(No Model.)

4 Sheets—Sheet 1.

N. J. SIMONDS.

HEEL STIFFENER MACHINE.

No. 530,462. Patented Dec. 4, 1894.

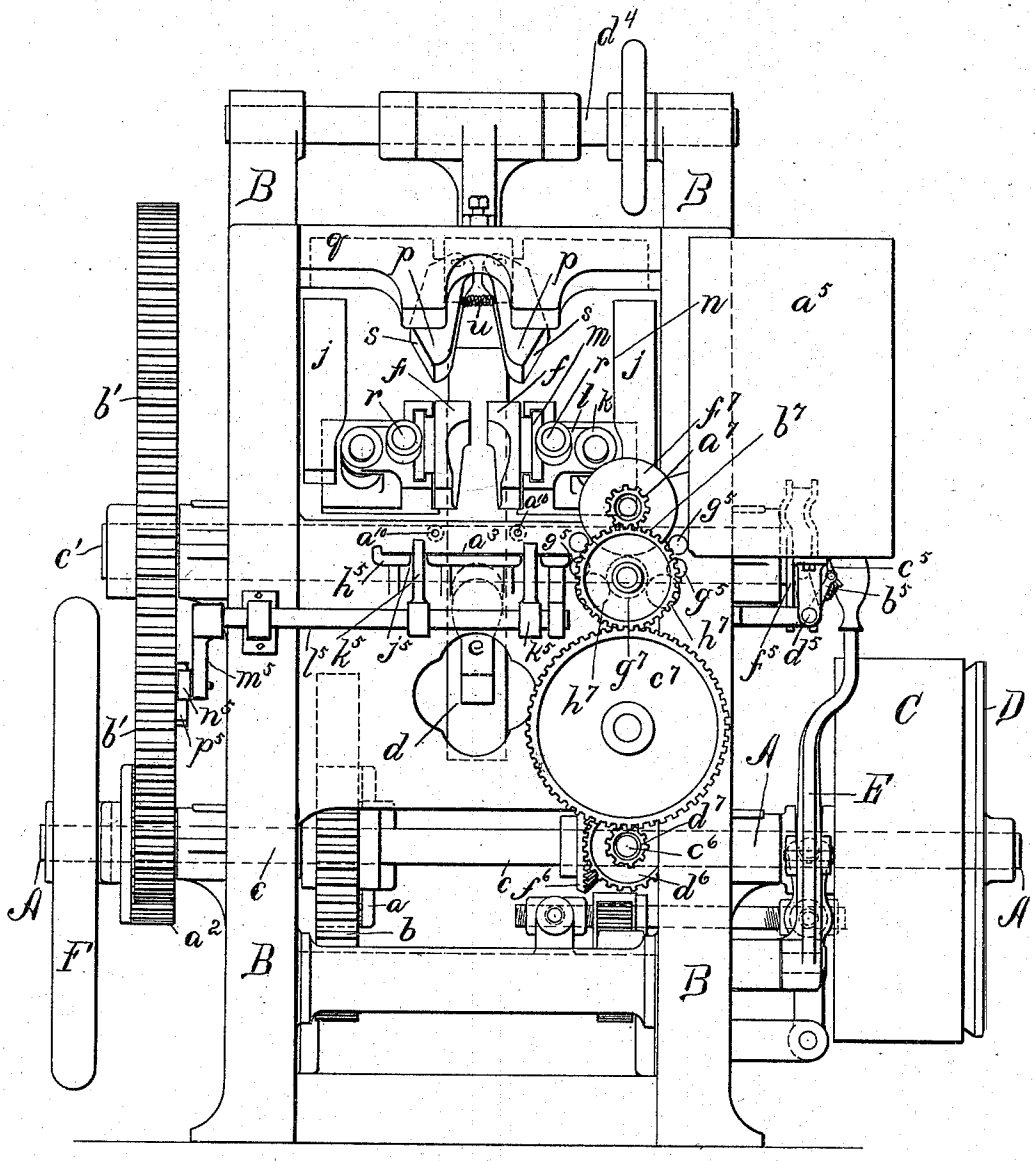

Fig. 1.

WITNESSES.

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Nathan J. Simonds

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his Attorneys.

(No Model.) 4 Sheets—Sheet 2.

N. J. SIMONDS.

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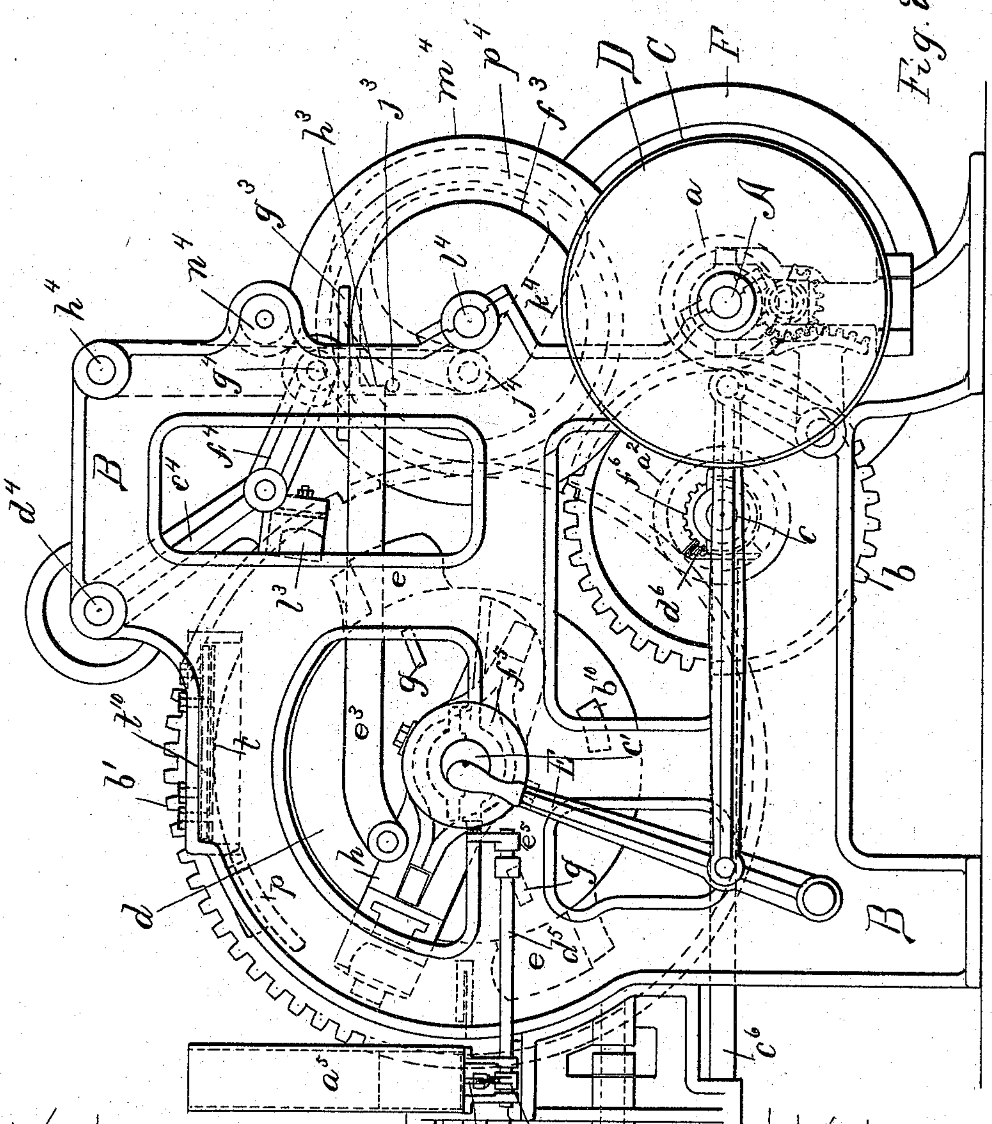

Fig. 2.

WITNESSES.

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(No Model.) 4 Sheets—Sheet 3.

N. J. SIMONDS.

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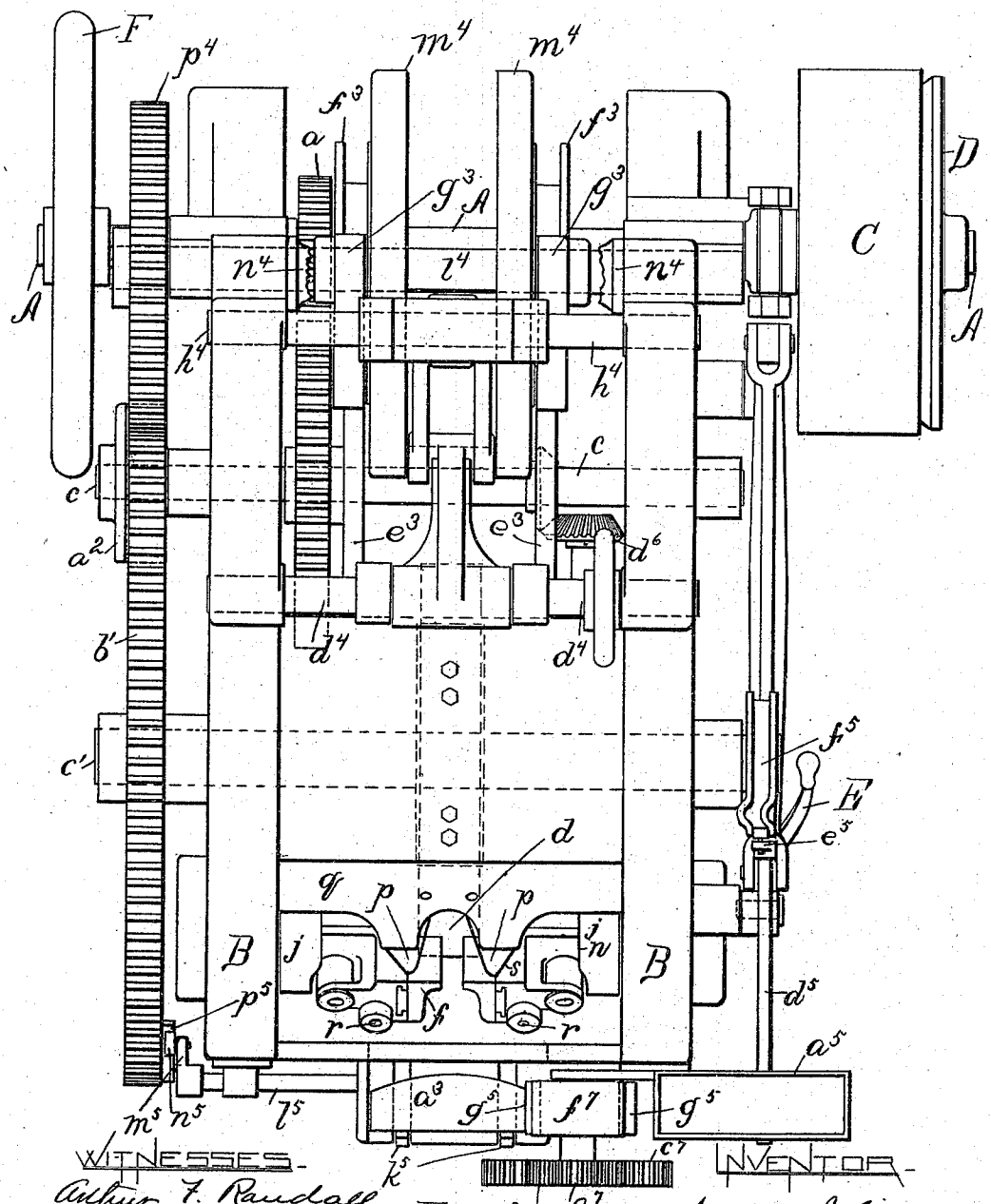

Fig. 3.

WITNESSES:
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(No Model.) 4 Sheets—Sheet 4.

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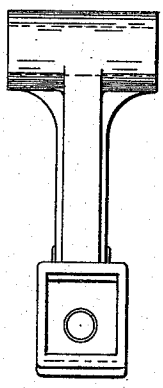

Fig. 7.

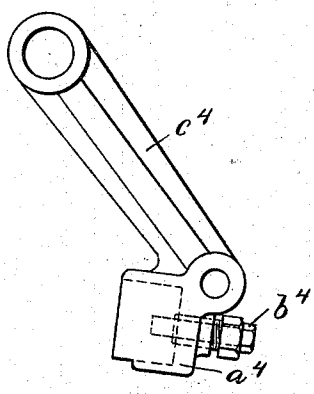

Fig. 8.

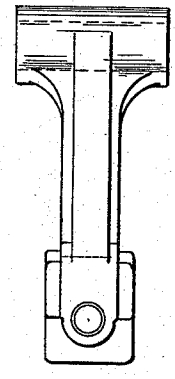

Fig. 9.

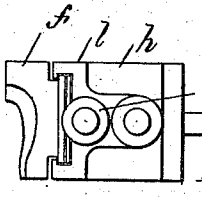

Fig. 6.

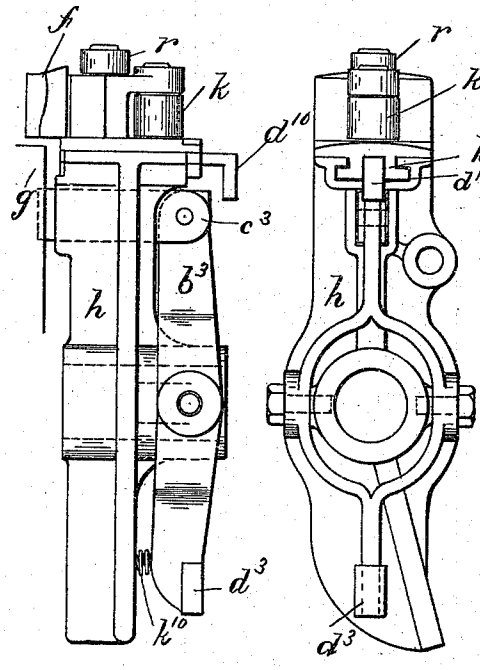

Fig. 4. Fig. 5.

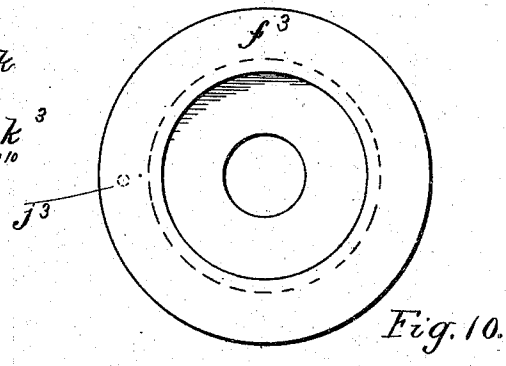

Fig. 10.

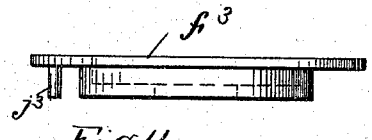

Fig. 11.

WITNESSES.

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UNITED STATES PATENT OFFICE.

NATHAN J. SIMONDS, OF WOBURN, MASSACHUSETTS.

HEEL-STIFFENER MACHINE.

SPECIFICATION forming part of Letters Patent No. 530,462, dated December 4, 1894.

Application filed June 23, 1892. Serial No. 437,760. (No model.)

To all whom it may concern:

Be it known that I, NATHAN J. SIMONDS, a citizen of the United States, residing at Woburn, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Machines for Forming Counter-Stiffeners for Boots or Shoes, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention has for its object to provide a durable and efficient machine for forming counter stiffeners for boots and shoes which shall be economical and speedy in its operation and it consists in a machine employing a wheel or rotary form carrier upon which the forms or male molds, over and upon which the counters are molded or formed, are carried, together with mechanism embracing dies or female molds and means for operating the same which press and mold the counter over the form, and devices for rubbing or pressing down the flanged portions of the counter, all said mechanism co-operating to produce a full molded counter from a blank of leather or leather board or similar material all as will be hereinafter more fully set forth.

The novel features of my device are pointed out in the claims which are appended hereto and made a part hereof.

In the accompanying drawings in which I have shown my invention embodied in the best form now known to me and to which reference will be made in the following description, Figure 1 is a front elevation. Fig. 2 is a side elevation and Fig. 3 is a plan view. Figs. 4, 5 and 6 are respectively a plan, side and end view of the lever arm which carries the movable female dies. Figs. 7, 8 and 9 are details of the toggle arm which carries the heel finishing die. Figs. 10 and 11 are respectively a plan and side view of the disk from which the lever arm, shown in Figs. 4, 5 and 6, is operated.

The machine and its operation will be readily understood from the following description.

Like letters of reference refer to like parts throughout the drawings.

The main shaft is shown at A and is mounted in a suitable upright frame B, which consists of two uprights or side frames secured together by suitable cross pieces. The precise shape of the frame is unimportant.

The form of the frame employed by me will be clearly seen from the drawings and particularly from the side elevation shown in Fig. 2. On the main shaft A is mounted a belt pulley C. A friction wheel or disk D, which is adapted to co-operate with the pulley C, is operated by means of a shipper lever E and suitable intermediate mechanism, all of well known construction, so that the operator by moving the shipper lever may stop and start the machine. At the other end of the main shaft is a balance wheel F, and said shaft also carries a pinion a which is in mesh with a gear b which is fast on the short shaft c which is journaled in the uprights B. Said shaft c is provided with a pinion a^2 which meshes with the gear b', which is fast on shaft c'. The said shaft is mounted on the rotary form carrier d or large wheel which carries the forms e upon which the counters, as the counter stiffeners are usually termed, are formed or molded. The rotary form carrier may be provided with more than two forms, but I prefer to use two, as shown.

The sole of the human heel curves from the shank to the rear portion of the heel and it is desirable that the periphery of the form carrier should coincide substantially with this curve, in order that the flanges of the counter may be rubbed and set on this curve thus permitting the bottom of the counter to fit the last and the foot more accurately than it otherwise would. This consideration will determine to a considerable extent the diameter of the form carrier d. The two forms e which I employ are set opposite each other on said form-carrier as indicated by dotted lines Fig. 2. It will be obvious that if more than two forms were employed they would require to be differently disposed or placed on the periphery of the form carrier d. A form e being in the position shown in Fig. 1 it is carried upwardly by the movement of the form-carrier and a counter blank a^3, which is fed into position by mechanism which will hereinafter be described, comes in contact with the form and is carried upwardly between the rolls a^{10} which bend its ends around the form and it is then carried between the dies or female molds f. The concavity of each of said dies

f is adapted to fit one side or one half of the form e and said dies f are mounted as hereinafter described so that they may approach or recede from the form e. The lever arms h which carry the dies f are each mounted as shown more clearly in the details Figs. 4 and 5, said arms being pivoted or journaled on the shaft c' of the form-carrier, so that they may be reciprocated in a plane parallel with the plane of revolution of the form carrier.

The arm h must move with the form-carrier d while the female dies f are in contact with the counter blank on the form e in order that the blank may be pressed and molded by the said dies. After the dies have done their work they are withdrawn from contact with the counter, and the arm h then moves in the opposite direction back to its normal position to be in readiness for the succeeding form and counter blank. For the purpose of moving arms h the yoke-shaped levers b^3 are provided which are pivoted on the journals or bosses of the arms h as shown in Figs. 4 and 5 so that they may be rocked toward and from the arms h. At the upper end of each of the levers b^3 is pivoted a sliding arm or projection c^3 which as the lever b^3 is rocked slides inwardly and outwardly in a transverse slot in the lever h. When the lever b^3 is in its normal position shown in Fig. 4 the inner end of the sliding projection c^3 is in the path of the projection g, see Fig. 2, which is on the side of the rotary form-carrier d. As the form-carrier rotates the projection g will come in contact with the inner end of the sliding projection c^3 and the lever arm h will be caused to move with the form-carrier. When the lever arm h has reached the end of its movement the block d^3 at the opposite end of the lever b^3 comes in contact with a cam-shaped projection b^{10} on the inside of the frame which forces the lower end of the lever b^3 inwardly thus withdrawing the projection or arm c^3 from contact with the stop g and at the same time withdrawing the die f, the arm b^3 coming in contact with the stop d^{10} for this purpose. The arm h is then free to be moved back again to its normal position. The arm b^3 is moved in the opposite direction by means of the spring k^{10}. For the purpose of moving the arm h in the reverse direction, that is, back to its normal position I provide a connecting piece e^3 which is pivoted at one end as shown in Fig. 2 to the rear of the arm h and which projects rearwardly to the disk f^3 shown in Figs. 10 and 11. The rear end of the arm e^3 is provided with a projecting plate g^3 see Fig. 2 which rests on the periphery of the disk f^3 and the rear end of said arm is notched or provided with a shoulder as shown at h^3, Fig. 2. A pin or stud j^3 which is set on the face of the disk f^3 engages the shoulder h^3 when the arm e^3 is in its rearward position and as the disk f^3 revolves forces the arm e^3 forward until the said pin j^3 clears said shoulder. By this means the arm h is returned to its normal position. While the pin j^3 is out of contact with the shoulder h^3 the arm is free to be moved rearwardly as will be clear. A disk f^3 and arm e^3 are provided for each of said arms h. For the purpose of molding the blank on the form e the dies f must be forced inwardly against the blank on the form. To permit of this, dies f are mounted on holders l and a T-shaped projection shown at k^3 Fig. 5 which slides in a corresponding T-shaped groove or slot in the upper end of the arm h. The die holders may therefore slide toward or from the rotary form carrier.

In order to permit the dies f to be readily taken out of the machine when for any reason that is desirable they are provided with similar T-shaped projections which are received in vertical slots in the die holders l as shown in Fig. 6. The die holders l are provided with rolls k which as the arms h move engage the cam blocks j, see Fig. 1, which are secured to the frame of the machine and which operate to force the die holders and dies inwardly against the counter blanks on the form. As the form e and dies f continue their movement the rolls k traverse the substantially flat side of the cam blocks j thus continuing the pressure of the dies f on the counter blank for a sufficient time to thoroughly mold and set the fibers of the material in shape.

When a counter blank is clamped securely between the form e and the dies f, the edge thereof which is to form the flange in the finished counter projects upwardly above said dies and form. For the purpose of turning this flange over and ironing and rubbing it down so as to set it thoroughly in place, I have provided the jaws p which are pivoted to the under side of the cross piece q which extends between the uprights B. The jaws p are so set that as the dies f and form e pass under them they will come in contact with the projecting edge of the counter blank and press it down over the sole or bottom of the form e. As the flange of the counter is to project inwardly toward the center of the form e I deem it desirable that the jaws p should move inwardly toward the center of said form as the form passes under them. To this end I provide rolls r on the die holders l which as the dies reach a given point in their movement come in contact with the beveled ends s of said jaws p thus forcing the jaws inwardly and causing the flange to be wiped and rubbed down in an even and regular manner. The further onward movement of the form e forces the counter under the flange-rubbing piece t which extends rearwardly and which is curved to correspond with the path of movement of the form on the rotary form-carrier d and thus the counter flange is thoroughly rubbed and set in position on the bottom of the form e forming an even and smooth heel seat. The flange rubber t is preferably mounted as shown in Fig. 2, it being bolted to a cross piece extending between the upright or

side frames B, and being provided with a backing t^{10} composed of one or more strips of rubber or similar yielding material to allow the flange rubbing device to accommodate itself slightly to material of different thicknesses. The jaws p are returned to their open position by means of a spring u or in any other well-known manner.

While I deem it desirable to employ the pivoted jaws p, a solid piece of metal having a U-shaped notch corresponding somewhat to the opening between the jaws p as shown in Fig. 1 may be employed. Such a shaped piece of metal is old and well known for this purpose and is employed in many forms of counter molding machines now in use. The dies f are in fact two halves of a split die, and after the counter has been subjected to their operation it may have a slight ridge or projection up and down the back of the heel caused by the material bulging into the opening or joint between the two dies f. When a split die is used this ridge or projection will be more or less apparent, and in some classes of counters it is objectionable. To obliterate this ridge or projection and produce a counter with a smooth back I subject the counter while it is on the form e and after it has left the dies f to the action of another die which acts upon the counter around the back of the heel only. I have also found it desirable in making a counter to subject the back of the heel or heel portions thereof to a strong molding pressure after the sides have been molded, not only for the purpose of obliterating the ridge which I have referred to, and making a smooth back, but also because such a pressure sets the counter to shape and produces a better counter and one that will keep its shape better. In order to give the counter this extra molding operation at the back of the heel when it is desired to do so, I have provided a heel die shown at l^3 Fig. 2, which is adapted to fit the heel portions of the form e and which is brought into contact therewith, or the counter thereon, after the side dies f have been released and after the counter has been carried under the flange rubbing piece t previously described.

The heel die l^3 is mounted in a holder a^4 shown in Figs. 7, 8 and 9 which is recessed to receive it, and which is provided with an adjusting screw b^4 by means of which the die may be adjusted in the holder. Behind the die in the holder, I place a backing of rubber or similar yielding material which allows the die to yield slightly under pressure as also to accommodate itself to the form. The die holder a^4 is formed on one end of the toggle arm c^4, and the upper end of the toggle arm is set on a rock shaft d^4, see Figs. 1 and 2, which is journaled in the upper part of the frame B. The lower toggle arm f^4 is pivoted about midway of the vertical lever g^4, shown in dotted lines Fig. 2. The lever g^4 is secured to a rock shaft h^4 journaled in the top of the frame and at the lower end carries a cross bar upon either end of which is a cam truck j^4 Fig. 2, which engages cams k^4 of the shape shown by dotted lines Fig. 2. The cams k^4 are cut in the proximate faces of the wheels m^4 which are mounted on the shaft l^4. As the cam wheels revolve the lower end of the lever g^4 is moved toward and from the form-carrier d. As said lever g^4 moves from the position in which it is shown Fig. 2 toward the form carrier, that is toward the left in said figure the heel mold l^3 will be moved forward and directly into the path of the form e so that after the form passes the flange rubbing piece t, the back of the counter thereon will be pressed into the said heel mold l^3 and the mold will exert a strong pressure upon the back of the counter on the form, obliterating any ridge which may be left by the dies f and further forming and setting the counter to shape. The movements of the mechanism which operates the heel die l^3 are so timed that as soon as the said die has exerted a strong pressure on the counter on the forms the cams k^4 will be in a position to allow the trucks j^4 on the lever g^4 to be moved backwardly along the cam path so that the onward movement of the form e will operate to push the heel die l^3 back out of the path of the said form. n^4, Fig. 2, is a heavy rod which serves as a brace or cross piece between the frame uprights and which is circular in cross section as indicated by full and dotted lines Fig. 2.

For the purpose of removing the counters should they not readily drop off the form, any well known device may be employed. A counter removing device is not however, essential, as the operator may readily remove the counters from the form as it comes into position to engage with the next blank. The shaft l^4 which carries the cam wheels m^4 and the disks f^3 are provided with a gear p^4 which is in mesh with the large gear b' which is driven from the pinion a^2 on the shaft c, the shaft c being driven by means of the gear b which is in mesh with the pinion a on the main shaft.

For the purpose of feeding the flat blanks into the machine I have provided automatically operating mechanism which I prefer to employ but it will be evident that when desired the machine may be fed by hand in the usual manner of feeding similar machines, the operator sitting in front of the machine, picking up a flat blank, bending it into the proper shape with his fingers and holding it on the form e until it has been seized by the dies f.

The automatic feeding mechanism which I have provided is arranged as follows:—The flat blanks are placed one on top of the other in a box or receiver shown at a^5 which is of the proper size to receive them. The bottom of this box is slotted so that only one blank at a time can be slid out of it, the arrangement being substantially the same as is employed in card cases and the like which per-

mit of one card being withdrawn at a time. For the purpose of withdrawing or sliding out the bottom blank of the pile in the box a^5 an arm b^5, which is provided at its free end with a flexible or spring finger c^5, is mounted on a rock shaft d^5 which is journaled on the side of the frame. At the rear end of the rock shaft d^5 is an arm e^5 which engages a cam f^5 cut in the periphery of a wheel which is mounted on the end of the shaft c'. As the shaft c' revolves the rock shaft d^5 will be moved, causing the flexible finger c^5 to engage with and move the bottom blank in the box or receiver a^5 forward between the feed rolls g^5. The blank is then carried forward by the feed rolls which feed it forward onto a support or table h^5 on the front of the machine. It is now in proper position with reference to the form e but is in front of the path of the form and requires to be moved toward the form carrier into the path of the form. For the purpose of accomplishing this, the table h^5 is slotted transversely at two points as shown at j^5 Fig. 1 to receive arms k^5 which are mounted on the rock shaft l^5 which are journaled on the frame of the machine. An arm m^5 is secured to the shaft l^5 and is provided with a roll n^5 which is in the path of the cam-shaped block p^5 which is secured on the face of the gear b'. As the gear revolves the block p^5 engages the roll n^5 on the arm m^5, throwing the arms k^5 rearwardly, and sliding the counter blank a^3 into the path of the form e where it is held upon suitable projections. As soon as the gear b' has moved a given distance the cam-block p^5 clears the roll n^5 and allows the arm m^5 to drop back thus returning the arms k^5 to their normal position in readiness to move forward the succeeding blank. By providing a sufficient number of cam blocks p^5 and placing them in proper positions on the face of the gear b' the feeding arms k^5 may be operated as frequently as desired. The feed rolls g^5 are operated by means of a train of gears a^7, b^7, c^7 and d^7, Figs. 1 and 2 from the shaft c^6 which is provided at its rear end with a beveled gear d^6 which is in mesh with the beveled gear f^6 mounted on the shaft c.

On the shaft of the pinion a^7 is mounted a roll f^7 which is in frictional contact with the roll g^7 which is in turn in frictional contact with the rolls h^7 which drive by frictional contact the lower feed rolls g^5 as will be clear from Fig. 1.

The roll f^7 is driven at a relatively high rate of speed and operates to burnish the counter blank as it passes through the feed rolls in being fed forward onto the table or support h^5. This feature may or may not be employed but I consider it of importance.

What I claim is—

1. A counter-stiffener machine having a form-carrier, means for giving to said form-carrier a regular movement of rotation in a given direction, two or more forms carried by said form-carrier, female dies co-operating with said forms and partaking of the rotary movement thereof, and means for compressing said dies against the said forms acting while said form-carrier rotates to compress said dies and hold them closed against a form during a portion of the rotation of the form-carrier while such form is traveling by the compressing devices and the next form is approaching the feeding point, substantially as described.

2. A counter-stiffener machine having a form-carrier, means for giving to said form-carrier a regular movement of rotation in a given direction, two or more forms carried by said form carrier, female dies co-operating with said forms and partaking of the rotary movement thereof, means for causing said dies to move in a path parallel with the path of movement of the forms, and means for compressing said dies against the said forms acting while said form carrier rotates to compress said dies, and hold them closed against a form during a portion of the rotation of the form-carrier, whereby the said dies may operate to engage the counter on a form and hold it compressed upon the latter during the said portion of the rotation of the form-carrier, while the next form is approaching the feeding point, substantially as described.

3. A counter-stiffener machine having a form-carrier, means for rotating the same, two or more forms carried by said form-carrier, female dies co-operating with said forms to mold the sides of the counter, means for compressing said side dies against the said forms and holding them closed thereagainst during a portion of the rotation of the form-carrier, a heel-molding female die to engage the back or heel-portion of the counter, and means for compressing the said back or heel-portion between a form and the heel-die, as the form-carrier continues to rotate, substantially as described.

4. A counter-stiffener machine having a form-carrier, means for giving to said form-carrier a regular movement of rotation in a given direction, two or more forms carried by said form-carrier, female dies partaking of the rotary movement of said forms, and means for causing them to co-operate with said forms to mold a counter thereon as the form-carrier rotates, said means acting while the form-carrier rotates to compress the said dies against the said forms successively and hold them closed against a form during a portion of the rotation of the form-carrier while such form is traveling by the compressing devices and the next form is approaching the feeding point, and a flange-turning and rubbing device which turns and sets the flange of the counter on each form in turn during the rotation of the form-carrier, substantially as described.

5. A counter-stiffener machine having a form-carrier, means for giving to said form-carrier a regular movement of rotation in a given direction, two or more forms carried by said form-carrier, female dies partaking of the

rotary movement of said forms, and means for causing them to operate with said forms to mold counters thereon as the form-carrier rotates, said means acting while the form carrier rotates to compress the said dies against the said forms successively and hold them closed against a form during a portion of the rotation of the form-carrier while such form is traveling by the compressing devices and the next form is approaching the feeding point, and flange-turning jaws adjacent to the path of movement of the forms and whereby the flange of the counter on each form in turn is turned during the rotation of the form-carrier, substantially as described.

6. In a counter stiffener machine, the combination with the rotary form-carrier provided with two or more forms e of the dies f, the pivoted arms h, upon which said dies f are mounted and means for reciprocating said arms h whereby said arms may be made to travel with the form carrier while the dies f are in engagement with the counter and may then be returned to their normal position in readiness for the succeeding form, substantially as set forth.

7. In a counter stiffener machine, the combination with the rotary form carrier d of the form e mounted thereon, the dies f, die-holders l, arms h, said die-holders being arranged to slide in said arms toward and from the form on the form carrier, and the cams j for positively moving said die-holders and dies into engagement with the counter blank on the form, substantially as set forth.

8. In a counter stiffener machine, the combination with the rotary form carrier d and the form e mounted thereon of the dies f adapted to approach and recede from said forms e, mechanism for actuating said dies f, the heel die l^3 and the cam-actuated toggle-mechanism for operating said heel die, substantially as set forth.

9. In a counter stiffener machine, the combination with a rotary form-carrier, having two or more forms mounted thereon, of the heel mold l^3 and its toggle-actuating arms, and the lever g^4 and its actuating cams, substantially as set forth.

10. In a counter-stiffener machine, the combination with the form carrier d, and forms e mounted thereon, of the dies f, the lever arms h, the lever b^3, projections c^3 pivoted to said lever b^3, and projections g on the form carrier, substantially as set forth.

11. In a counter-stiffener machine having a rotary form-carrier provided with two or more forms upon which the counters are molded, the combination therewith of the dies f, the lever arms h which support said dies, their actuating levers e^3 and the disks l^4 each having a pin or projection which engages a lever e^3 to actuate the same, substantially as set forth.

12. In a counter-stiffener machine having a rotary form carrier provided with two or more forms mounted thereon and having cooperating dies to mold the counters over and upon said forms, the combination therewith of the speeded roll f^7 for burnishing the counter blanks before they are subjected to the action of the dies, substantially as set forth.

13. In a counter-stiffener machine having a rotary form carrier a form mounted thereon, the combination therewith of feed mechanism, whereby the counter blanks are fed one at a time, to a position in front of the line of movement of the form, and transferring mechanism whereby said blanks are moved forward from said position into the path of the form, substantially as set forth.

14. In a counter-stiffener machine having a rotary form carrier, the combination therewith of a receptacle for holding the counter blanks, mechanism for transferring the blanks from the receptacle singly to the feed rolls, feed rolls for feeding said blanks to a suitable support in line with and in front of form and transferring mechanism for moving said blanks forward into the path of the forms, substantially as set forth.

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

NATHAN J. SIMONDS.

Witnesses:
WM. A. MACLEOD,
ROBERT WALLACE.