Aug. 18, 1953 L. HAJEK 2,648,936

BLANK GRINDING MACHINE

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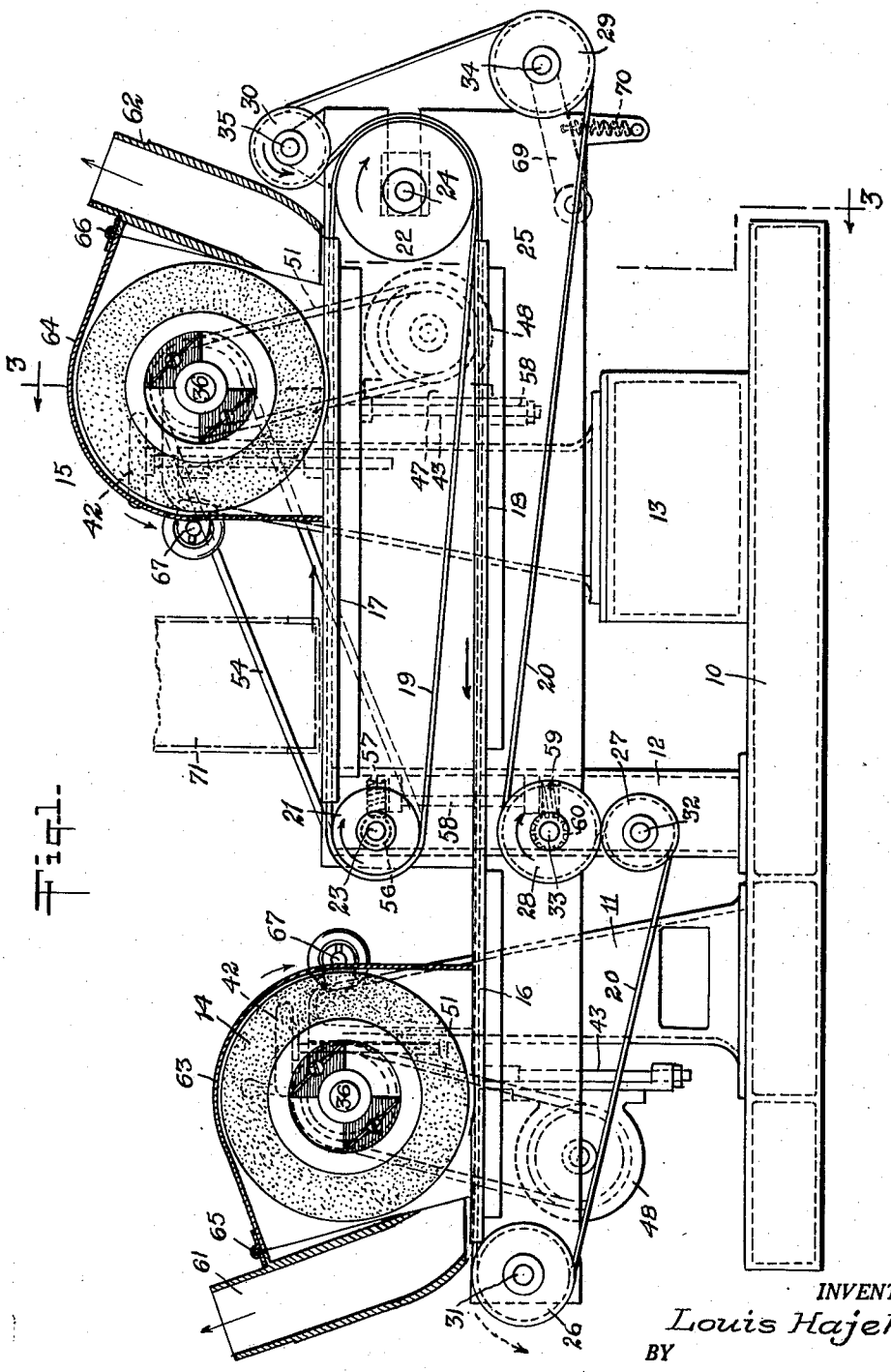


Fig. 1.

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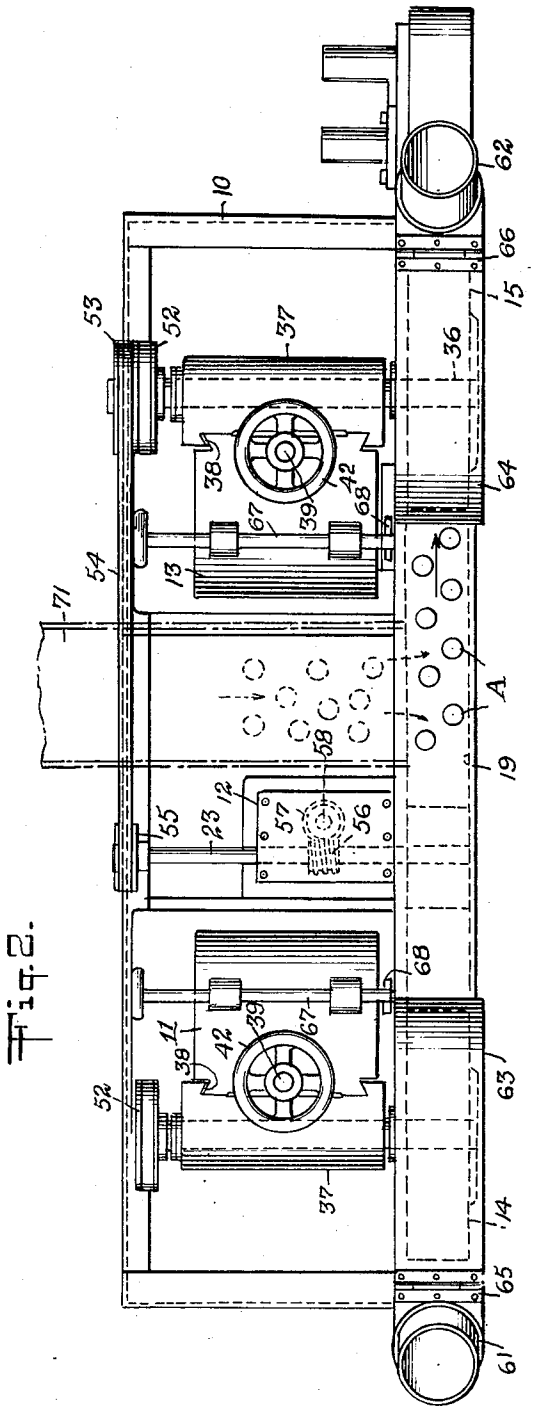


Fig. 2.

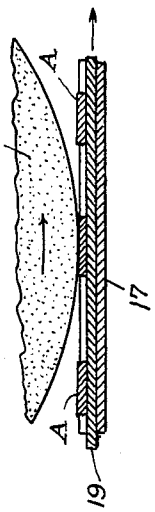


Fig. 4.

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Fig. 3.

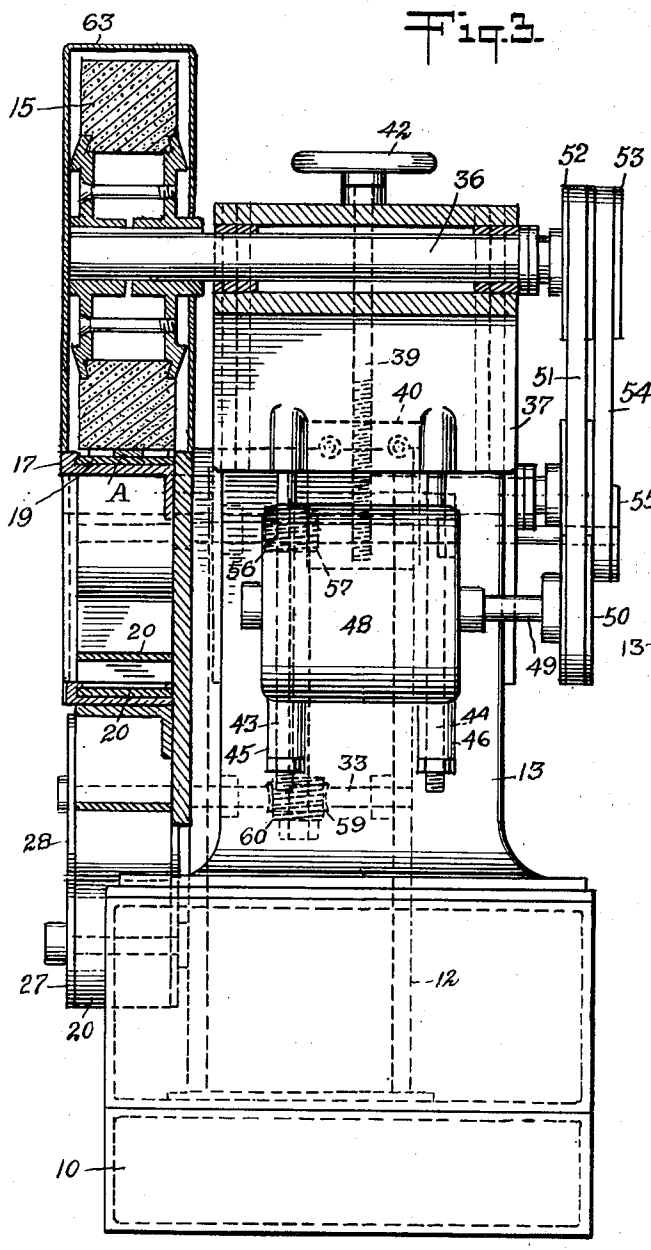
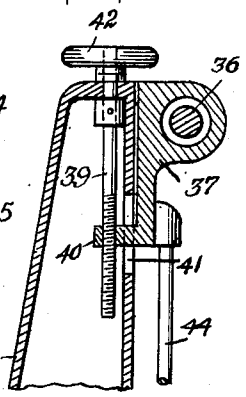


Fig. 5.



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BLANK GRINDING MACHINE

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Application April 27, 1950, Serial No. 158,409

4 Claims. (Cl. 51—80)

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This invention relates to new and useful improvements in grinding machines and has particular reference to machines for grinding blanks such as button blanks.

A main object of the invention is to provide a simple, efficient machine so that blanks of indefinite thickness may be rapidly and accurately ground on both sides to a desired thickness in one passage through the machine and are then ready for finishing processes.

A further object is to provide a simple and efficient machine in which one operator may handle large quantities of blanks and can easily and readily adjust the various elements to produce the exact thickness of blank desired and with a minimum of time and effort.

A still further object is to provide a simple and efficient machine in which a constant stream of blanks are fed to be ground on one side and then automatically turned over and passed through a grinding operation on the opposite side and all the operator has to do is to feed the blanks to a belt at an initial position after which the treatments are taken care of automatically and in a continuous manner until the blanks drop into a receiving hopper.

Further and more specific objects, features and advantages will more clearly appear from a consideration of the detailed specification hereinafter set forth, especially when taken in connection with the accompanying drawings which illustrate a present preferred form which the invention may assume and which form part of the specification.

In brief and general terms, the machine comprises a base frame supporting a plurality of platforms across which pass and on which are supported conveyor belts to receive suitable blanks to be ground. Grinding wheels are mounted adjustably with respect to these belts and may be accurately adjusted to grind the surfaces of the blank to just the right amount so as to produce blanks of exactly the desired thickness. The blanks are passed to one grinding wheel on a belt to have one surface ground and then are gripped between two belts and are gripped long enough for the belts to reverse their position presenting the other surface for grinding by another wheel through which the second belt then passes them. After the second grinding, the blanks drop off the second belt into a receiving hopper.

The grinding wheels are mounted on slidable ways which can be adjustable readily to get the exact grinding position. The motors for turning the grinding wheels are adjustable with the

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wheels so that the drive belt connections do not have to be constantly adjusted every time a wheel position is changed.

The present preferred form which the invention may assume is illustrated in the drawings, of which,

Fig. 1 is a side elevation of the machine with certain casings broken away;

Fig. 2 is a plan view of the machine;

Fig. 3 is a vertical cross section taken on the line 3—3 of Fig. 1;

Fig. 4 is an enlarged partial section showing a grinding wheel, a conveyor belt, and blanks to be ground disposed thereon; and,

Fig. 5 is detail showing the manner in which a grinding wheel support may be finely adjusted to get exactly the desired position thereof for grinding a blank surface.

Referring now merely to the specific form of the invention which is shown in the drawings, it will be noted that there is a base 10, from which pedestal members 11, 12, and 13 extend upwardly. From these pedestals there are supported in any suitable manner adjustable grinding wheels 14 and 15 and belt conveyor-supporting platforms 16, 17, and 18. There are two endless conveyor belts 19 and 20. Belt 19 extends between and passes around pulleys 21 and 22 mounted on shafts 23 and 24 which are supported on a frame member 25 which is supported from the pedestal member 12 in any suitable manner not shown in detail. The endless belt 20 passes over pulleys 26, 27, 28, 29, and 30 which are mounted respectively on shafts 31, 32, 33, 34, and 35 suitably associated also with the frame 25. All these pulleys above mentioned are disposed in one plane. In passing around from pulley 30 back to pulley 26, the endless belt 20 will be seen as passing around the pulley 22 carrying the other belt 19 and for a substantial arcuate distance the two belts are in contact to hold therebetween blanks A as will be later set forth.

The upper run or reach of the belt 19 passes along and rests upon the platform 17 and passes under the grinder wheel 15. The upper run or reach of the other belt 20 passes along and rests upon the surface of the platforms 16 and 18, and while on the platform 16 passes under the grinder wheel 14. The shaft 36 of the grinder wheel 15 is rotatably supported in a casing 37 which is vertically adjustable with respect to the upper end of the pedestal 13 by means of tongue and groove abutting faces as indicated generally by the number 38 in Fig. 2. A threaded stem 39 (Fig. 5) is rotatably mounted on top of pedestal

13 and its threads engage an ear 40 on the casing 37 which extends through a slot 41. This stem can be rotated by means of a hand knob 42 on the top thereof. Spaced rods 43 and 44 dependent from the casing 37 slidably support sleeves 45 and 46 on the frame 47 of the motor 48 the shaft 49 of which has a pulley 50 and a belt 51 extending over the same to a pulley 52 on the end of shaft 36 of the grinder wheel 15. On this same shaft 36 is another pulley 53 over which passes a drive belt 54 extending to and around a pulley 55 on the end of shaft 23 of the belt pulley 21 above mentioned. On this shaft 23 is a worm 56 meshing with a worm gear 57 on a vertical shaft 58 at the lower end of which is a worm 59 meshing with a worm gear 60 on the shaft 33 of the pulley 26 shown in Fig. 1. This mechanism affords means whereby the motor 48 drives the grinder wheel 15 and also the two belts 19 and 20.

Suction chutes 61 and 62 are disposed adjacent the wheels 14 and 15 to draw off the fine material ground off the surface of the blanks. The wheels are partly enclosed by cover plates 63 and 64 pivoted at 65 and 66, any suitable latching means, as shown at 67—68 being provided to hold the cover plates closed when desired. The pulley 29 is disposed on the end of an arm 69 pivoted to the frame and engaged by a spring 70 to exert pull on the arm and keep the belt 20, passing around the pulley 29, under constant tension.

The grinder wheel 14 shown at the left in Fig. 1 is mounted in the same manner as the grinder wheel 15 above mentioned and is related to and moved with its drive motor in the same manner. This mutual adjusting movement of each grinder with its motor permits the connecting belts between them to be maintained in constant tension without having to readjust them every time the wheels are adjusted for different amounts of grind. A hopper 71, which has a descending conveyor chute (not shown) or some other suitable means for dispensing the blanks, is filled with the blanks A and they spill out on to the top of the conveyor belt 19 passing along the platform 17 and can be spread out on said belt by the hands of an operator seated at this point. This operator's position is also convenient for adjustment of the wheels to adjust the depth of grind.

Referring now in brief and general terms to the operation of this machine, it will be seen that it is simple, compact and capable of easily and rapidly handling a continuous stream of blanks passing from the hopper 71 on to the belt and being spread out thereon by the operator. The belt 19 passes to the right along the platform 17 and moves the blanks A under the grinder wheel 15 which has already been adjusted at the proper level to produce the determined cut. The fine dust ground off is immediately sucked away by the suction chute or tube 62. This first grinding operation then grinds the upper surface of the blanks which pass beyond the wheel on the belt 19 and just beyond the suction chute 62 the belt 19 with the blanks thereon meets the other conveyor belt 20 which closely abuts it as they both pass in this abutting relation around the pulley 22 and thereby hold the blanks firmly between them until the belt 20 starts on its horizontal run along the platform 18 at which point the belt 19 leaves its abutting relation with the belt 20 and the blanks A now disposed with the unground face upward are carried forward by the belt 20 across the platform 16 to and beneath the grinder wheel 14, which has already been adjusted to its grinding level. Then the last surface of the blank is ground and the dust carried off immediately by the closely adjacent suction chute 61. Beyond this point the completely ground blanks drop off the belt 20 into any suitable receptacle (not shown). It will thus be clearly apparent that blanks may be fed on to a belt system and passed through the machine to receive two grinding operations so that opposite faces of the blanks are ground off to produce exactly the thickness of blank desired and that this complete grinding operation is performed in one machine which can be efficiently handled and adjusted by one operator whose main function after the machine is started is to keep the blanks fed on to the belt system and properly spread out thereon. In previous grinding devices there has been the need to run the blanks through two machines to grind both opposite surfaces or to run through the same machine twice and to turn the blanks between these two separate operations. This has involved more time, and labor costs and required more machinery. This novel machine avoids all these complications in the simple and efficient manner shown. The blanks are fed by the belt system and ground on one surface, turned over, and then fed to another grinder to grind the opposite surface, all in one continuous rapid and effective manner. Nothing has to be done to the blanks except to subject them to necessary finishing operations which, in any case, would have to be done in other types of machines.

While the invention has been described in detail and shown with respect to the accompanying drawing, it is not to be limited to such details, since many changes and modifications may be made in the invention without departing from the spirit and scope thereof. Hence, it is desired to cover any and all forms and modifications of the invention which may come within the language and scope of any one or more of the appended claims.

I claim:

1. A grinding machine comprising a frame, a pair of primary pulleys, one being a supporting pulley and the other being a blank reversing pulley, mounted on said frame, a primary belt-like endless conveyor carried by and passing about said primary pulleys and having its upper and lower reaches extending longitudinally of said frame, said upper reach being adapted to receive thereon blanks to be moved forwardly by said conveyor toward said reversing pulley, a group of secondary pulleys, one being a delivery pulley, supported by said frame, a secondary belt-like endless conveyor carried by and passing about said secondary pulley and having its upper reach, in part, disposed beneath the lower reach of said primary conveyor, said secondary pulleys being so disposed with relation to said primary pulleys that said secondary conveyor passes over said reversing pulley and there engages said primary conveyor throughout an extent thereof equal to a substantial arcuate length of said reversing pulley, whereby said blanks are carried over said reversing pulley and delivered in an inverted position onto the upper reach of said secondary conveyor to be moved rearwardly thereby beyond said primary conveyor and toward said delivery pulley, a primary grinding wheel mounted above the upper reach of said primary conveyor and there adapted to engage and exert on said blanks a grinding action as

they move toward said reversing pulley, a secondary grinding wheel mounted above the upper reach of said secondary conveyor and there adapted to engage and exert on said blanks a grinding action as they move toward said delivery pulley, and power means operatively connected to said conveyors for so moving them that the respective upper reaches travel in opposite directions.

2. A grinding machine comprising a frame, a pair of primary pulleys, one being a supporting pulley and the other being a blank reversing pulley, mounted on said frame, a primary belt-like endless conveyor carried by and passing about said pulleys and having its upper and lower reaches extending longitudinally of said frame, said upper reach being adapted to receive thereon blanks to be moved forwardly by said conveyor towards said reversing pulley, a group of secondary pulleys, one being a delivery pulley, supported by said frame, a secondary belt-like endless conveyor carried by and passing about said secondary pulleys and having its upper reach, in part, disposed beneath the lower reach of said primary conveyor, said secondary pulleys being so disposed with relation to said primary pulleys that said secondary conveyor passes over said reversing pulley and there engages said primary conveyor throughout an extent thereof equal to a substantial arcuate length of said reversing pulley, whereby said blanks are carried over said reversing pulley and delivered in an inverted position onto the upper reach of said secondary conveyor to be moved rearwardly thereby beyond said primary conveyor and toward said delivery pulley, a primary grinding wheel mounted above the upper reach of said primary conveyor and there adapted to engage and exert on said blanks a grinding action as they move toward said reversing pulley, a secondary grinding wheel mounted above the upper reach of said secondary conveyor and there adapted to engage and exert on said blanks a grinding action as they move toward said delivery pulley, a rigid support disposed beneath the upper reach of said primary conveyor for there supporting that reach against downward deflection with relation to said primary grinding wheel, a rigid support disposed beneath the upper reach of said secondary conveyor for there supporting that reach against downward deflection with relation to said secondary grinding wheel, and power means operatively connected to said conveyors for so moving them that their respective upper reaches travel in opposite directions.

3. A grinding machine comprising a frame, a pair of primary pulleys, one being a supporting pulley and the other being a blank reversing pulley, mounted on said frame, a primary belt-like endless conveyor carried by and passing about said primary pulleys and having its upper and lower reaches extending longitudinally of said frame, said upper reach being adapted to receive thereon blanks to be moved forwardly by said conveyor toward said reversing pulley, a group of secondary pulleys, one being a delivery pulley, supported by said frame, a secondary belt-like endless conveyor carried by and passing about said secondary pulleys and having its upper reach, in part, disposed beneath the lower reach of said primary conveyor, said secondary pulleys being so disposed with relation to said primary pulleys that said secondary conveyor passes over said reversing pulley and there engages said primary conveyor throughout an extent thereof

equal to a substantial arcuate length of said reversing pulley, whereby said blanks are carried over said reversing pulley and delivered in an inverted position onto the upper reach of said secondary conveyor to be moved rearwardly thereby beyond said primary conveyor and toward said delivery pulley, vertically adjustable primary supporting means, a primary grinding wheel rotatably supported by said vertically adjustable primary supporting means above the upper reach of said primary conveyor and there adapted to engage and exert on said blanks a grinding action as they move toward said reversing pulley, adjusting means connected to said primary supporting means for moving said primary grinding wheel vertically toward and away from the upper reach of said primary conveyor, vertically adjustable secondary supporting means, a secondary grinding wheel rotatably supported by said vertically adjustable secondary means above the upper reach of said secondary conveyor and there adapted to engage and exert on said blanks a grinding action as they move toward said delivery pulley, adjusting means connected to said secondary supporting means for moving said secondary grinding wheel vertically toward and away from the upper reach of said secondary conveyor, and power means operatively connected to said conveyors for so moving them that their respective upper reaches travel in opposite directions.

4. A grinding machine comprising a frame, a pair of primary pulleys, one being a supporting pulley and the other being a blank reversing pulley, mounted on said frame, a primary belt-like endless conveyor carried by and passing about said primary pulleys and having its upper and lower reaches extending longitudinally of said frame, said upper reach being adapted to receive thereon blanks to be moved forwardly by said conveyor towards said reversing pulley, a group of secondary pulleys, one being a delivery pulley, supported by said frame, a secondary belt-like endless conveyor carried by and passing about said secondary pulleys and having its upper reach, in part, disposed the lower reach of said primary conveyor, said secondary pulleys being so disposed with relation to said primary pulleys that said secondary conveyor passes over said reversing pulley and there engages said primary conveyor throughout an extent thereof equal to a substantial arcuate length of said reversing pulley, whereby said blanks are carried over said reversing pulley and delivered in an inverted position onto the upper reach of said secondary conveyor to be moved rearwardly thereby beyond said primary conveyor and toward said delivery pulley, vertically adjustable primary supporting means, a primary grinding wheel rotatably supported by said vertically adjustable primary supporting means above the upper reach of said primary conveyor and there adapted to engage and exert on said blanks a grinding action as they move toward said reversing pulley, adjusting means connected to said primary supporting means for moving said primary grinding wheel vertically toward and away from the upper reach of said primary conveyor, vertically adjustable secondary supporting means, a secondary grinding wheel rotatably supported by said secondary supporting means above the upper reach of said secondary conveyor and there adapted to engage and exert on said blanks a grinding action as they move toward said delivery pulley, adjusting means connected to said sec-

ondary supporting means for moving said secondary grinding wheel vertically towards and away from the upper reach of said secondary conveyor, a rigid support disposed beneath the upper reach of said primary conveyor for there supporting that reach against downward deflection with relation to said primary grinding wheel, a rigid support disposed beneath the upper reach of said secondary conveyor for there supporting that reach against downward deflection with relation to said secondary grinding wheel, and power means operatively connected to said conveyors for so moving them that their respective upper reaches travel in opposite directions.

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