J. CHRISTY.

MECHANISM FOR SECURING BALLS TO TAPE OR THE LIKE.

APPLICATION FILED MAR. 20, 1913.

Patented Aug. 18, 1914.

1,107,758.

2 SHEETS—SHEET 1.

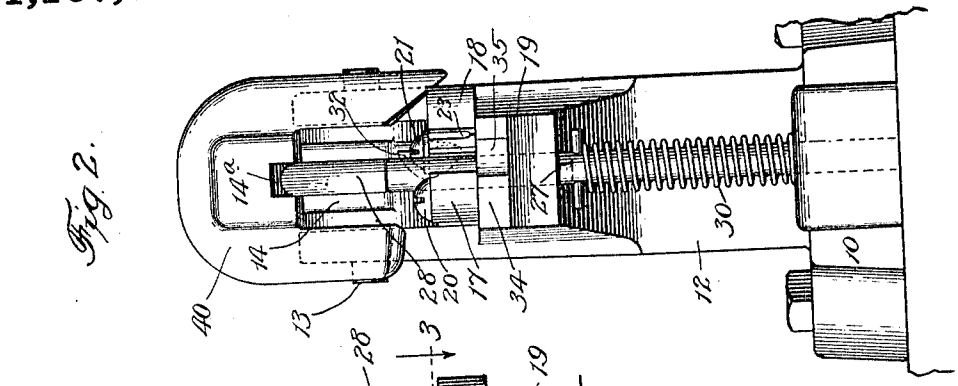


Fig. 2.

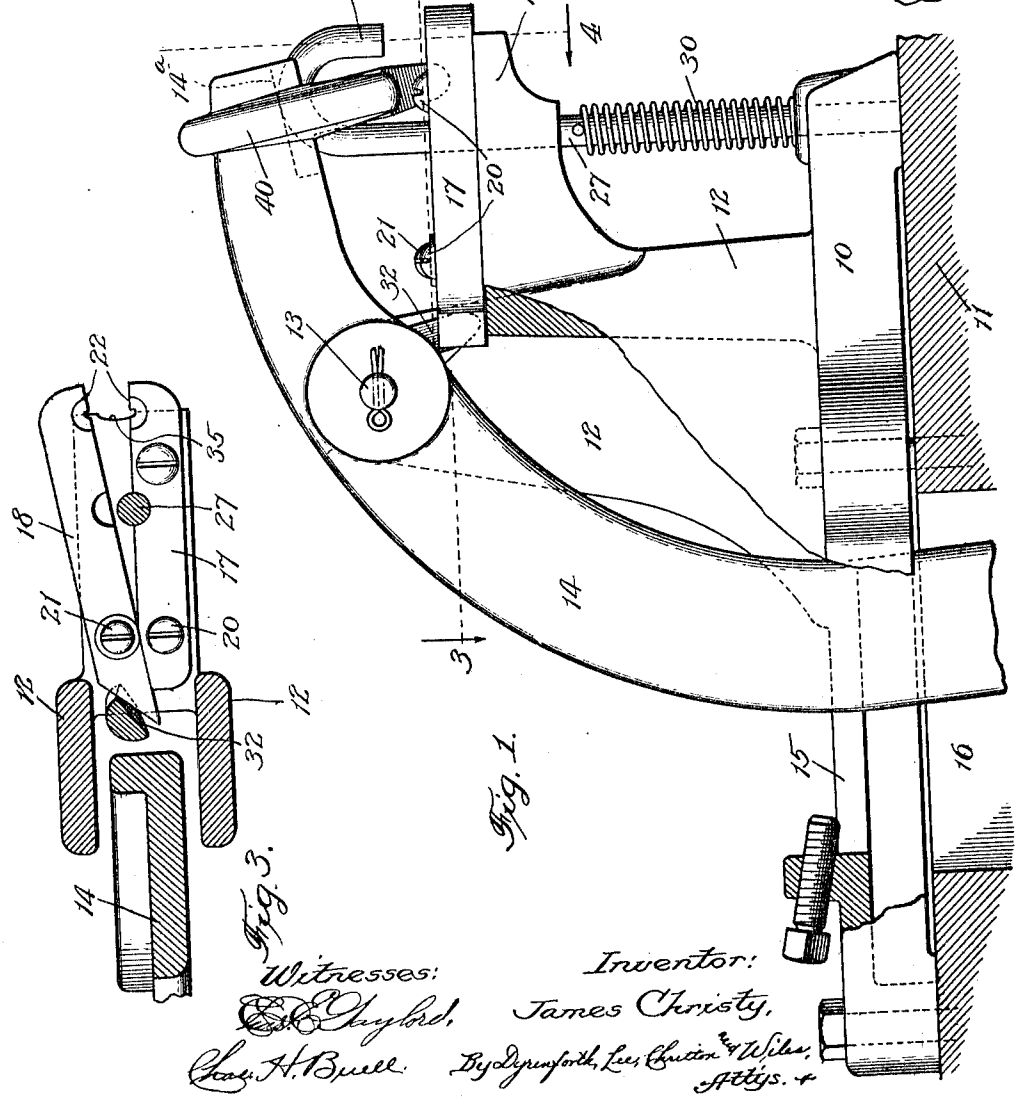


Fig. 1.

Fig. 3.

Witnesses:
E. E. Shuford,
Chas. H. Burell.

Inventor:
James Christy,
By Dyrenforth, Lee, Chrisman & Wiles,
Attys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

J. CHRISTY.

MECHANISM FOR SECURING BALLS TO TAPE OR THE LIKE.

APPLICATION FILED MAR. 20, 1913.

Patented Aug. 18, 1914.

1,107,758.

2 SHEETS—SHEET 2.

Fig. 4.

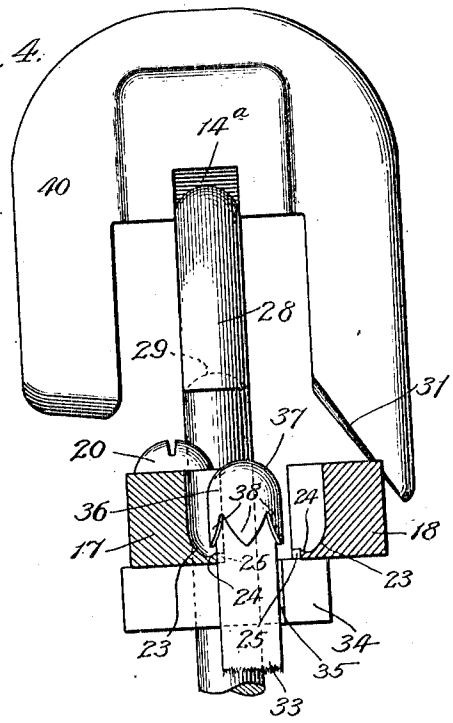


Fig. 5.

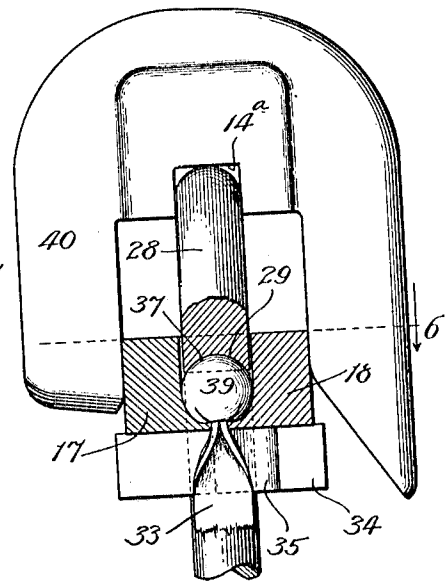


Fig. 7.

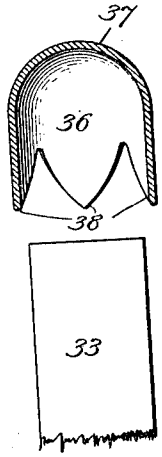


Fig. 8.

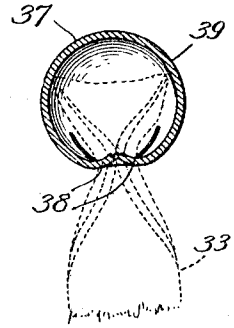


Fig. 6.

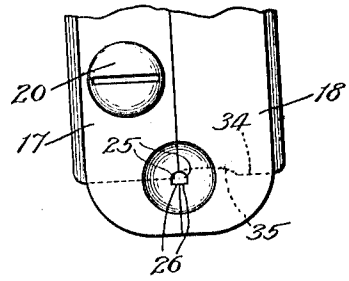
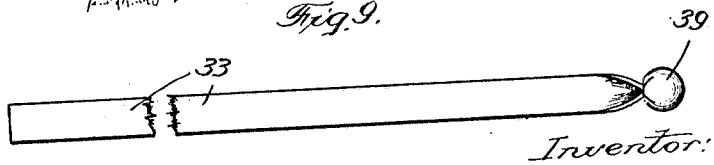


Fig. 9.



Witnesses:
C. C. Staybold,
Chas. H. Bull.

Inventor:
James Christy.
By Dyrenforth, Lee, Chrisman & Wilkes,
Attys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JAMES CHRISTY, OF CHICAGO, ILLINOIS.

MECHANISM FOR SECURING BALLS TO TAPE OR THE LIKE.

1,107,758. Specification of Letters Patent. Patented Aug. 18, 1914.

Application filed March 20, 1913. Serial No. 755,637.

To all whom it may concern:

Be it known that I, JAMES CHRISTY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Mechanism for Securing Balls to Tape or the like, of which the following is a specification.

My invention relates to mechanism of the variety adapted to secure balls to the ends of tape, or the like, for use more particularly in connection with the manufacture of gloves, and my objects, generally stated, are to provide a machine of the variety above stated which shall be simple of construction, economical of manufacture and positive in operation; by which the operations of fastening balls to the ends of tapes may be quickly effected and the ball-blank formed into a substantially perfect sphere and firmly attached to the tape by a single operation, and without requiring the forming of a knot in the tape.

Referring to the accompanying drawings, Figure 1 is a view in elevation, partly sectional, of mechanism, constructed in accordance with my invention, for securing balls to tapes, or the like, the machine being shown in normal position. Fig. 2 is a view in front elevation of the same. Fig. 3 is a section taken at the line 3 on Fig. 1 and viewed in the direction of the arrows. Fig. 4 is an enlarged section taken at the line 4 on Fig. 1 and viewed in the direction of the arrows, showing a piece of tape with a ball-blank positioned thereon and in position in the machine for being operated on to form the blank into a ball and secure it to the tape. Fig. 5 is a similar view showing the parts in the position they assume after the ball-forming operation. Fig. 6 is a plan view of the sectional members of the female member of the die, this view being taken at the line 6 on Fig. 5 and viewed in the direction of the arrow. Fig. 7 is a view in elevation of the ball-blank, preferably employed, and a piece of tape to be assembled therewith, the blank being shown in section. Fig. 8 is a view in sectional elevation of the ball formed by the machine, the tape to which it is secured being shown by dotted lines; and Fig. 9, a broken plan view of the finished ball-equipped tape produced by my improved mechanism.

The base-portion of the machine is represented at 10 and in the construction illustrated is of a form adapting it to be secured to the top of a table represented at 11. The base 10 is equipped with a pair of upwardly-extending lugs 12 spaced apart and carrying a pin 13 forming a fulcrum for a lever 14 located between said lugs and extending at its lower end through openings 15 and 16 in the base 10 and table-top 11, respectively, the lower end of this lever, in practice, preferably being connected with treadle mechanism (not shown) for operating it, as is common in mechanism of this character.

The female die-member of the machine is formed of relatively-movable sections 17 and 18, which are supported on the top of a horizontally-disposed extension 19 of the base 10 in the particular construction illustrated, the section 17 being stationarily secured to the extension 19, as by screws 20, and the section 18 being pivoted near its rear end on said extension, as indicated at 21, to permit it to be moved at its forward end toward and away from the section 17.

Each of the sections 17 and 18 contains in its inner side at its forward end a recess 22, these recesses being of such form and so disposed, as illustrated, as to cause an opening of circular-shape in cross-section to be presented, when the section 18 is swung laterally into contact with the section 17 (Fig. 5), the walls of the recesses 22 being of spherical contour at their bottom portions, as represented at 23, and terminating in slightly upwardly-inclined surfaces 24 surrounding openings 25 in the bottoms of the recesses 22, the front walls of the openings 25 being straight, as represented at 26, with the other portions thereof of arc-shape.

The male die-member in the construction illustrated is in the form of a rod 27, guidedly confined in openings in the base 10 to permit it to be vertically reciprocated and having a downwardly-turned section 28 the underside of which contains a recess 29 of spherical form, at which, in the operation of the mechanism, the member 28 presses against the ball-blank, hereinafter described, in the female die-member, the member 28

being so disposed that when it is depressed it will register with and enter the opening, formed by the recesses 22, in the female die-member, as hereinafter set forth.

In the operation of the device the section 18 is first swung into contact at its forward end with the section 17, and the male plunger-member 28 is then depressed to enter the female die-members and operate on the ball-blank, as hereinafter described, these operations in the preferred illustrated embodiment of my invention being effected by the single operation of the lever 14 through the medium of the following-described means: A coiled spring 30 surrounds the rod 27 and holds the latter normally in raised position wherein it extends at its upper end into the path of movement of the lever 14 in rocking downwardly at its forward end, and thus when the lever 14 is actuated the member 28 is depressed into the female die-members, the upper end of the rod 27 extending into a slot 14^a in the lever 14 for holding the rod 27 rigid and preventing it from turning. The lever 14, at its forward end, is provided with a cam-surface 31 adapted to engage the edge of the section 18, at its forward end, and swing it into engagement with the section 17 when the lever 14 is swung downwardly at its forward end; and with a cam-surface 32 adapted to engage the rear end of the section 18 and swing it away from the section 17 when the lever 14 is swung in the reverse direction, the parts of the mechanism being so arranged and proportioned that the section 18 will be moved into contact with the section 17 before the male plunger-member 28 has lowered sufficiently to contact with the ball-blank arranged in the female die-members as hereinafter described.

The operation of the mechanism is as follows: The tape such as that represented at 33 and to which a ball is to be secured is positioned, by the operator, at its upper end flatwise against the front side 34 of the extension 19, (Fig. 4) which latter is preferably recessed, as represented at 35. Prior to the positioning of the tape as described, or after it has been so positioned, a ball-blank as for example that represented at 36, is positioned over the upper end of the tape 33 (Fig. 4) to lie between the recesses 22, the ball-blank illustrated and which is of a form I prefer to employ being shaped like a cylinder with one end closed and of spherical contour, as represented at 37, and its opposite end open and serrated to afford relatively sharp prongs 38. The operator after thus positioning the tape 33 and ball-blank 36 in the machine operates the lever 14 with the result of first causing the section 18 to swing into contact with the section 17, and thereupon causing the plunger-member 28 to descend. As the section 18 thus swings, it causes the tape 33 immediately below the blank 36 to curl (Fig. 5) by engaging the tape between the walls of the openings 25, such curling action being insured by the provision of the curved recess 35 in the extension 19, and forces the blank toward the wall of the recess 22 in the section 17, the tape 33 at the end of the movement of the member 18 being gripped between the walls of the openings 25, (Fig. 5). The plunger-member 28 in descending engages the spherical surface 37 of the blank 36 and crowds it downwardly, the prongs 38, by engaging with the spherical and upturned portions 23 and 24, respectively, of the recesses 22, curling inwardly and finally upwardly (Figs. 5 and 8) into rigid, preferably penetrating, engagement with the tape 33 on the interior of the ball thus formed and represented at 39, a yoke 40 carried by the lever 14 serving as a clamp to prevent the sections 17 and 18 from spreading during the operation just described. Upon releasing the treadle, above referred to, the spring 30 returns the lever 14 and rod 27 to normal position (Figs. 1, 2 and 4) and thus the section 18, by engagement of the cam 32 therewith, is automatically swung to the position illustrated in Figs. 2, 3 and 4, preparatory to again being operated in which open condition of the female die-sections the tape with the finished ball thereon may be readily removed from the machine.

It will be readily understood from the foregoing that by reason of the fact that the forming surfaces for the blank are unmutilated, the only opening therein being at the bottom thereof where the tape enters the ball, a ball of substantially perfect spherical form, with the tape neatly folded where it enters the ball, may be produced by a single operation of the lever; and further that the upward deflection of the prongs 38 operate to prevent the tape 33 from pulling out of the ball 39, thus avoiding the necessity of knotting the tape with consequent economy in amount of tape required to be used. It will also be manifest that in my machine the tape and ball may be quickly and easily positioned, preparatory to operation thereon by the forming mechanism and that danger of producing defective articles is reduced to the minimum.

Another advantage afforded by my invention, when embodied in the preferred form, is the omission of overhung bearings which render a machine expensive to manufacture.

While I have described my improved machine for use in assembling balls with pieces of tape, it will be readily understood that it has equal applicability to the assembling of cords, string and the like, with balls, it being

within my invention to use it with cords, string and the like as well as tapes of any description. Furthermore, while I have illustrated and described a particular embodiment of my invention, I do not wish to be understood as intending to limit it to such embodiment as the same may be variously modified and altered without departing from the spirit of my invention.

What I claim as new and desire to secure by Letters Patent, is:—

1. In a machine of the character set forth, the combination of a base, a female die-member thereon, a member of inverted U-shape reciprocably supported at one arm thereof in said base with its opposite end carrying a male die, means tending to hold said U-shaped member in raised condition, and a rock-lever fulcrumed on said base with one end above said U-shaped member, and into the path of movement of which said U-shaped member extends, for the purpose set forth.

2. In a machine of the character set forth, the combination of a female die-member, a surface beneath said die-member and extending part way across the recess therein and against which the tape is positioned to extend into said die-member, and a male die-member coöperating with said female die-member, said surface extending lengthwise of the path of movement of said male die-member.

3. In a machine of the character set forth, the combination of a female die-member formed of relatively-movable sections, a surface beneath said die-member and extending part way across the recess formed between the sections of said die-member and against which the tape is positioned between the sections of said die-member, a male die-member, and means for actuating said male die-member, said surface extending lengthwise of the path of movement of said male die-member.

4. In a machine of the character set forth, the combination of a female die-member formed of relatively movable sections, a surface beneath said die-member and extending part way across the recess formed between the sections of said die-member and against which the tape is positioned between the sections of said die-member, a male die-member, and means for actuating said male die-member, said surface extending lengthwise of the path of movement of said male die-member.

5. In a machine of the character set forth, the combination of a female die-member, and a male die-member adapted to enter said female die-member, the end of said female die-member opposite to that entered by the male die-member, containing an opening of less width than the recess in said female die-member, for the purpose set forth.

6. In a machine of the character set forth, the combination of a female die-member formed of relatively movable sections, and a male die-member adapted to enter one end of said female die-member, said female die-member containing in its end opposite to that entered by said male die-member, an opening of less width than the recess in said female die-member, for the purpose set forth.

7. In a machine of the character set forth, the combination of a female die-member formed of relatively-movable sections, a male die-member adapted to enter one end of said female die-member, said female die-member containing in its end opposite to that entered by said male die-member, an opening of less width than the recess in said female die-member, and means for actuating said die-members.

8. In a machine of the character set forth, the combination of a female die-member containing a blank-receiving recess having an opening in its bottom, said female die-member being formed of relatively-movable sections together forming said recess, a surface beneath said die-member adjacent to said opening against which surface and in which opening the tape is positioned between said die-members, a male die member, and means for actuating said male die-member, said surface extending lengthwise of the path of movement of said male die-member.

9. In a machine of the character set forth, the combination of a female die-member containing a blank-receiving recess having an opening in its bottom of general circular shape enlarged at its forward portion, said female die-member being formed of relatively-movable sections together forming said recess, a surface beneath said die-member adjacent to said opening against which the tape is positioned between said die-members, a male die-member, and means for actuating said male die-member.

10. In a machine of the character set forth, the combination of a female die-member containing a blank-receiving recess having an opening in its bottom of general circular shape and enlarged at its forward portion with its front wall substantially straight, said female die-member being formed of relatively-movable sections together forming said recess, a surface beneath said die-member adjacent to said opening against which the tape is positioned between said die-members, a male die-member, and means for actuating said male die-member.

11. In a machine of the character set forth, the combination of a female die-member containing a blank-receiving recess having an opening in its bottom, said female die-member being formed of relatively-movable sec-

tions together forming said recess, a concaved surface beneath said die-member adjacent to said opening against which the tape is positioned between said die-members, a male die-member, and means for actuating said male die-member.

12. In a machine of the character set forth, the combination of a female die-member containing a blank-receiving recess having an opening in its bottom, said female die-member being formed of a relatively-stationary section and a section movable toward and away from said stationary section, said sections together forming said recess, a surface beneath said die-member adjacent to said opening against which surface and in which opening the tape is positioned between said die-members, a male die-member, and means for actuating said male die-member.

13. In a machine of the character set forth, the combination of a female die-member containing a blank-receiving recess having an opening in its bottom, a surface beneath said die-chamber adjacent to said opening against which surface and in which opening the tape is positioned in said recess, and a male die-member coöperating with said female die-member, said surface extending lengthwise of the path of movement of said male-member.

14. In a machine for tipping tape ends with pronged ball-blanks, the combination of a female die-member containing a blank-receiving recess shaped to bend inwardly the prongs on said blanks and having an opening in its bottom, said female die-member being formed of relatively-movable sections together forming said recess, the opening in said female die-member being of less width than the width of the tape when said sections are closed together, and a male die-member coöperating with said female die-member.

15. In a machine of the character set forth, the combination of a female die-member containing a blank-receiving recess having an opening in its bottom, said female die-member being formed of relatively-movable sections together forming said recess, the opening in said female die-member being of less width when said sections are closed together than the width of said tape, a surface beneath said die-member adjacent to said opening against which surface and in which opening the tape is positioned between said die-members, and a male die-member coöperating with said female die-member, said surface extending lengthwise of the path of movement of said male die-member.

16. In a machine for tipping tape-ends with pronged ball-blanks, the combination of a female die-member containing a recess the lower portion of which is of substantially spherical form, a male die-member coöperating therewith, and means in said recess for upwardly deflecting the ends of the prongs of the ball-blank.

17. In a machine for tipping tape-ends with pronged ball-blanks, the combination of a female-die-member containing a recess the lower portion of which is of substantially spherical form with an opening in the bottom of said recess for the tape, a male die-member coöperating with said female die-member, and means in said recess for upwardly deflecting the ends of the prongs of the ball-blank.

18. In a machine for tipping tape-ends with pronged ball-blanks, the combination of a female die-member containing a recess the lower portion of which is of substantially spherical form, the bottom of said recess containing a tape-receiving opening and the lower part of said recess being of general spherical form, a male die-member coöperating with said female die-member, and means in said recess for upwardly deflecting the ends of the prongs of the ball-blank.

19. In a machine for tipping tape-ends with pronged ball-blanks, the combination of a female die-member formed of relatively-movable sections containing a recess, the lower portion of which is of substantially spherical form, a male die-member coöperating therewith, and means in said recess for upwardly deflecting the ends of the prongs of the ball-blanks.

20. In a machine for tipping tape-ends with pronged ball-blanks, the combination of a female die-member formed of relatively-movable sections containing a recess, the lower portion of which is of substantially spherical form, a male die-member coöperating therewith, means in said recess for upwardly deflecting the ends of the prongs of the ball-blanks, and means for actuating said male and female die-members.

21. In a machine of the character set forth, the combination of a female die-member formed of relatively-movable sections containing a blank-receiving recess having an opening in its bottom, a surface beneath said die-member adjacent to said opening against which surface and in which opening the tape is positioned in said recess, and a male die-member coöperating with said female die-member, said surface extending lengthwise of the path of movement of said male die-member.

22. In mechanism of the character set forth, the combination of a female die-member formed of relatively-movable sections, and a male die-member adapted to enter said female die-member, the end of said female die-member, opposite to that entered by the

male die-member, containing an opening of less width than that of the forming-recess in said female die-member and extending substantially concentric with the walls of said recess.

23. In a machine of the character set forth, the combination of a female die-member formed of relatively-movable members, a male die-member adapted to enter said female die-member, the end of said female die-member, opposite to that entered by the male die-member, containing an opening of less width than the width of the forming-recess in said female die-member and extending substantially concentric with the walls of said recess, and a tape-positioning surface below said recess and extending lengthwise of the path of movement of said male die.

24. In a machine of the character set forth, the combination of a female die-member formed of relatively-movable sections, a male die-member adapted to enter said female die-member, the end of said female die-member, opposite to that entered by said male die-member, containing an opening communicating with the forming-recess in said female die-member, and a tape-positioning surface below the recess in said female die-member and extending in a direction lengthwise of said recess and substantially midway between diametrically opposed sides of said recess.

25. In a machine of the character set forth, the combination of a female die-member formed of relatively-movable sections, a male die-member coöperating with said female die-member, the end of said female die-member, opposite to that entered by the male die-member, containing an opening communicating and arranged concentrically with the forming-recess therein and of less width than the width of said recess, and a surface below said recess and extending in a direction lengthwise of said recess and substantially midway between diametrically opposed sides of said recess.

26. In a machine for tipping tape ends with pronged ball blanks, the combination of a female die-member formed of relatively-movable sections together forming the ball-forming recess, the bottom of which is of general spherical form and contains an opening in its bottom substantially concentric with the sides of the recess, and of relatively small width compared with the width of said recess, and a male die-member adapted to enter said female die-member.

27. In a machine for tipping tape ends with pronged ball blanks, the combination of a female die-member formed of relatively-movable sections together forming a ball forming-recess, the bottom of which is of general spherical form and contains an opening in its bottom, means adapted to engage with the tape in said opening and constrict said tape, and a male die-member adapted to enter said female die-member.

28. In a machine for tipping tape ends with pronged ball blanks, the combination of a female die-member formed of relatively-movable sections together forming a ball-forming recess the bottom of which is of general spherical form and contains an opening in its bottom, means adapted to engage with the tape in said opening and constrict said tape, a male die-member adapted to enter said female die-member, and a tape-positioning surface below the recess in said female die-member and extending lengthwise of the path of movement of said male die-member and substantially midway between opposite sides of said recess.

29. In a machine of the character set forth, the combination of a female die-member formed of sections one of which is pivotally supported to be moved toward and away from the other thereof, a pivotally supported lever, means operated by said lever and engaging said pivoted die-section at one point thereof for moving said die-section toward the stationary die-section, and means operated by said pivotally supported lever and engaging said pivoted die-member at another point thereof for moving the latter away from said stationary die-member, and a male die-member operated by said pivotally supported lever and coöperating with said female die-member.

30. In a machine of the character set forth, the combination of a female die-member formed of a stationary section, and a section pivoted between its ends, a pivotally supported lever, means operated by said lever and engaging with one end of said pivoted die-section for moving the latter toward said stationary die-section, means operated by said pivoted lever and engaging the other end of said pivoted die-section for moving the latter away from said stationary die-section, and a male die-member operated by said lever and coöperating with said female die-member.

31. In a machine of the character set forth, the combination of a female die-member formed of a stationary die-section and a die-section pivoted between its ends, a pivotally supported lever, means operated by said lever for engaging with one end of said pivoted die-section for moving the latter toward said stationary die-section, an inclined member operatively connected with said lever and engaging with the other end of said pivoted die-section for moving the latter away from said stationary die-section, and a male die operated by said lever and coöperating with said female die-member.

32. In a machine of the character set

forth, the combination of a stationary base, a lever fulcrumed on said base to extend at one end over the latter, a rod reciprocably confined in an opening in said base, a female die-member supported on said base, and a depending male die-member on the upper end of said rod and extending into engagement with said lever, for the purpose set forth.

JAMES CHRISTY.

In presence of—
O. C. AVISUS,
J. G. ANDERSON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents. Washington, D. C."