No. 835,525. PATENTED NOV. 13, 1906.

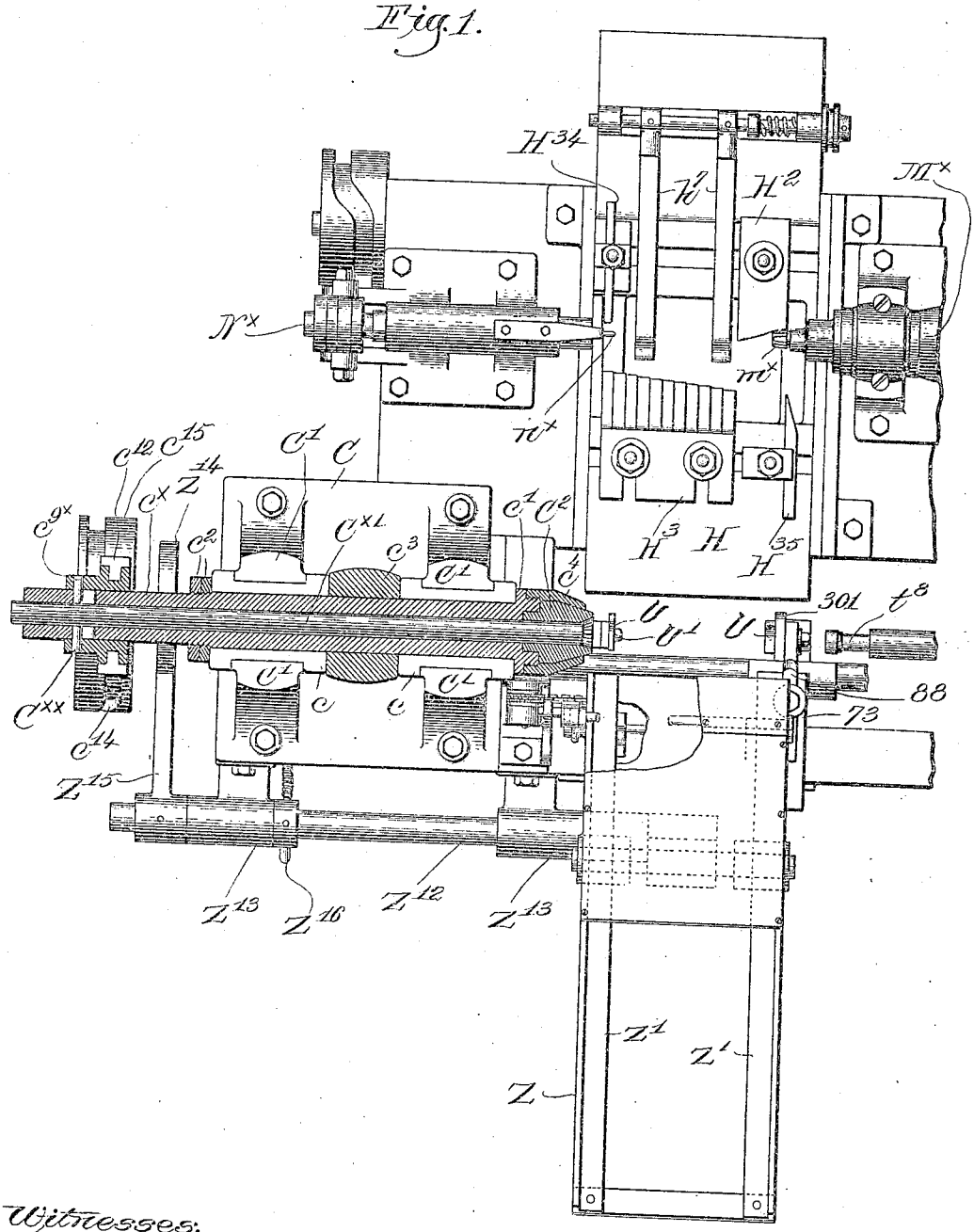
C. HIRD.

APPARATUS FOR MAKING TURNED ARTICLES.

APPLICATION FILED JUNE 28, 1905.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses:
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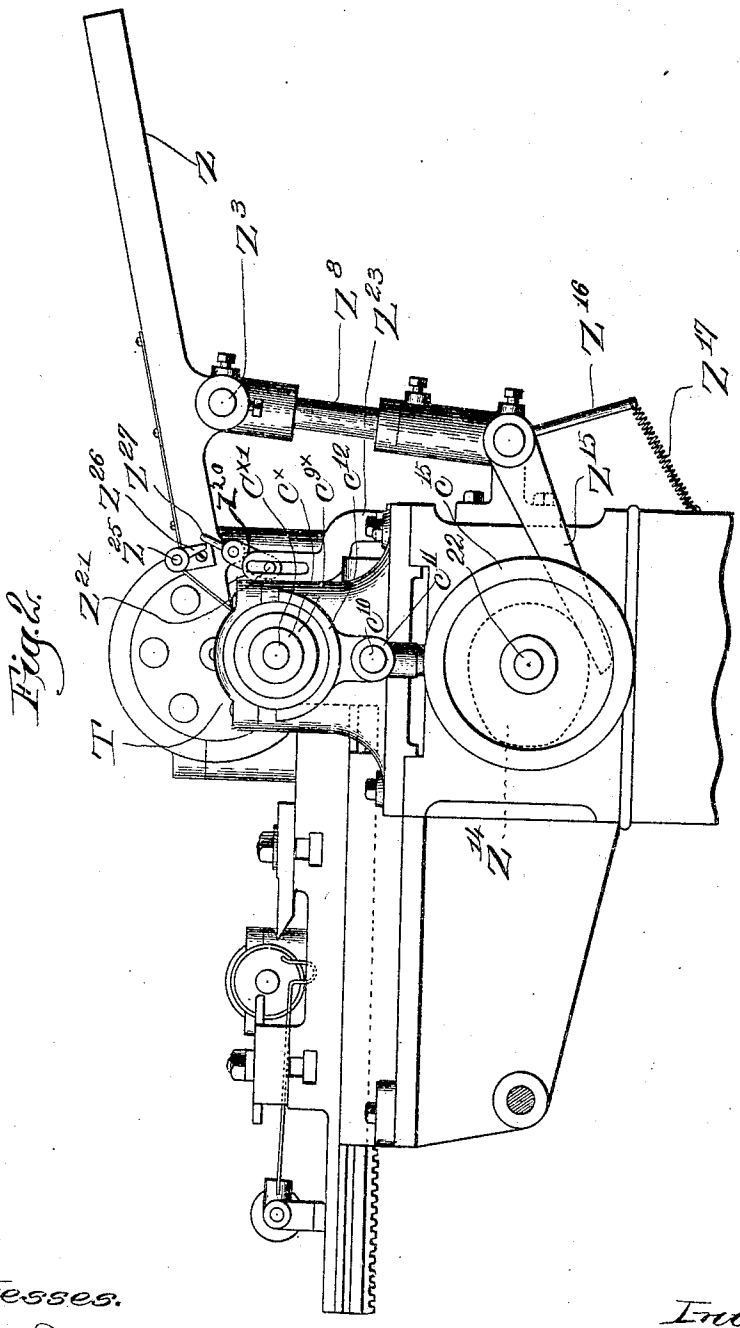
3 SHEETS—SHEET 2.

Fig. 2.



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3 SHEETS—SHEET 3.

Fig. 3.

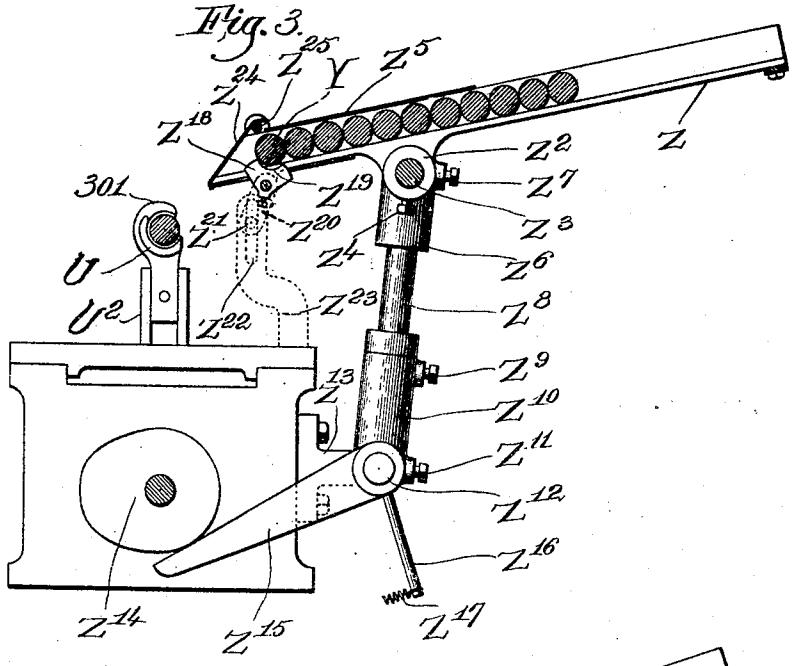
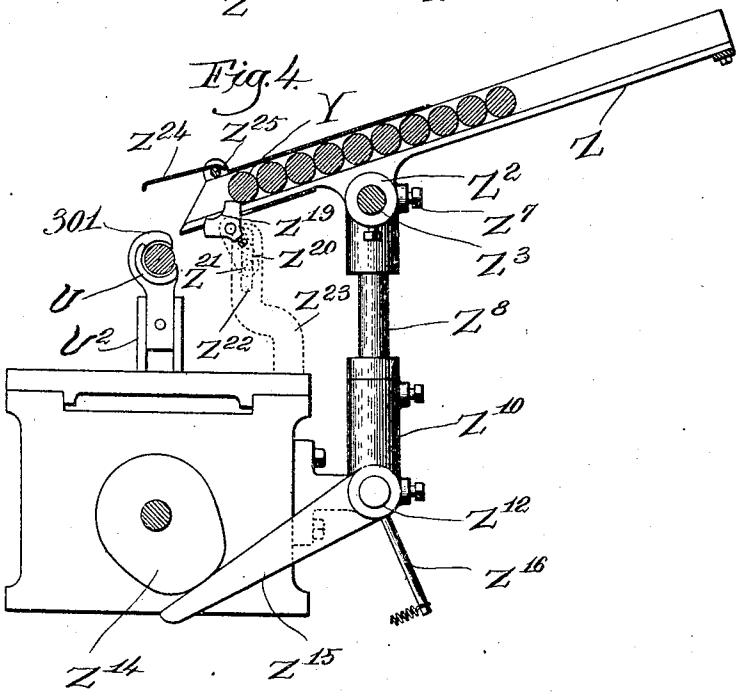


Fig. 4.



Witnesses.

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UNITED STATES PATENT OFFICE.

CHARLES HIRD, OF WOONSOCKET, RHODE ISLAND, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, OF ONE-FOURTH TO COLIN C. BELL, OF BROOKLINE, MASSACHUSETTS, AND ONE-HALF TO GEORGE F. WILLETT, OF NORWOOD, MASSACHUSETTS.

APPARATUS FOR MAKING TURNED ARTICLES.

No. 835,525. Specification of Letters Patent. Patented Nov. 13, 1906.

Application filed June 28, 1905. Serial No. 267,332.

To all whom it may concern:

Be it known that I, CHARLES HIRD, a subject of the King of Great Britain, residing at Woonsocket, county of Providence, and State of Rhode Island, have invented an Improvement in Apparatus for Making Turned Articles, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to an apparatus particularly designed for making bobbins on which yarn is spun to be subsequently used in the shuttle of a loom. Such bobbins are made of wood and comprise an elongated barrel, an enlarged chambered head, and a longitudinal bore of varying diameter.

The invention is particularly an improvement upon a prior apparatus invented by Ira F. Peck and Charles Hird jointly, which prior apparatus is shown and described in detail in United States Patent No. 794,543, dated July 11, 1905. In this prior apparatus the stock from which the bobbins were turned was fed to the machine in the shape of long cylindrical rods. These rods were fed into line with the axis of the lathe-stock and were then fed longitudinally through the axis of the lathe-stock into turning position.

In the present invention the stock is fed to the machine in the form of cylindrical blanks each of a size adapted for a single bobbin. These blanks are fed from a holder directly into turning position between the lathe-centers, and mechanism is provided for positioning them in the lathe-chuck and for maintaining them in position until the desired operations are performed.

The invention also comprises an ejector mechanism for ejecting the turned article from the lathe or turning apparatus.

While the apparatus is illustrated as especially designed for the making of bobbins, it is equally well adapted for the making of any other turned or bored article, the shape, number, and arrangement of the cutting and boring tools being a matter capable of wide variation.

The features of the invention will be more particularly set out in the accompanying specification and definitely set forth in the appended claims.

The drawings represent so much of the entire apparatus as is necessary for an understanding of the present invention. For further details of the entire apparatus and for description and illustration of the entire apparatus save in regard to the present improvements reference may be had to the before-mentioned Patent No. 794,543.

Figure 1 is a top plan view of the main portions of the apparatus, showing the mechanism for feeding the blanks to the first turning mechanism, showing also the ejector mechanism partially in horizontal cross-section, and showing also the finishing turning mechanism. Fig. 2 is a side elevation of the parts shown in Fig. 1. Fig. 3 is a view, partly in cross-section and partly in side elevation, showing the blank-supply holder and the mechanism for operating it, the parts being shown in normal position. Fig. 4 is a view similar to Fig. 3, showing the parts in the position just after a blank has been discharged from the supply-holder.

The entire apparatus comprises, as in the apparatus described and illustrated in the said Patent No. 794,543, a preliminary roughing-out mechanism, shown as lathe-stocks in which the blank is held and rotated, and associated cutting and boring tools for shaping both the exterior and the interior of the blank in a preliminary manner, mechanism for supplying the blanks to this turning mechanism, mechanism for releasing the preliminarily-turned work from the turning mechanism, a second or finishing turning mechanism, mechanism for transferring the preliminarily-turned work to this second or finishing turning mechanism, and mechanism for discharging the completed work from the machine.

Since the present invention relates only to the mechanism for giving the preliminary turning to the blank, the mechanism for supplying the blanks thereto, and the mechanism for releasing or ejecting the blanks therefrom, the remaining portions of the machine need not be here described in detail.

The bed-plate C is provided with bearings C′, carrying bushings *c*. In these bushings is journaled a tubular shaft $c^{\times}$, and longitudinal movement of this shaft is prevented by a flange *c′*, formed at its forward end and

abutting against the forward bushing c, and by check-nuts c^2, abutting against the rear bushing c. The shaft is continuously driven by means of a pulley c^3, connected thereto and situated between the bushings. The forward end of the tubular shaft $c^\times$ carries a conical cap c^4, screw-threaded onto the shaft and serving to lock and hold in engagement with the shaft a chuck C^2. The chuck must be constructed to receive and grip the end of the blank to be turned and for this purpose is shown as provided with a conical or bell-shaped mouth roughened or corrugated by longitudinal ridges.

The shaft $c^\times$ is made tubular to provide for the ejection of the blank after completion of the turning operation. The ejector mechanism comprises a rod $C^{\times\prime}$, mounted to slide longitudinally in the shaft $c^\times$ and provided with a pin $C^{\times\times}$, projecting through a slot in the tube and attached to a collar $c^{9\times}$. The collar is reciprocated on the shaft $c^\times$, carrying with it the rod $C^{\times\prime}$, by the following mechanism: A horizontal stud c^{10}, projecting outward from one of the bearings C', slidably supports a sleeve c^{11}, having an upturned yoke c^{12}, which engages the collar $c^{9\times}$, a roller or other stud depending from the sleeve entering a cam-groove c^{14} on the periphery of a disk c^{15}, fast on a shaft 22, supported in bearings in the frame of the apparatus and driven in a suitable manner. This mechanism is so timed that upon the completion of the turning of the blank the cam-groove c^{14} will act through the mechanism described to reciprocate the rod $C^{\times\prime}$ and shove out or eject the turned blank from the chuck C^2.

The blanks which are supplied to the machine in cylindrical form of a length and size to correspond with the article to be made are placed in a blank-supply holder Z of flat box-like form. As shown, it is constructed of an open framework comprising two L-shaped side pieces Z', each being provided with a depending socketed lug Z^3, mounted upon a rod Z^3 and held in position thereon by a set-screw Z^4. The forward end of the holder is preferably covered, as indicated at Z^5. In normal position the holder should be inclined slightly toward its forward end, so that the blanks will roll by gravity toward the forward end, and this inclination can be varied by means of the set-screws Z^4.

The shaft Z^3, carrying the blank-supply holder, has formed thereon a sleeve Z^6, which sleeve in turn is adjustably mounted by means of the set-screw Z^7 on a rod Z^8, and the rod Z^8 in turn is adjustably mounted by means of a set-screw Z^9 in a sleeve Z^{10}, which sleeve Z^{10} is adjustably mounted by means of a set-screw Z^{11} on a shaft Z^{12}, and the shaft Z^{12} is supported in bearings Z^{13} from the frame of the apparatus. It will thus be seen that the blank-supply holder can be adjusted at any angle or at any height desired.

In feeding the blanks to the turning apparatus the blank-supply holder is swung or tipped about the shaft Z^{12} to bring its forward end substantially over the turning axis, so that when the blank is discharged from the holder it will drop directly into position and upon rests to be hereinafter described. This swinging or tipping movement is given by means of a cam Z^{14}, mounted upon the shaft 22 and coöperating with an arm Z^{15}, rigidly connected with the shaft Z^{12}. An arm Z^{16}, projecting from the shaft Z^{12}, is connected, by means of a spring Z^{17}, with the framework of the apparatus and serves to hold the arm Z^{15} in contact with the cam Z^{14}.

The blank is retained in position in the supply-holder and released therefrom by positively-operated means. A retaining and let-off device Z^{18} is pivoted at the forward end of the supply-holder and projects up through the bottom thereof and is provided on its upper surface with an arc-shaped groove Z^{19}, adapted to receive the blank. It projects sufficiently through the bottom of the supply-holder to prevent the passage of a blank between it and the cover Z^5 save as the blank is carried by while held in the groove Z^{19}. The retaining and let-off device Z^{18} carries a depending arm Z^{20}, and a pin Z^{21} on the lower end of this arm is arranged to slide in a vertical slot Z^{22} in a rigid arm Z^{23}, projecting from the framework of the apparatus. The slot and pin are so arranged that when the blank-supply holder is in its normal position (shown in Fig. 3) the retaining and let-off device will be in a position to allow a blank, as Y, to roll into the arc-shaped groove Z^{19}, but not beyond the let-off device. When the blank-supply holder is tipped into discharging position, the pin Z^{21}, moving in the slot Z^{22}, swings the retaining and let-off device into the position shown in Fig. 4, allowing the blank Y to roll out from the arc-shaped groove and at the same time preventing the remaining blanks from rolling down.

The supply-holder is also provided at its forward end with a cover or gate Z^{24}, which prevents chips or shavings from being thrown into the supply-holder and clogging the same or interfering with the feed of the blanks. This gate is pivoted at its upper end on a small rock-shaft Z^{25}, and a depending finger Z^{26} engages an upwardly-projecting finger Z^{27} on the arm Z^{20}, so that the rocking movement of the arm Z^{20} serves at the same time with the rocking of the retaining and let-off device to open or shut the gate Z^{24}.

Work-rests U U are mounted on the bed-plate or table of the apparatus in position to receive and give preliminary support to the blank in its turning position. These work-rests are vertically adjustable by means of the set-screw U' in ways U^2 and are curved

of proper size to receive and support the blanks. These rests are located in vertical alinement with the lathe-centers and are adjusted to bring the center of the blank substantially in line with the lathe-centers.

The work-rest U which is farther from the holding-chuck C^2 may be fixed in position on the bed-plate, but is preferably formed on the socketed head 301, the construction and operation of which is fully described in the aforesaid Patent No. 794,543, and which, it will be seen therefrom, is moved by a spring toward the chuck C^2 and positively moved away from the chuck at the desired time, the socketed head 301 supporting one end of the blank held at its other end in the chuck C^2, but being open to receive the various boring and drilling tools in the turret-head of the lathe. When the work-rest U is attached to the socketed head 301, it must be made of sufficient width to allow of this movement without letting the blank fall. The turret-head or carrier of the lathe is not shown herein in detail. It appears at T on Fig. 2, and one of the carriers carrying the pushers t^8 is shown on Fig. 1. The only difference in the operation of this portion of the apparatus is in the movement given to the pusher t^8, which is more extended in the present case in order to hammer or drive the blank into the grip of the chuck C^2 after the blank has been placed in position on the work-rests U.

The roughing-tool 88, mounted in its tool-holder 73, is of the same construction and is guided and operated in the same way as in the said Patent No. 794,543, and serves to rough out the exterior surface of the blank.

The finishing turning mechanism shown in Figs. 1 and 2 is also similar in construction to that of the said Patent No. 794,543, the spindles $N^\times$ $M^\times$ carrying suitable centers $m^\times$ and $n^\times$ to receive and hold the partly-turned blank. In this finishing apparatus the finishing and cutting-off tools H^3, H^2, H^{34}, and H^{35} are mounted in the sliding plate or carrier H and serve when driven against the blank to turn the exterior surface to the finishing-point and cut off the ends of the blank.

Transferring mechanism is also to be provided, as illustrated and described in the said Patent No. 794,543, for transferring the blank from its position in the roughing-out or preliminary turning apparatus to the finishing apparatus, and then the ejecting mechanism, provided with the arms h^7, serves as in the said patent to eject the bobbin from the machine.

The operation of the apparatus, particularly with respect to the improvements made the subject of this invention, is as follows: The blanks are placed in the supply-holder Z by hand or any other suitable manner in such a way as to lie horizontally therein and roll toward the forward end. On the operation of the machine the blank-supply holder is rocked forward by the cam Z^{14} until the forward end reaches a position just above the work-rests U, as shown in Fig. 4. During this movement the gate Z^{24} is opened and the retaining and let-off device Z^{19} is rocked to release a blank Y and allow it to roll directly onto the rests U. When the blank reaches the rests U, it is in line with the lathe-centers. The socketed head 301, which in the meantime has been retracted, is now pressed forward by its spring to force the blank into the conical roughened end of the chuck C^2, and the blank is thus held between the chuck and the socketed head 301. Immediately the pusher t^8, which has revolved into alinement with the axis of the lathe, is now driven forward to jam the blank firmly into the grip of the clutch C^2. Thereafter the roughing-out tool 88 comes into operation and the various drilling or boring tools held in the carrier T revolve into position and are set in operation, the chuck being rotated continuously in the usual manner. When the blank has been roughed out, the socketed head 301 is retracted, and the cam c^{14} acts to move the rod $C^{\times\prime}$, which ejects the blank from the chuck, leaving it in the fingers of the transferring mechanism. The transferring mechanism then takes up the blank and carries it to the finishing mechanism, when it is caught between the centers $m^\times$ $n^\times$ and the finishing operation is performed and the blank ejected from the machine. As the blank is removed from the work-rests U U to the finishing mechanism another blank is fed into place on the work-rests U U, and the work progresses as already described, two articles being thus in course of formation in the machine at the same time.

Various changes or modifications may be made in the details and arrangement of the apparatus herein shown and described without departing from the spirit and scope of the invention.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an apparatus of the class described, a blank-supply holder, means for retaining blanks therein, a head-stock carrying a chuck, work-rests to receive the blank and aline it with the chuck, means for tipping the holder and releasing a blank to drop it upon the said rests.

2. A blank-supply holder, a retaining and let-off device pivoted to the holder near its discharge end, means for tipping the holder to bring its discharge end into delivery position, a cover-gate for the discharge end of the holder, means operable upon the tipping of the holder to open the gate and to remove the retaining and let-off device to allow a blank to drop from the holder.

3. In an apparatus of the class described, work-rests for receiving and alining the

blanks, a blank-supply holder, a retaining and let-off device pivoted to the holder near its discharge end, means for tipping the holder to bring its discharge end over the work-rests, means operable upon the tipping of the holder to move the retaining and let-off device to allow a blank to drop from the holder onto the work-rests.

4. In an apparatus of the class described, work-rests for receiving and alining the blanks, a blank-supply holder, a retaining and let-off device pivoted to the holder near its discharge end, means for tipping the holder to bring its discharge end over the work-rests, a cover-gate pivoted at the discharge end of the holder, means operable upon the tipping of the holder to swing the gate open and move the retaining and let-off device to allow a blank to drop from the holder onto the work-rests.

5. In an apparatus of the class described, a blank-supply holder, a rock-shaft supporting said holder and carrying a projecting arm, a cam coöperating with said arm to rock the shaft and tip the holder to bring its discharge end into delivery position, a retaining and let-off device at the discharge end of the holder, means operable upon the tipping of the holder to move the retaining and let-off device to allow a blank to drop from the holder.

6. In an apparatus of the class described, a supporting-table, work-rests mounted on said table, a blank-supply holder, means for tipping the holder to bring its discharge end into position above said rests, a retaining and let-off device pivoted to the holder near its discharge end, an arm projecting from the table and engaging the retaining and let-off device, whereby upon the tipping of the holder the said device is moved to allow a blank to drop from the holder onto the rests.

7. In an apparatus of the class described, a supporting-table, work-rests mounted on said table, a blank-supply holder, means for tipping the holder to bring its discharge end into position above said rests, a retaining and let-off device pivoted to the holder near its discharge end, an arm projecting from said retaining and let-off device, an arm projecting from the table, a pin-and-slot connection between said arms, whereby upon the tipping of the holder the retaining and let-off device is moved to allow a blank to drop from the holder onto the rests.

8. In an apparatus of the class described, a supporting-table, work-rests mounted on said table, a blank-supply holder, means for tipping the holder to bring its discharge end into position above said rests, a retaining and let-off device pivoted to the holder near its discharge end, a cover-gate pivoted at the discharge end of the holder, a connection between said gate and said retaining and let-off device whereby the gate is open and shut by the movement of the said device, an arm projecting from said retaining and let-off device, an arm projecting from the table, a pin-and-slot connection between said arms, whereby upon the tipping of the holder the retaining and let-off device is moved to allow a blank to drop from the holder onto the rests.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES HIRD.

Witnesses:

WALTER R. RAY,

BESSIE G. RICH.