, and means mounted on the table for moving the pile of blanks therefrom onto the platen underneath the elevated pile.

5. In a machine for the purpose indicated, in combination with a platen for carrying a pile of blanks; a screw-shaft or standard for said platen; a divided nut cooperating with the screw-shaft for upward movement of the latter; means for rotating one of said cooperating elements to elevate the shaft and the

platen; means for spreading the divided nut to permit the shaft and platen to descend; guides between which the platen moves vertically; dogs mounted on said guides adapted to engage the pile of blanks under its edges at elevated position; a table adjacent to the platen at lowered position, and means for moving the pile of blanks from the table onto the platen.

6. In a machine for the purpose indicated, in combination with means for supporting and elevating a pile of blanks; means for engaging underneath the edges of the pile when it is elevated for supporting it independently of the elevating means; means for permitting the elevating means to be withdrawn downward, and means for advancing a new pile laterally onto the elevating means under the elevated pile.

7. In a machine for the purpose indicated, in combination with means for supporting and elevating a pile of blanks, means for engaging the pile underneath its lower edges when the bottom thereof is elevated to a determined level, adapted, when thus engaged to support it independently of the elevating means and without further elevation; means adapted to be advanced against the top of the pile for encountering and engaging the top blank having a range of operative position for such action which extends from a limited distance above said determined level down to the same; means for permitting the support to descend after such engagement of the pile, and means for advancing a new pile laterally onto the lowered support.

8. In a machine for the purpose indicated, in combination with a platen for supporting and elevating a pile of blanks, means for lifting the platen to elevate the pile; vertical guides on three sides of the path of ascent of the platen for guiding and restraining the pile in three directions; dogs mounted on said vertical guides adapted to protrude into the path of the pile for engaging underneath the three bottom edges of the same; means for permitting the platen to descend after the pile is lodged on said dogs; a fixed table adjacent to the fourth side of the platen at the lowered position of the latter; means on said table for moving the pile therefrom across said fourth side of the platen onto the latter, and guards overhanging the path of the pile in such movement located as low as the bottom of the pile supported by said dogs for removing from the laterally-advancing pile any blanks above that level while it is being advanced onto the platen.

9. In a machine for the purpose indicated, in combination with a platen for supporting and elevating a pile of blanks, and means for lifting it to elevate such pile; vertical guides between which the platen moves adjustable toward and from the same to restrain the

pile within the limits of the dimensions of the blanks; dogs mounted on said guides adapted to engage underneath the pile of blanks when lifted to certain elevated position; a fixed table adjacent to one side of the platen at lowered position of the latter; a vertically-extended follower mounted and provided with a longitudinal guideway on said fixed table; a propelling-chain and sprocket-wheels about which the same is carried attached to said follower; means for rotating one of the sprocket-wheels to propel the chain and follower for advancing a pile of blanks from said fixed table onto the platen.

10. In a machine for the purpose indicated, in combination with a support for blanks having a threaded stem, a standard into which said stem telescopes; a divided nut for engaging the stem; means for rotating one of said two parts to raise the support, and means for operating the nut to release the stem, the cavity of the standard in which the stem telescopes being closed at the bottom for imprisoning the air therein under the stem to cushion the stem in its descent.

11. In a machine for the purpose indicated, in combination with a support for blanks comprising a stem and disengageable means for engaging the stem to raise the support and means for disengaging the stem to permit the stem and support to descend, the standard having a vertical bore in which the stem telescopes, said bore being substantially closed

at the end to imprison the air to cushion the descending stem.

12. In a machine for the purpose indicated, in combination with a support for blanks, a standard in which it is mounted and disengageable means for feeding the support upward; means for effecting such disengagement to permit the support to descend; a rock-shaft mounted on the standard having a lever-arm protruding under the support, and means for rocking the shaft to cause said lever-arm to lift the support when disengaged from the upward-feeding means.

13. In a machine for the purpose indicated, in combination with a support for blanks having a threaded stem, a standard in which the stem is mounted; a divided nut for engaging the threaded stem; means for rotating one of the engaging elements to raise the support; means for opening and closing the nut, and means mounted on the standard for operating on the support to lift it a short distance from its lowermost position, the means for closing the divided nut being adapted to be operated while the support is thus lifted.

In testimony whereof I have hereunto set my hand, at Chicago, Illinois, this 20th day of May, A. D. 1905.

EMIL TYDEN.

In presence of—

CHAS. S. BURTON,
J. S. ABBOTT.