July 7, 1925. 1,544,762

C. D. KING

GAUGING AND ASSORTING MEANS AND METHOD

Original Filed Aug. 21, 1922 2 Sheets-Sheet 1

Fig.1

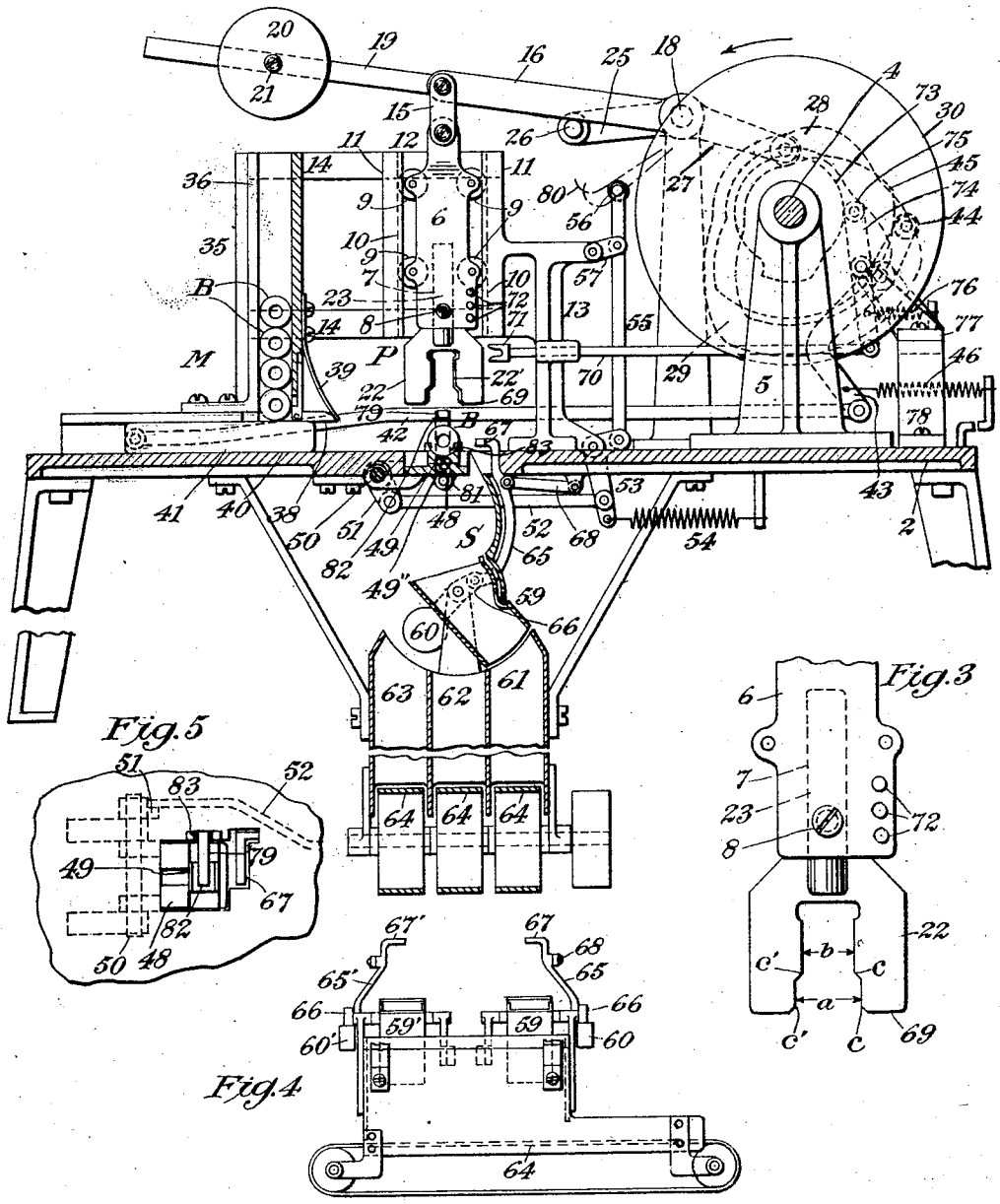


Fig.5

Fig.3

Fig.4

Inventor:
Charles D. King.

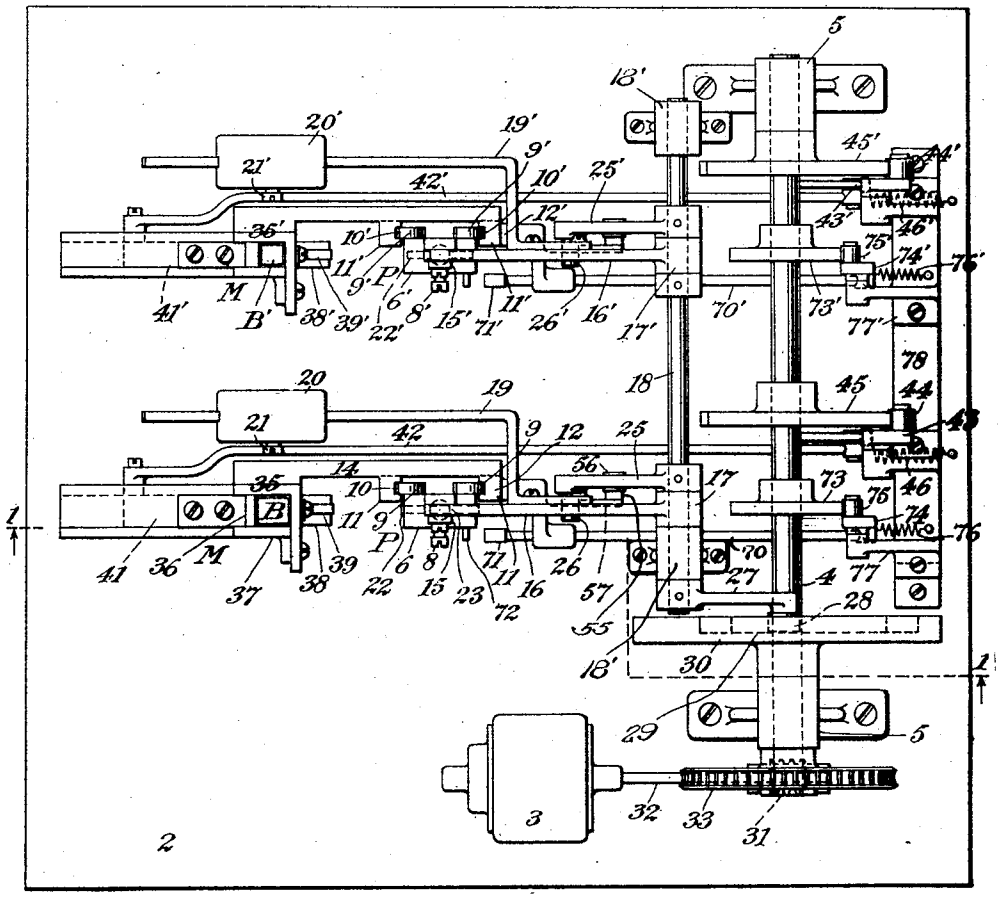
July 7, 1925. 1,544,762

C. D. KING

GAUGING AND ASSORTING MEANS AND METHOD

Original Filed Aug. 21, 1922 2 Sheets-Sheet 2

Fig. 2



Inventor:

Charles D. King.

Patented July 7, 1925. 1,544,762

UNITED STATES PATENT OFFICE.

CHARLES D. KING, OF RUTHERFORD, NEW JERSEY.

GAUGING AND ASSORTING MEANS AND METHOD.

Application filed August 21, 1922, Serial No. 583,194. Renewed October 15, 1924.

To all whom it may concern:

Be it known that I, CHARLES D. KING, a citizen of the United States, residing in Rutherford, in the county of Bergen and State of New Jersey, have invented certain new and useful Improvements in Gauging and Assorting Means and Methods, of which the following is a specification.

This invention relates to improvements in means for gauging and assorting various articles such as machined or partly machined parts or blanks which require to be accurately gauged and assorted in the course of manufacture.

The main object of the invention is to provide improved means and methods whereby such parts of a permissible size can be separated from oversized and undersized parts. Another object is to provide means for more rapid, accurate, and efficient separation of such parts than any other means now known to me. Other objects consist in improvements in mechanism which I term the gauging means of such apparatus, and also in means cooperative with and connected with said means.

The means I prefer to employ to accomplish these objects, and other features of my invention not hereinbefore mentioned, are illustrated in the drawings accompanying and forming part of this specification, and in which—

Figure 1 is a section of my improved apparatus for gauging and assorting blanks, taken on the line 1—1 of Fig. 2.

Fig. 2 is a plan of the invention.

Fig. 3 is an enlarged front elevation of the gauge and a portion of its holder.

Fig. 4 is a side elevation of the lower part of the apparatus, and

Fig. 5 is a plan of a portion of the apparatus under the gauge.

Like characters of reference refer to like parts in all the figures of the drawings.

In the form of my invention herein illustrated, I have designated by the letter M a portion of the mechanism which I term the blank-feeding means, another portion of the mechanism which I term the gauging means I have designated by the letter P, and still another portion of the mechanism which I term the blank-assorting or separating means I have designated by the letter S.

These several portions of the mechanism are mounted on or supported by a base 2, together with an electric motor 3, a cam-shaft or power-shaft 4 and parts thereon, and the bearings 5 for the said power-shaft. The said shaft can be of any convenient length according to the number of feeding, gauging, and blank-assorting means to be accommodated. In the present machine two each of such means or mechanisms are shown, but if desired, many times this number can be employed without departing from the general principles herein disclosed. The greater the number of such means employed, the greater will be the capacity of the machine in variety and number of blanks possible to be worked on.

Referring now to the portion of the apparatus designated by P or the gauging means, the numeral 6 designates the gauge-holder which ordinarily is provided with a socket 7, a set-screw 8, and anti-friction rollers 9. The latter are guided in ways 10 of the upright bars 11 which form part of a frame 12 supported at the right by a portion 13 and at the left by bars 14 secured to the blank-chute (see Figs. 1 and 2).

The upper end of the gauge-holder 6 is connected by a link 15 to a lever 16 which is journaled by its hub 17 on a shaft 18 which shaft is suitably journaled in brackets 18′. There is a second lever 16′ on said shaft 18 beyond the first lever 16, and this lever 16′ is connected to a link 15′ and a gauge-holder 6′ movable on rollers 9′ in ways 10′. The levers 16, 16′, have side extensions 19, 19′, on which are mounted adjustable weights 20, 20′, secured by set-screws 21, 21′.

In the socket 7 is secured a gauge member 22, which is provided with two gauging sizes or elements as indicated on a larger scale in Fig. 3. One of these sizes is marked *a* and is ordinarily spoken of as the "go" size, and is in this instance the larger of the two elements or sizes: The other size is marked *b* and is called the "not go" size. Each of the gauge elements or sizes has two contact points that are spaced apart the stated distance *a* or *b* as the case may be, one of said points in each size being designated by *c* and the other by *c′*. The "go" element can pass over the diameter or other dimension of the part to be measured, but

the "not go" element being here less than the permissible size, cannot pass onto the part to be measured if the part is large enough to be permissible or is oversized. The gauge 22 has a shank 23 which fits the socket 7 of the holder 6 where it is held by the set-screw 8.

Secured to the shaft 18 are arms 25, 25′, having pins 26, 26′, extending under the levers 16, 16′, respectively, and there is an arm 27 secured on said shaft which has a roll 28 movable in a slot 29 of the cam 30 secured to the power-shaft 4. The latter is driven by the motor 3 through the means of the worm 31 on the motor shaft 32, engaging with the worm-gear 33 on the power-shaft 4. When the motor armature revolves, the gauge-holders and gauges are given up and down movements, the former due to the direct driving of the motor and the latter due to the gravity of the weights and attached parts.

At the left of the gauging means is a feed-chute 35, preferably with an adjustable left hand wall 36, and an adjustable front wall 37. There is a door 38 normally held closed by a spring 39. Under the chute 35 is a surface 40 extending to the right, and on said surface is a feed-slide 41 moved by a rod 42 connected to a lever 43 on which is a roll 44 held in contact with the periphery of the cam 45 (secured to the cam-shaft 4) by the tension of the spring 46 secured at one end to said lever and at the other end to a pin in the base 2. There is a second feed-chute 35′, and slide 41′ and other corresponding parts to operate with the gauge 22′ and gauge-holder 6′.

The blank-assorting means S are associated with the blank-removing means of which the first portion will now be described. Under the gauge and gauge-holder is a trap-door 48, secured to a shaft 50 journaled in the base 2. The said door has a blank-seat 49 preferably as a separate member and held by a suitable screw 49″. There is also an arm 51 secured to the shaft 50 which arm is connected by a link 52 to a bell-crank 53 journaled on the base 2. A spring 54 is attached at one end to the longer arm of the bell-crank and at the other to a pin in the base 2 and normally holds the trap-door 48 in its closed position. The short arm of the bell-crank 53 is connected to a rod 55, having a roll 56 at its upper end and joined to the frame 12 by a short link 57. As the arm 25 comes near the end of its stroke, it encounters the roll 56 and moves it downward, thus causing the trap-door 48 to open so that a blank thereon may drop down, and the reverse movement of the arm 25 allows it to close by reason of the spring 54.

Under the trap-door 48 is an oscillating chute 59, normally held in the position of Fig. 1 by its counterweight 60. Under the chute 59 are three receptacles 61, 62, 63, the first 61, to receive oversized blanks, the second, 62, to receive permissible blanks, and the third, 63, to receive undersized blanks. The receptacles may be provided with bottoms, or instead, moving belts such as 64 may be employed whereby the blanks dropped thereon may be conveyed away. A thrust member 65, connected to arm 66 on the oscillating chute 59 extends upward and preferably ends in a bent portion 67, and a link 68 joins it movably to the base 2. As the gauge 22 descends, its right foot portion 69 comes against the part 67 and by moving it downwards determines the position of the chute 59 and its counterweight 60.

As soon as the gauge member 22 gauges a blank, it is held in its final gauging position for such blank by means of the lock-rod 70 and fork-head 71 engaging one of the pins 72 on the gauge-holder 6. The lock-rod 70 is operated by a cam 73 on the cam-shaft 4, through a lever 74 having a roll 75 held against the cam by a coil spring 76 secured at one end to the lever and at the other to a pin in the bracket 77. The lever 74 is fulcrumed on said bracket which is mounted on a cricket 78 secured to the base 2. The bracket 77 also supports the lever 43 of the feed-rod 42.

There are duplicates of the trap-door 48 and its operating parts, below the gauge 22′ and there are also duplicates of the chute 59 and its operating parts, together with a lock-rod 70′ and its operating parts similar to those for the rod 70. All the corresponding parts are understood to be designated by like numbers as those parts described hereinbefore with the addition of a prime mark.

The operation of my improved means for gauging and assorting is as follows;

A supply of blanks B is placed in the chutes 35, 35′, and the machine is started by energizing the motor 3. The worm 31 on the motor shaft 32 causes the worm-gear to revolve the power-shaft 4, and the cams 30, 45, 45′, 73, 73′, whereupon the arms 27, 25, 25′, shaft 18, and pins 26, 26′, effect the raising of the levers 16, 16′ weights 20, 20′, gauge-holders 6, 6′, and gauges 22, 22′. Also the springs 46, 46′, move the slides 41, 41′, by means of the levers 43, 43′, and rods 42, 42′, as they are permitted by the rotation of the cams 45, 45′.

The slides 41, 41′, on moving towards the right, take the lowermost blank in each chute and move them to the proper blank-seats 49, 49′. At this time the gauges 22, 22′, are descending and reach the respective blanks immediately afterward. If the size *a* of the gauge is less than the size measured thereby on the blank, the gauge stops in this position. If, however, the blank is of a

permissible size, the gauge continues to descend and stops where the size *b* comes in contact with the blank. This is the "not go" size and the "go" size has already passed over the blank, so that it is plain that the latter is of a permissible size.

A "tolerance" is permitted in all such blanks and varies with the nature of the piece or blank. In a great many machined parts it is but a few thousandths or even ten thousandths of an inch. The difference between the size *a* and the size *b* may be the same amount, or it may be less than the "tolerance". In the last instance, the work will be of greater accuracy than would otherwise be the case. In the drawings the sizes *a* and *b* are exaggerated for the sake of clearness.

If the blank being tested is too small, both sizes of the gauge will pass over it and in so doing will push down the portion 67 of the member 65 which in turn moves the chute 59 to the position where it will discharge into the receptacle 63. If the blank is of permissible size, the chute is moved to a position where it will discharge into 62, by the foot 69 pushing down on 67 about halfway. At this time the rod 70 is moved to the left so that the fork-head 71 engages the middle pin 72 thus locking the gauge. The upper and lower pins 72 are respectively for use when the blanks gauged are under and over the permissible size. By these means the gauge is locked at the height it is in when it makes contact on the blank so that when the blank is released the gauge shall not rise and change the setting of the chute 59.

The cam 30 has now brought the levers 25, 25′, to the broken line position indicated by 80. The lever 25 presses down the roll 56, rod 55, and bell-crank 53, thereby moving the link 52 and the arm 51, so that the trap-door 48 is dropped, allowing the blank to fall into the chute 59. The chute being set as hereinbefore explained allows permissible blanks to fall into the receptacle 62, under-sized blanks into the receptacle 63, and over-sized blanks into the receptacle 61. The blanks fall onto the belts 64 which are preferably of rubber or leather and prevent marring of finished surfaces. The belts convey the blanks to any suitable receptacles (not shown) for final storage.

Various sizes of gauges can be used in the above-described apparatus, and new gauges can readily be inserted when the working gauges become sufficiently worn. Many other dimensions can be gauged by the apparatus besides the sort shown in the drawings which are illustrative of the general principe involved and not limited as to the specific gauge, or dimensions. Gauges of various types may be employed including length, thickness, internal, and other gauges ordinarily employed for inspecting work. Different dimensions on the same piece can be gauged by using a number of gauges, turning the pieces, and adjusting feed-chutes and various parts necessary.

By using a considerable number of feeding, gauging, and removing means in one apparatus, extending the shaft 4 and base 2, and arranging the mechanism in proper relation, a great number of blanks can be gauged and assorted in a very short time with a very small amount of attendance which may for the placing of blanks in the feed-chutes be wholly unskilled and any skilled labor required will be only at long intervals and in small amounts for keeping the machine in running order. In practice the feed-chutes will be much higher and may be provided with hoppers if desired, and may be varied so as to accommodate pieces of different sizes and shapes. The seats on the trap-doors are made removable so that seats conforming to the piece desired to be gauged can be put in place when required.

If for any reason it should so happen that either the size *a* or the size *b* should be so near the dimension being measured on a blank as to cause the gauge to go so tightly thereon as not to fall by gravity when the trap-door 48 is lowered, there is an extractor 79 provided which is preferably pivoted on the side of the trap-door at 81 and has an overhanging portion 82 to engage with the top of the blank and is guided in a slot 83 so as to secure proper alinement on the return of the door. The extractor 79 moves downward on the opening of the trap-door and the portion 82 will draw down the blank on the full opening of said door.

It is evident that the mere mechanism for giving the movements to the various parts of the above-described mechanism can be varied and any suitable forms of parts may be employed without departing from the principle and essence of the invention and I do not therefore confine myself to the details of construction here shown. Other forms of the invention may be devised and come within the scope and meaning of the appended claims.

What I claim is:—

1. A gauging and assorting mechanism embodying gauging means having caliper gauge elements of two sizes for a given dimension and movable together into and out of contact with the blanks, one greater and one less than the dimension, and mechanism cooperating with said gauging means in selecting blanks of a permissible size.

2. A gauging and assorting mechanism embodying gauging means which include "go" and "not go" caliper gauge sizes one of which sizes is greater and the other of which is less than the dimension to be

gauged and blank-assorting means which include a selector for a plurality of sizes and controlled by said gauging means.

3. A gauging and assorting mechanism embodying gauging means that include oversize and undersize caliper gauge elements for a given dimension which elements are movable transversely to said dimension, and mechanism coacting with said means for separating blanks of different sizes into three groups one of which groups consists of blanks of permissible size, one of those oversized, and one of those undersized.

4. The combination of blank-feeding means, gauging means having two spaced apart contact points movable together transversely to the dimension to be gauged, and blank-assorting means controlled by the gauging means.

5. The combination of gauging means having two spaced apart contact points movable together transversely to the dimension to be gauged, and blank-assorting means which include means for removing blanks from the gauging means and means for conducting the blanks into any one of a plurality of receptacles which means are controlled in position by the gauging means.

6. In combination, gauging means having oversize and undersize measuring elements movable together into and out of contact with the blanks, and blank-feeding means and blank-assorting means coacting with the gauging means.

7. In combination, gauging means which include a gauge, a lever connected thereto, a weight on the lever moving it downward, and means for raising the gauge from its gauging position together with the lever and weight and also permitting the lowering of the same, and blank-feeding means and blank-assorting means coacting therewith.

8. In combination, blank-feeding means, gauging means, and blank-removing means embodying a movable door, receptacles for blanks of different sizes, and a selector between the door and said receptacles effective to conduct blanks into any one of the receptacles.

9. In combination, blank-feeding means, gauging means, and blank-assorting means embodying a movable door, receptacles for blanks, and a member under the door controlled by the height of the gauging means and effective to conduct blanks into any one of the receptacles.

10. In combination, gauging means which include a gauge, and blank-assorting means embodying a pivoted selector, receptacles for blanks under said selector, and a member movable downward by the gauge for controlling the position of the selector.

11. In combination, gauging means including a reciprocating gauge, locking means for the gauge, a movable door under said gauge, a pivoted chute under said door, an arm on the chute, a member connected to the arm and having a portion in the path of the gauge, and a plurality of receptacles under the chute.

12. In combination, gauging means which include a gauge embodying two spaced apart contact points movable transversely to the dimension to be gauged, and blank-assorting means for a plurality of sizes and cooperative with and controlled by the position of said contact points.

13. In combination, gauging means which include a gauge having two spaced apart points of contact movable into operation by gravity transversely to the dimension to be gauged, and blank-assorting means cooperative with said gauging means and controlled by the height of said contact points.

14. In combination, gauging means which include a gauge having two spaced apart contact points movable downward by gravity transversely to the dimension to be gauged, and blank-assorting means cooperative with said gauging means and which include a selector controlled in position by the height of said contact points.

15. In combination, a power-shaft, a plurality of gauging means influenced in operation by means on said shaft, and movable into operation by separate means, a plurality of blank-feeding means operated by said shaft and coacting with the gauging means, and a plurality of blank-assorting means, each including a portion controlled by the gauging means and a portion operated by means on said power-shaft.

16. In combination, a power-shaft, means for rotating the same, a plurality of gauging means each having a gauge movable independently into operation by gravity, means connected to the power-shaft to permit the operation of each of said gauging means and also to move them out of gauging position, a plurality of blank-feeding means operated by means on the power-shaft and coacting with the gauging means, and a plurality of blank-assorting means each having a portion operated by means on said shaft and a portion coacting with the gauging means.

17. In combination, a power-shaft, means for rotating the same, a plurality of gauging means each embodying a gauge, a lever connected to the gauge, and a weight on the lever, a plurality of members movable in unison by means on said shaft and effective for raising said levers, weights, and gauges, a plurality of blank-feeding means operated by means on the power-shaft and coacting with the gauging means, and a plurality of blank-assorting means operated by means on said shaft and each having a portion controlled by its respective gauging means.

18. In combination, a power-shaft, means for rotating the same, a plurality of gauging

means each movable into operation independently, each embodying limit gauge elements and influenced by means on said power-shaft, a plurality of blank-feeding means operated by means on the power-shaft and coacting with the gauging means, a plurality of trap-doors operated by means on the power-shaft, a door under each gauging means and each provided with a blank-seat, a plurality of receptacles, and a plurality of chutes, one under each trap-door and each controlled independently by its respective gauging means and each adapted to discharge into any one of said receptacles.

19. In combination, gauging means, and blank-removing means which include a trap-door under said gauging means, means for operating the trap-door, an oscillating chute under the trap-door controlled in position by the gauging means, a plurality of bottomless receptacles under the chute, and travelling belts, one below each receptacle.

20. The combination of a gauge-holder, a gauge in said holder having "go" and "not go" sizes each size having two contact points spaced apart transversely to the axis of the gauge-holder, a guide for the gauge-holder, a lever connected to said holder, a weight on said lever, a support for the lever, a power-shaft, means for rotating the same, suitably journaled and supported, a cam secured to the power-shaft, an arm suitably supported and adapted to raise and permit the descent of said lever and actuated by means of said cam, blank-feeding means suitably supported and actuated by the power-shaft, gauge-locking means suitably supported and actuated by means on the power-shaft, a trap-door journaled under the gauge, having a blank-seat and actuated by means of said cam, an oscillating chute supported under said door, a member actuated by the gauge and connected with the chute to oscillate the same, and a plurality of receptacles for blanks supported under said chute.

21. The combination of gauging mechanism embodying oversize and undersize measuring elements and supporting means therefor adapted to permit reciprocating movements of said measuring elements, and means cooperative with the gauging mechanism in assorting blanks of different sizes.

22. The combination of gauging mechanism embodying oversize and undersize measuring elements, a holder for said elements movable in one direction by gravity and in the other direction by different means and guiding means for said holder, and means cooperative with said gauging mechanism in assorting blanks of different sizes.

23. The combination of gauging mechanism embodying a gauge-holder, a gauge in said gauge-holder and guiding means for the gauge-holder adapted to permit reciprocating movements thereof, and means cooperating with said gauging mechanism in assorting blanks of different sizes.

24. The combination of gauging mechanism embodying a gauge, a lever connected thereto, a weight on said lever for moving it in one direction and means for moving it in the opposite direction and permitting its movement in the first-named direction, and means cooperating with said gauging mechanism in assorting blanks of different sizes.

25. The combination of gauging mechanism embodying a gauge, a lever connected to the gauge for moving it into and out of gauging position, a weight on said lever for moving it downward, and up-and-down-moving member for raising said lever and means for actuating the up-and-down-moving member, and means cooperating with said gauging mechanism in assorting blanks of different sizes.

26. The combination of gauging mechanism embodying a gauge, means for guiding the gauge, a lever suitably supported, means for connecting the lever and gauge, a weight on the lever for moving it downward, an arm adapted to raise the lever and means to oscillate the arm, and mechanism cooperating with said gauging mechanism in assorting blanks of different sizes.

27. The combination of gauging mechanism embodying a gauge, a lever, means for connecting the gauge and lever, a weight on the lever for moving it in one direction, an arm for moving the lever in the opposite direction, a cam to oscillate the arm and means to rotate the cam, and mechanism cooperating with said gauging mechanism in assorting blanks of different sizes.

28. The combination of gauging mechanism embodying a door on which the blank is gauged and which is movable for releasing the blank, and assorting means controlled by the gauging mechanism and cooperating with said door.

29. The combination of gauging mechanism embodying a reciprocating caliper gauge, a door on which the blank is gauged and which is movable for releasing the blank and extracting means cooperative with said gauge and said door, and assorting means controlled by the position of the gauge and cooperating with said door.

30. A gauging and assorting mechanism for blanks, embodying gauging means having caliper gauge elements of two sizes for a given dimension, one greater and one less than the dimension, means for producing relative movement between the gauging means and the blanks, and mechanism cooperating therewith for automatically separating blanks of a predetermined size.

31. The method of gauging and assorting blanks which consists in placing each blank in succession on a given one of its faces on a support in reach of a gauge having oversize

and undersize gauging elements for a given dimension, gauging the blank for such dimension by causing relative movement between said gauge and the blank by a constant mechanically-controlled force operating substantially at right angles to the plane of support and indicating the size of the blank from the final position of the gauge relative to the blank, and then placing said blank, by the result of the gauging, in one of a plurality of groups, which groups include one for permissible sized blanks.

32. The method of gauging and assorting blanks which consists in placing each blank in succession on a given one of its faces, moving said blank in such position into reach of a gauge having oversize and undersize gauging elements for a given dimension, gauging said blank for such dimension by relative movement between the gauge and blank substantially at right angles to the first-mentioned movement and effected by the lowering of a constant weight and indicating the size of the blank from the final position of the gauge relative to the blank, and then placing said blank, by the result of such gauging, in one of three groups, one for oversized blanks, one for undersized blanks, and one for blanks of permissible size of such dimension.

Signed at New York, in the county of New York, and State of New York, this 17th day of August, 1922.

CHARLES D. KING.