J. BRANT.

Apparatus for the Manufacture of Seamless Balls.

No. 207,158. Patented Aug. 20, 1878.

Fig. 1.

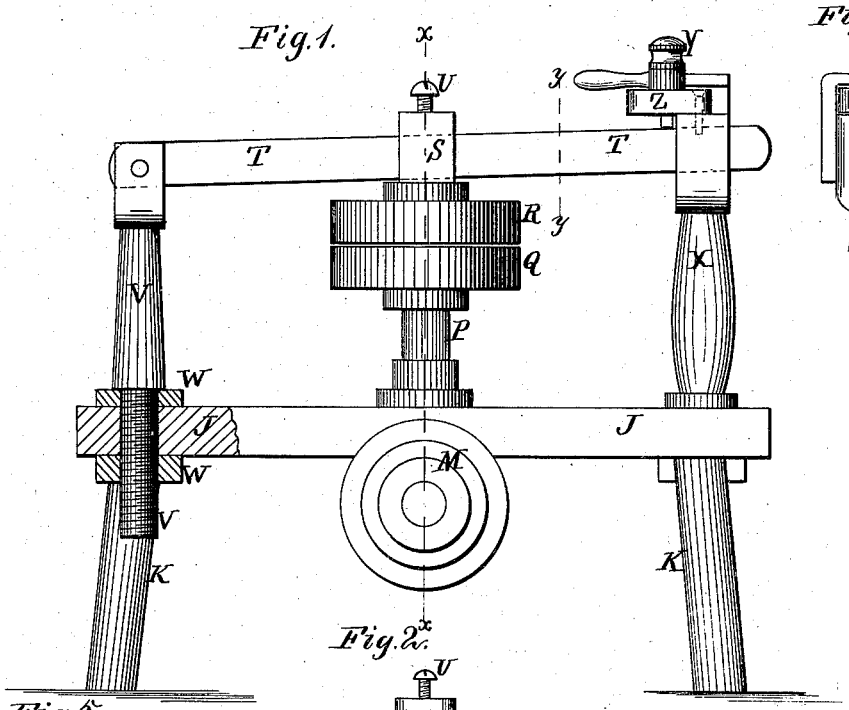

Fig. 3.

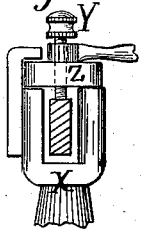

Fig. 2.

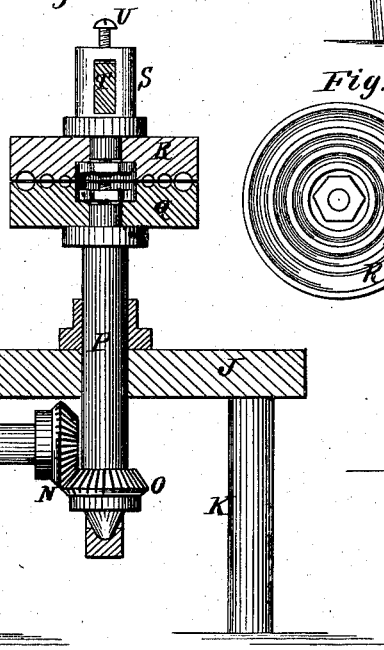

Fig. 5.

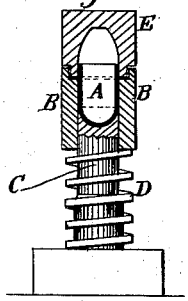

Fig. 4.

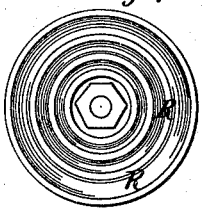

Fig. 7.

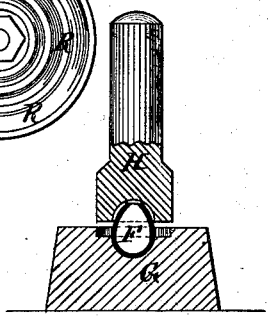

Fig. 6.

Fig. 8.

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UNITED STATES PATENT OFFICE.

JOHN BRANT, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO SYLVANUS M. LEWIS, OF SAME PLACE.

IMPROVEMENT IN APPARATUS FOR THE MANUFACTURE OF SEAMLESS BALLS.

Specification forming part of Letters Patent No. **207,158**, dated August 20, 1878; application filed July 3, 1878.

To all whom it may concern:

Be it known that I, JOHN BRANT, of Providence, in the county of Providence and State of Rhode Island, have invented a new and useful Improvement in Apparatus for Manufacturing Seamless Balls, of which the following is a specification:

Figure 1 is a side view of a finishing and polishing machine, partly in section to show the construction. Fig. 2 is a vertical cross-section of the same, taken through the line *x x*, Fig. 1. Fig. 3 is a detail section taken through the line *y y*, Fig. 1. Fig. 4 is a detail face view of one of the finishing and polishing wheels. Fig. 5 is a vertical section of the dies for drawing in the open end of the cylindrical cup-blank. Fig. 6 is a side view of the blank after its open end has been drawn in. Fig. 7 is a vertical section of the dies for bringing the blank to a spherical form. Fig. 8 is a detail view of a completed ball.

Similar letters of reference indicate corresponding parts.

The object of this invention is to furnish an improved apparatus for manufacturing seamless balls, which will enable seamless balls of any desired size to be made rapidly and accurately, and which shall be simple in construction and convenient in use.

I will describe the construction of the apparatus in connection with the description of its use.

A piece of sheet metal is first struck up into the form of a cylindrical cup, A, with a convex bottom, by means of the dies now in common use for such purposes. The blank A is then placed in the sleeve B, with its convex end resting in the semi-spherical concavity in the upper end of the stud C, which stud is made of such a size that the sleeve B may slide up and down upon it freely.

Upon the lower part of the stud C is placed a spiral spring, D, the lower end of which rests upon the base of the said stud, and upon its upper end rests the lower edge of the sleeve B.

The upper edge of the sleeve B is rabbeted upon its inner side to fit upon the lower edge of the upper part, E, of the dies.

The lower end of the die E has a tapering or conical concavity formed in it, so that the said die E, when forced downward by a press or other suitable means, may draw the upper edges of the blank A inward, and may produce the blank F. The blank F is then placed in the semi-spherical concavity of the die G, and the die H is forced down upon it.

The concavity of the die H is also semi-spherical, so that the dies G H may bring the blank F to a spherical or ball shape, as shown at I in Fig. 8.

J is the bed-plate or table of the finishing and polishing machine, which is supported upon legs K, of such a length as to support the machine at a convenient height. L is a short horizontal shaft, which revolves in bearings attached to the under side of the table J, and to the outer end of which is attached a pulley, M, to receive a driving-belt from any convenient power.

I prefer to make the pulley M a cone-pulley, to enable the rapidity of motion to be varied as required.

To the inner end of the shaft L is attached a bevel-gear wheel, N, the teeth of which mesh into the teeth of the bevel-gear wheel O, attached to the lower part of the short vertical shaft P.

The shaft P revolves in bearings attached to the table J, and its lower end revolves in a step attached to a cross-bar of the machine.

To the upper end of the shaft P is attached a wheel, Q, above which is placed a similar wheel, R.

In the adjacent faces of the wheels Q R are formed a number of concentric ring-grooves, which are made of different sizes, and are semi-cylindrical in their cross-section, so as to form tubular ring spaces or cavities when the two wheels are brought together.

To the upper side of the upper wheel, R, is attached, or upon it is formed, an eye or socket, S, to receive the lever T, to which it is adjustably secured by a set-screw, U. One end of the lever T is hinged to the notched or slotted upper end of the post or standard V.

The lower part of the standard V passes down through a hole in the table J, and has a screw-thread formed upon it to receive the nuts W, which are screwed upon it, the one

above and the other below the said table J, so that the wheels R Q may be adjusted at any desired distance apart.

The other end of the lever T is placed in a notch or slot formed in the upper end of the standard or post X, the lower end of which is rigidly attached to the table J. The end of the lever T is held down at the proper place in the slot of the standard X by a set-screw, Y, which passes down through the button Z, so that its forward end may rest against the upper edge of the said lever T.

The button Z is pivoted at one end to the upper end of the standard X at one side of its slot. The other end of the button Z swings into a notch in the other part of the end of the standard X, or in a projection formed upon the said part.

The button Z may be provided with a handle for convenience in swinging it in and out.

With this construction, when the balls are taken from the dies G H they are placed in the appropriate groove of the wheels Q, the wheel R is lowered and adjusted upon it, and a rapid motion is given to the wheel Q, so that the ball will be finished and smoothed, all inequalities being removed, and at the same time thoroughly polished.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination of the stud C, having a semi-spherical cavity formed in its upper end, the sliding sleeve B, the spiral spring D, and the die E, having a tapered or conical concavity formed in its face, with each other, for drawing in the edge of the cylindrical cup-blank A, substantially as herein shown and described.

2. The combination of the wheels Q R, having graduated concentric semi-cylindrical ring-grooves formed in their adjacent faces, the lever T, the adjustable standard and nuts V W W, the stationary standard X, the set-screw Y, and the button Z, with each other, with the table A, and with the driving mechanism M N O P, substantially as herein shown and described.

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Witnesses:

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SYLVANUS M. LEWIS.