A. W. JOHNSON.

MEANS FOR SHAPING AND DRYING FABRIC ARTICLES.

APPLICATION FILED APR. 28, 1920.

1,425,969.

Patented Aug. 15, 1922.

2 SHEETS—SHEET 1.

Fig. 1

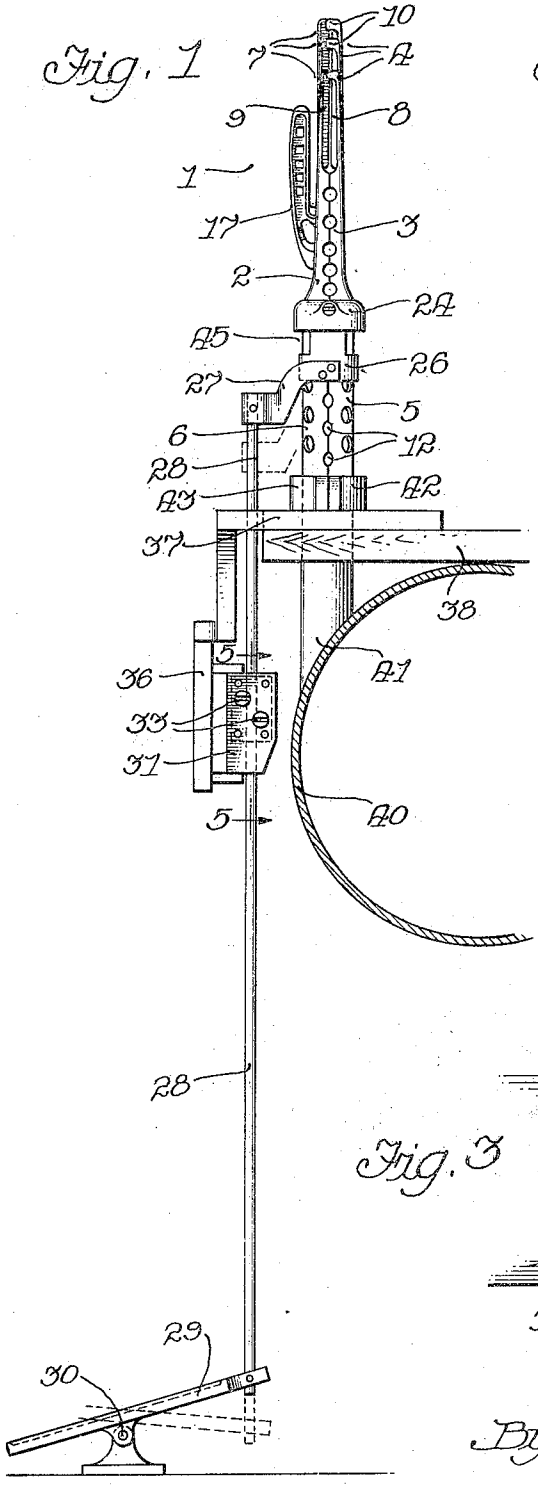


Fig. 2

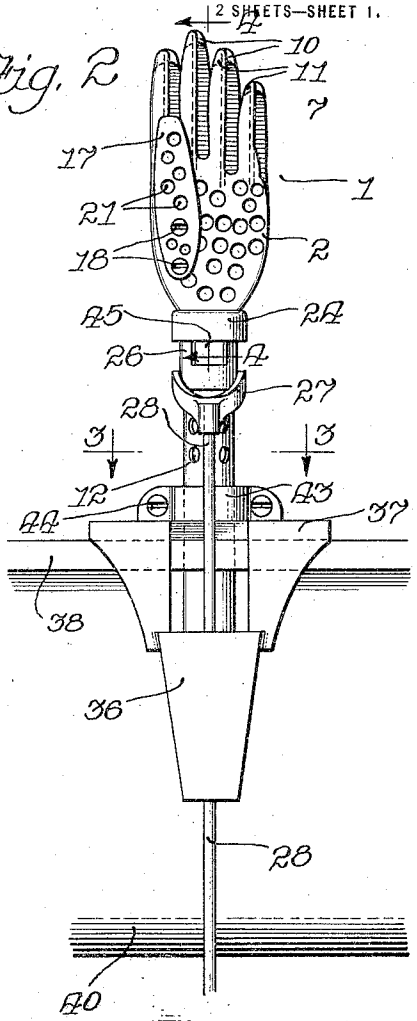
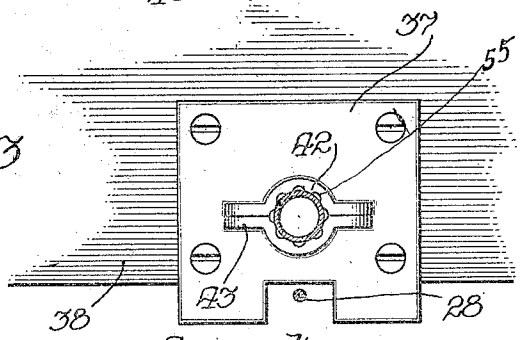


Fig. 3



Inventor
Arthur W. Johnson
By Brown Borden & Dixon
Attorneys.

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2 SHEETS—SHEET 2.

Fig. 4

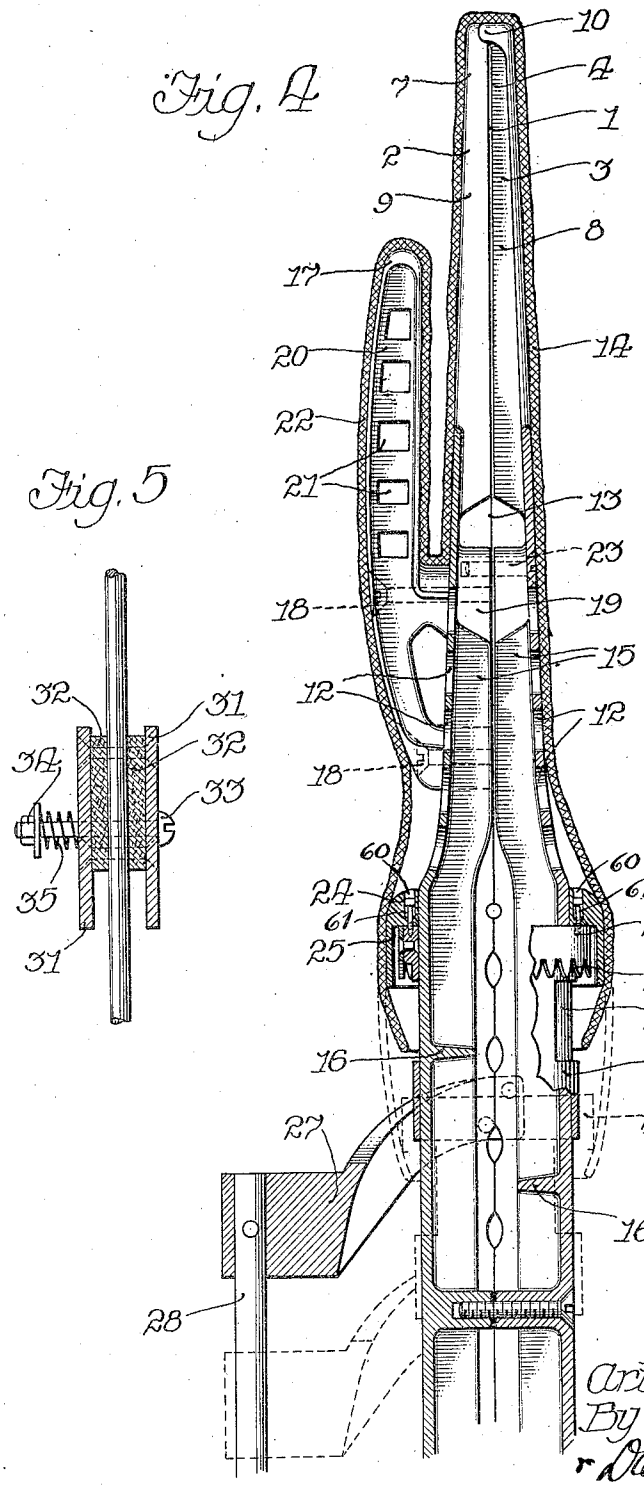


Fig. 5

Fig. 6

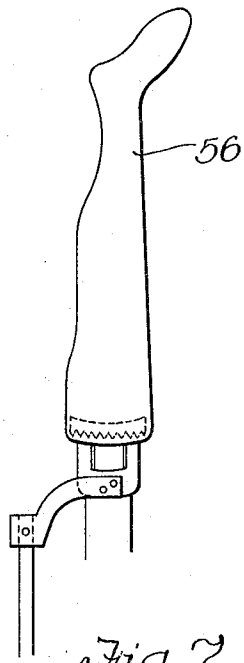
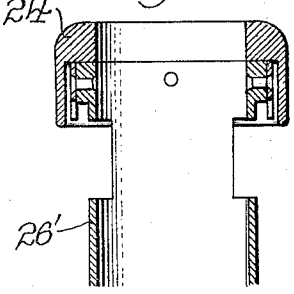


Fig. 7



Inventor
Arthur W. Johnson
By Brown Boulder
Denver Attorneys

UNITED STATES PATENT OFFICE.

ARTHUR W. JOHNSON, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO BRADLEY KNITTING COMPANY, OF DELAVAN, WISCONSIN, A CORPORATION OF WISCONSIN.

MEANS FOR SHAPING AND DRYING FABRIC ARTICLES.

1,425,969. Specification of Letters Patent. Patented Aug. 15, 1922.

Application filed April 28, 1920. Serial No. 377,289.

To all whom it may concern:

Be it known that I, ARTHUR W. JOHNSON, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented a certain new and useful Improvement in Means for Shaping and Drying Fabric Articles, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to the art of finishing fabric articles of manufacture and is concerned more particularly with an improved arrangement for shaping and drying fabric articles, especially knitted gloves, hosiery and the like.

In finishing various fabric, especially knitted articles they are put through what is commonly known as a shaping or drying process which consists in arranging the article in a moist condition upon a shaping form and drying the article to shape. Heretofore in the art great difficulty has been experienced in properly positioning the fabric article upon the form. Further difficulty has been experienced in maintaining such proper positioning during the shaping or drying process. In attempting to maintain the positioning of the article various means of which those skilled in the art are well aware, have been provided, such as for example, fabric holders secured to the form to prevent the article from creeping up during the drying process, or even pins have been arranged through the exterior surface of the article disfiguring and consequently detracting from the saleable appearance thereof. Furthermore, such provisions as these have in no way aided in arranging the article upon the form. This has been a considerable problem in that it has been customary for the operator to grasp the open end of the stocking or mitten for example, and pull the same on to the form. Belled, flared and non-uniform open ends, the extent of which has been increased in stretching the article to the desired length, have been the result. Fabric holders, the nap of which is intended to prevent creeping of the article, are not adapted for cooperation with such belled or flared ends, but must be arranged at a considerable distance therefrom. Consequently, even though a uniformity of length down to such holder were thereby insured, there would be no provision for providing a uniformity of length from the holder to the end of the knitted article. Non-uniformity in the dimensions of the finished or ultimate product increases the work of the pairers and frequently makes re-shaping necessary.

A further difficulty of the prior art has been in casting a satisfactory shaping form with a smooth exterior surface and an internal conducting channel free from flaws and other defects. The shrinkage of the metal around the core has made proper removal of the same impractical. Furthermore, shifting of such a mold was frequent and inconsistent, wall thickness and blows common. Sheet metal forms frequently do not possess the desired rigidity and have proven otherwise unsatisfactory.

Primarily the object of my invention is to obviate the above disadvantages, and includes the provision of an improved method of and means for positioning the fabric article upon the form and for maintaining the same properly positioned during the shaping or drying process. A further object is to provide a novel manner of releasing the article upon the completion of the shaping or drying process. Another object is the provision of a novel, simple and improved shaping form, and a still further object is the provision of an improved drying process, which consists in arranging the article upon a shaping form conveying a drying medium into the form and then discharging the same through the fabric of the article arranged thereupon, leaving the fabric in a more "lofty" or better condition than heretofore. The following advantages are the result of my invention:

(*a*) Uniformity in dimensions of the articles and consequently less work for the pairers;

(*b*) Non-disfigurement of the articles, non-belling and non-flaring of the ends, and consequently a more saleable appearance;

(*c*) More satisfactory shaping of the product than heretofore provided;

(*d*) Increased efficiency of the shaping process, in that a labor saving is effected and the speed of the shaping process is increased;

(e) Better condition of the fabric upon completion of the shaping and drying process than heretofore.

My invention will be more readily understood by reference to the accompanying drawings, in which:

Figure 1 is a side elevational view of a highly successful form of apparatus for carrying out my invention;

Figure 2 is a front elevational view of the same;

Figure 3 is a horizontal cross sectional view taken substantially on the line 3—3 of Figure 2;

Figure 4 is an enlarged vertical sectional view taken substantially on the line 4—4 of Figure 2;

Figure 5 is a vertical section taken substantially on the line 5—5 of Figure 1;

Figure 6 is a side elevational view of an alternative adaption of my invention; and

Figure 7 is a fragmentary sectional view of a further modification.

I have considered it conducive to a clear understanding of my invention to illustrate primarily the apparatus for shaping and drying a particular knitted article, and while I have taken a knitted glove or mitten as an example, it is to be understood that my invention is not limited to use in such particular connection, but is adapted for shaping and drying hosiery and various other knitted articles as well.

To shape and dry the knitted article a shaping form 1, adapted to be heated from within to any desired temperature, is utilized. This shaping form comprises a pair of supplemental sections 2 and 3 cast or otherwise, suitably fashioned, preferably of aluminum or an aluminum alloy. This sectional formation of the form facilitates coring the internal conducting channel therein and convenient removal of the core in spite of any shrinkage of the metal thereupon. The section 3 comprises a back portion having upwardly extending finger portions 4 to simulate the back of a hand, and a downwardly extending portion 5 of semi-circular horizontal section which extending semi-circular portion 5, together with the co-operating semi-circular portion 6 of the section 2 comprises a conduit for conveying heated fluid into the form. The section 2 includes, in addition to the downwardly extending conduit-forming portion 6, a palm portion having upwardly extending finger portions 7. The adjacent edges of the finger portions 4 and 7, which finger portions are preferably offset as shown in Figure 2 to produce a lap formation of arrangement of the fingers of the fabric glove, are provided with co-operating flanges 8 and 9 respectively therealong. These co-operating flanges provide, in effect a baffle wall through each of the fingers resulting in an effective and even distribution of the heat through the finger portions of the glove or mitten to be dried. Co-operating lugs or prongs 10 and 11, carried adjacent the upper ends of the finger portions 4 and 7 respectively, provide for aligning the form sections so that they may be properly secured together.

Outlet openings 12, distributed through the walls of the form sections 2 and 3, permit the heated air, steam or other fluid conveyed to the internal conducting channel 13 to pass therefrom and through the fabric of the glove 14 (Figure 4), or other article arranged upon the form, to properly dry the same. This discharge of the heating fluid through the fabric of the glove leaves the fabric in a better or more "lofty" condition than heretofore. Integral longitudinally arranged flanges or webs 15 carried by the internal faces of the sections 2 and 3, serve as baffles for distributing the heat properly through the form, while the transversely arranged webs 16 retard the flow of the heated fluid through the conduit portion of the form sufficient to adequately heat and thereby properly dry the gauntlet portion of the glove.

An independent thumb section 17 is suitably secured in proper position upon the palm portion of the form section 2, as by means of suitable machine screws 18 or the like threaded into suitable bosses 19 carried by the section 2. The heads of the screws 18 are countersunk so as to be substantially flush with or within the outer surface of the forms. The heated fluid is conveyed from the internal conducting channel 13, into the hollow thumb section 17 by way of certain of the outlet openings 12 distributed through the section 2. The hollow thumb section 17 is provided with a substantially centrally disposed web 20 and a plurality of outlet openings 21 therethrough from the forward to the rear face thereof, whereby the heat is distributed evenly through the fabric of the thumb 22 of the glove 14.

The sections 2 and 3 are secured together by means of suitable machine screws 23 or the like. A ring or annulus 24 embraces the co-operating conduit portions 5 and 6 thereof, adjacent their termination in the palm and back portions of the form. The ring or annulus 24, provides an effective stripper or means for releasing the knitted article from the positioning member as will be hereinafter more fully set forth.

I do not intend to limit the present invention to the construction of the form herein disclosed, nor to the particular manner of conveying the heated fluid through the form and consequently these novel provisions may be varied without departing from the present invention. For example, the present in-

vention is as equally applicable in connection with the shaping of a stocking and various other knitted articles as it is in connection with a glove or mitten.

The ring or annulus 24 is counter bored or otherwise provided with a co-axial pocket 25 for the reception of the fabric engaging portion of the positioning and position maintaining member. The fabric positioning member comprises a sleeve 26 slidably mounted upon the downwardly extending conduit portions of the form 1 and secured adjacent its lower end as by means of suitable rivets or the like between the forked arms of a yoke member 27. The yoke member 27 is fixedly mounted upon the upper end of an operating rod 28 the lower end of which rod 28 is connected with a foot operated treadle 29 adapted for movement about its pivot 30, whereby sliding movement of the positioning member along the upright conduit portion of the form 1 is effected.

Within its length the rod 28 is arranged between a pair of plates 31, the inner faces of each of which plates is provided with a fibrous or other suitable friction facing 32. These plates are clamped in engagement with the rod 28 by means of a pair of threaded stems or studs 33, the free ends of which threaded stems engage in suitable nuts 34 between each of which nuts 34 and the adjacent plate 31 a coiled spring 35 is interposed. The friction faced plates 31—31 are carried by a flange 36 depending from a mounting base 37, the contact or frictional engagement between the faces of these plates and the rod 28 maintaining the rod positively against displacement from any position into which it is adjusted or moved by means of the treadle 29.

The mounting base 37 is mounted upon a table or other suitable form supporting surface 38 beneath or otherwise suitably positioned relative which a fluid conveying conduit 40 is arranged for conveying heated air, steam or the like to the forms. An upright conduit 41 communicating with the conduit 40 at its lower end extends up into open communication with a bore provided through the horizontally arranged portion of the mounting base 37. Substantially one half of this bore is defined by an integral upright flange 42 between which flange 42 and a co-operating clamping bracket 43 the lower end of the conduit portion 5—6 of the form 1 is securely clamped as by means of suitable bolts 44. Thus the internal conducting channel 13 of the form 1 is placed in convenient and effective communication with the supply conduit 40.

The sleeve 26 is provided with openings 45 so as to not interfere appreciably with the passage of the heated fluid through the outlet openings 12. The upper end of the sleeve 26 is provided with an annular portion of increased diameter, which annular portion is embraced by a fabric engaging element 46 in the nature of a sheet metal ring secured thereto by means of suitable rivets or the like and provided with a lower serrated fabric engaging edge 47. The annular portion of increased diameter adjacent the upper end of the sleeve 26 spaces the fabric engaging element therefrom slightly so that the lower end of the knitted article will be positively and effectively engaged by the serrated edge 47 upon the downward movement of the positioning member. The continuity of the fabric engaging element about the form provides for engagement with the article completely about the inner periphery thereof. There are no disengaged gaps and consequently no bulging of the fabric.

The ring or annulus 24 is connected with the fabric positioning sleeve 26 through set bolts 60, the heads of which engage in suitable openings 61, countersunk from the upper surface of the annulus 24. It is to be noted that clearance is provided between the heads of the bolts 60 and the lower ends of the countersunk openings 61. Consequently, in operation the fabric positioning sleeve 26 is first moved downwardly a sufficient distance to effect engagement with the fabric article whereupon further downward movement of the sleeve 26 will move the annulus 24 downwardly therewith by reason of the engagement of the heads of the bolts 60 with the lower ends of the openings 61. In releasing the article the sleeve will be first moved or telescoped up into the annulus 24 to strip the fabric from the fabric engaging edge 47, further upward movement returning the annulus to its normal position. This lost motion between the annulus 24 and the sleeve 26 may obviously be provided through a slot and pin arrangement or in any other desired manner. The result is that any tendency toward bulging of the gauntlet portion of the glove will be restricted to the lower edge thereof.

The knitted article is positioned and maintained positively positioned during the shaping or drying process as follows: The mitten, for example, is arranged loosely upon the form substantially as shown in full lines in Figure 4. The forward portion of the foot operated treadle 29 is then depressed, moving the sleeve 26 downwardly through the rod 28 along the conduit portion 5—6 of the form 1. This downward movement of the sleeve 26 first causes engagement of the serrated edge 47 of the fabric engaging member 46 carried thereby with the interior face of the fabric adjacent the lower end of the glove 14, further downward movement of the sleeve thereupon stretching the glove to the desired dimensions (determined by

the movement of the treadle 29) or in other words, further downward movement of the sleeve 26 properly positions the glove upon the form as shown in dotted lines. Such positioning has been accomplished heretofore by grasping the lower edge of the glove and pulling the same onto the form and has been accomplished with numerous disadvantageous results hereinbefore set out. Upon attaining the desired dimensions or the dimensions of the ultimate product, the foot is removed from the treadle 29, the frictional engagement of the faced plates 31—31 positively maintaining the glove in stretched condition, or in other words properly positioned upon the form during the drying thereof.

The heated air or other drying fluid conveyed from the conduit 40 through the conduit 41 to the internal conducting channel 13 of the form passes through the outlet openings 12 and is distributed evenly through the fabric of the glove to properly dry or iron the same. When the glove has been properly dried and shaped the rear or after portion of the treadle 29 is depressed, moving the sleeve upwardly along the conduit portion 5—6 of the form 1. Upon telescoping the fabric engaging or holding member into the ring or annulus 24 the downwardly extending flange or petticoat thereof serves as a stripper for stripping the fabric from the serrated edge 47, thereby releasing the knitted article upon completion of the shaping or drying process so that it is arranged loosely upon the form and adapted for convenient removal. In order to insure proper drying of the lower edge of the glove, I have provided a plurality of grooves or passages 55 in the inner peripheries of the clamping brackets 42 and 43 for conveying heating fluid from the upright conduit 41 to the lower edge of the glove.

In Figure 6 I have shown my invention embodied in connection with a hosiery form 56, the particular construction of which form is immaterial.

In the modification shown in Figure 7 the ring or annulus 24′ is adapted to be fixed against movement upon the conduit forming portion of the form. The sleeve 26′ is free of the ring or annulus 24′ for movement into and out of the same, to engage and position the article and release the same substantially as pointed out in connection with Fig. 4.

From the foregoing it will be apparent that I have provided for attaining the objects of my invention and obviating the disadvantages of the prior art in a simple, reliable and highly effective manner. I do not intend to be limited to the specific disclosure or precise utilities specified, but aim to cover all modifications and adaptations coming within the scope of my invention as set out in the appended claims. The particular arrangement for transmitting relative motion between the shaping form and the positioning elements, as well as the means for maintaining such elements in adjusted position may be varied.

I claim:

1. The combination with a shaping form upon which a fabric article is adapted to be shaped, of a fabric engaging element adjustable relative to said form, means for effecting disengagement of said fabric engaging element, said disengaging means being adjustable relative to said form, and a lost motion connection between said fabric engaging element and said disengaging means.

2. The combination with a shaping form upon which a fabric article is adapted to be shaped, of a fabric engaging element associated with said form, means for effecting disengagement of said fabric engaging element, said disengaging means being movable relative the form.

3. In combination, a form upon which an article to be shaped is adapted for arrangement, an article engaging element associated with said form and means for effecting disengagement of said article engaging element, said disengaging means being movable relative the form and the article engaging means.

4. In combination, a form upon which an article is adapted for arrangement, means movable along the form to position an article thereupon, article releasing means extending outwardly beyond the surface of the form, said article positioning means being movable between the form and said releasing means to release the article.

5. In combination, a form upon which an article to be shaped is adapted for arrangement, an article engaging member movable along the form to engage the article, means for releasing said engagement, and a lost motion connection between said article engaging and said releasing means.

6. In combination, a form upon which an article to be shaped is adapted for arrangement, means movable along the form to position the article thereupon, means normally restraining said positioning means against movement, and means for moving said positioning means against the resistance of said restraining means, the restraining means holding the positioning means in any position at which the movement of said means is terminated.

7. In combination, a form upon which an article to be shaped is adapted for arrangement, an annulus encircling said form and provided with an annular pocket and an article engaging element encircling the form and movable into and out of said annular pocket.

8. In combination, a form upon which an article to be shaped is adapted for arrange-

ment, an annulus encircling said form and provided with an annular pocket, an article engaging element encircling the form and movable into and out of said annular pocket and a lost motion connection between said annulus and said article engaging element.

9. In combination, a form upon which an article is adapted for arrangement, means for positioning the article upon the form, rigidly acting means for releasing the article positioning means, said rigidly acting releasing means being movable relative to the form.

10. In combination, a form upon which an article is adapted for arrangement, rigidly acting article engaging means for positioning the article upon the form, and means for releasing engagement of said rigidly acting article engaging means.

11. In combination, a form upon which an article is adapted for arrangement, rigidly acting article engaging means for positioning the article upon the form and means for releasing engagement of said rigidly acting article engaging means, said releasing means being rigidly acting.

12. In combination, a form upon which an article is adapted for arrangement, means engageable with the article and movable along the form to position the same thereupon, said means being positioned wholly without the external peripheral dimension of the form throughout its various positions.

13. In combination, a form upon which an article is adapted for arrangement, article engaging means movable along the form in one direction to position the article thereupon, article releasing means in the path of movement of said article engaging means in the opposite direction, said article engaging means being movable in said opposite direction longitudinally beyond the releasing surface of said releasing means to release the article.

In witness whereof I hereunto subscribe my name this 24th day of April 1920.

ARTHUR W. JOHNSON.