Aug. 15, 1933. W. E. HUMPHREY 1,922,852

APPARATUS FOR BRANDING ARTICLES

Filed April 27, 1932 3 Sheets-Sheet 1

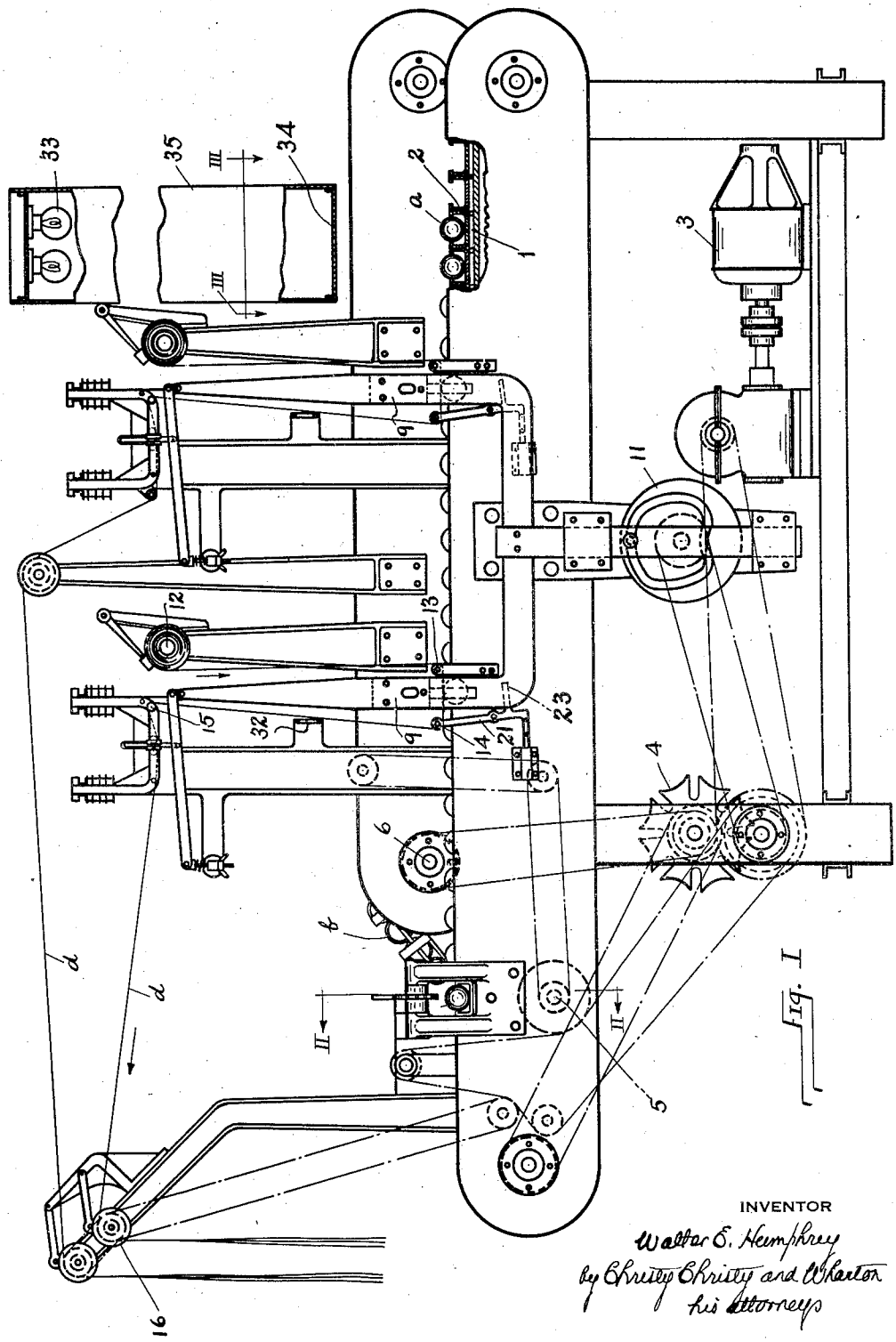

Fig. I

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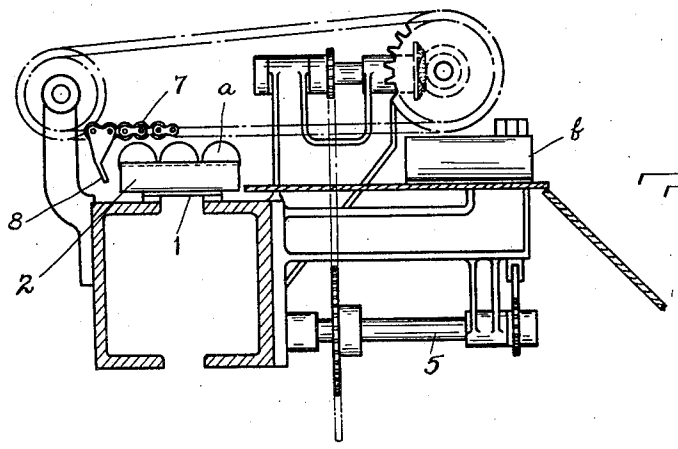

Fig. II

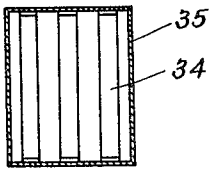

Fig. III

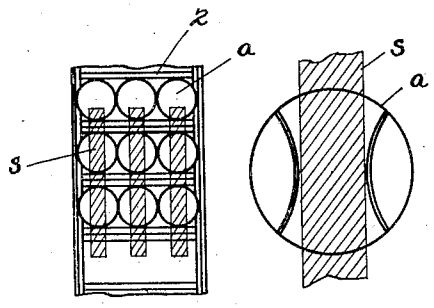

Fig. IV

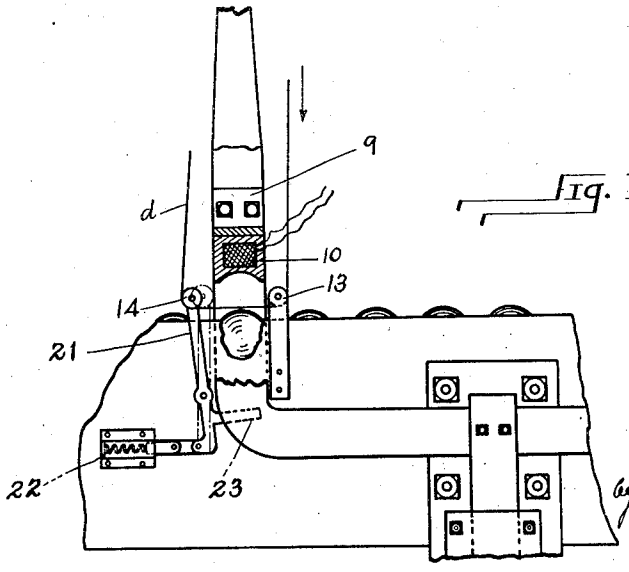

Fig. V

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Fig. VII

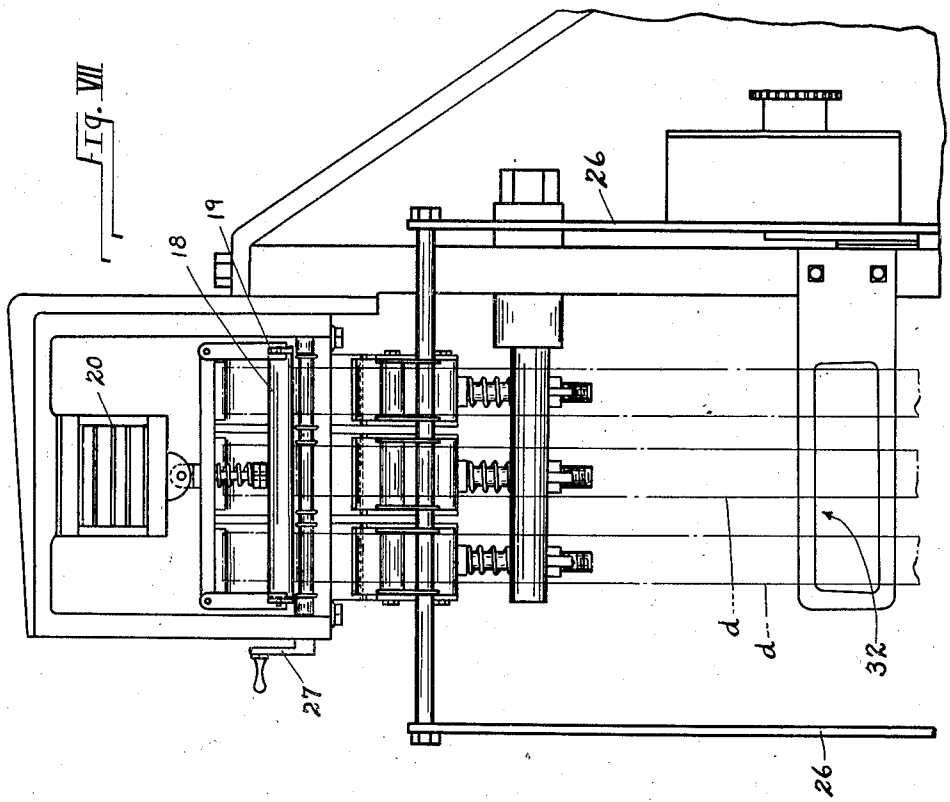
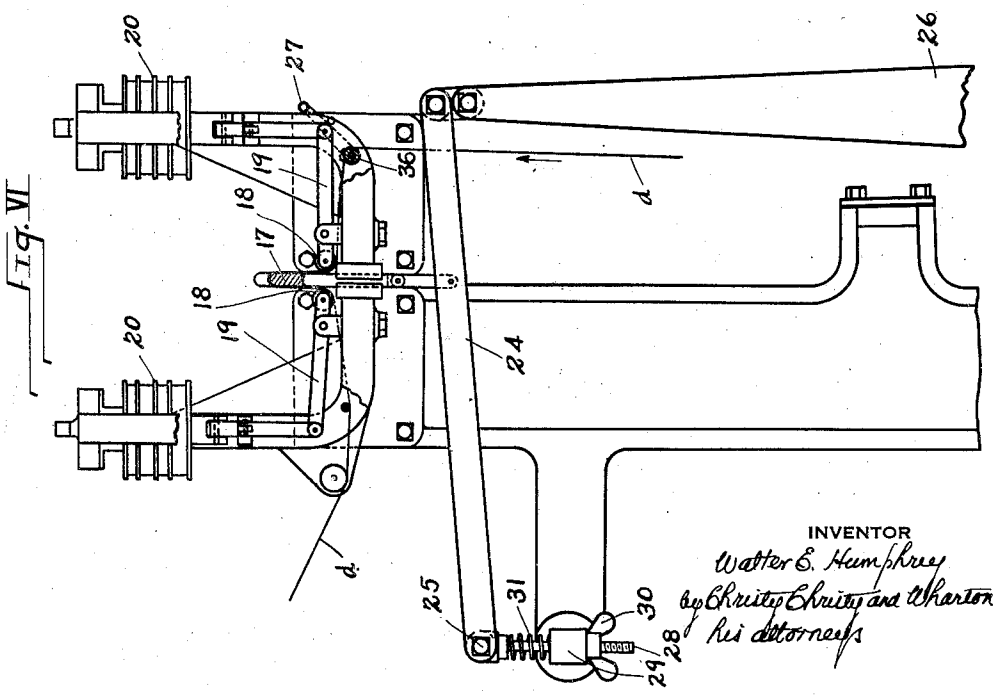


Fig. VI



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Patented Aug. 15, 1933 1,922,852

UNITED STATES PATENT OFFICE

1,922,852

APPARATUS FOR BRANDING ARTICLES

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Application April 27, 1932. Serial No. 607,795

5 Claims. (Cl. 101—44)

This invention relates to improvements in apparatus for branding articles, in preparing them for the market; it ordinarily will be associated (though not necessarily associated) with the packaging of the articles, and it finds practical application in the branding of tennis balls. Tennis balls are thin-walled spheres, formed essentially of rubber, and filled with air or other gas under somewhat elevated pressure. Because the materials are, some of them, chemically unstable, and because the walls of the balls are not ordinarily perfectly impenetrable, it has been found advantageous to pack tennis balls in hermetically sealed containers, within which and externally of the balls a pressure is established of such magnitude as to prevent leakage of gas from within the balls outwardly through their walls. Tennis balls commonly are used in sets of three, and it is desirable to can them in sets of three. The cans conveniently are elongate cylinders, of diameter sufficient to receive the balls with snug fit, and of length approximately three times the diameter. Apparatus for packing tennis balls in cans is shown and described in Letters Patent of the United States No. 1,743,780, granted January 14, 1930, on the application of Lee R. Hurlburt.

The present invention, although developed and used in association with packing apparatus for tennis balls having the characteristics shown and described in the said Letters Patent, has primarily to do, not with the packaging itself, but with the marking of the balls, as the last step in preparing them for packaging.

In the accompanying drawings Fig. I is a view in side elevation of a branding machine for tennis balls, in which the present invention is embodied; Fig. II is a view in cross-section, on the plane indicated at II—II, Fig. I; Fig. III is a view in horizontal section, on the plane indicated at III—III, Fig. I, and illustrating a detail; Fig. IV is a fragmentary view in plan from above, of a portion of the apparatus with its burden of tennis balls, and illustrating a feature of the invention, and, associated with this is a large-scale diagram, which will serve to indicate more clearly this feature and its utility; Fig. V is a fragmentary view partially in side elevation (and to that extent corresponding to Fig. I) and partially in vertical section, and illustrating details of the branding instrumentalities and their operation; Figs. VI and VII are views to larger scale, illustrating in side and in end elevation, and with greater particularity, a detail of the general showing of Fig. I.

An endless conveyor 1, equipped with a succession of transversely placed and open-ended troughs 2 (in which the balls are set in groups of three—cf. Fig. II) advances from right to left, Fig. I, in an upper, horizontal, burden-sustaining reach. The advance of the conveyor is intermittent, with pauses between successive, step-by-step, advances. Toward the left-hand end of this, its upper, burden-sustaining reach, instrumentalities are associated with conveyor 1 for pushing from each trough 2 in turn (conveyor 1 being at pause) and into a waiting can *b* (which has in simultaneity advanced to receiving position) its intended charge of three tennis balls *a*, and for driving the filled can from filling position, to make way for the next ensuing can. With these instrumentalities are coordinated means for feeding empty cans one by one to filling position.

In Fig. I a motor 3 is indicated, with driving connections to conveyor 1, and in the line of connections is included a star-gear 4, for affording the desired intermittent advance of the conveyor. The same motor imparts continuous rotation to shaft 5 and (through star-gear 4) intermittent rotation to shaft 6; from shaft 5 an endless chain 7 equipped with a push-finger 8 is driven; and from shaft 6 a feed conveyor for cans *b* is driven. Such an assembly and its coordinated operation are described in the Hurlburt patent, named above; and the assembly constitutes the situation in which the present invention is placed, the mechanical organization upon which the invention is in its actual development predicated.

As the conveyor advances the balls *a* are set by an attendant in groups of three in the successive troughs 2. This is done near the right-hand end of the upper reach of the conveyor 1, as seen in Fig. I. And as the balls advance in their troughs toward the left-hand end of the upper reach of the conveyor they are branded. The troughs are of such shape and dimensions and are formed of such material that the balls (of rubber and felt-coated) are seated firmly and retained in the precise positions in which the attendant has placed them, as they advance to and are acted on by the branding instrumentalities; and they are, over their upper surfaces, exposed, to be acted on by the branding instrumentalities.

The branding instrumentalities include a vertically reciprocating head 9 having its nether surface shaped for cooperation with the row of spherical balls and equipped, in this instance, with a heating element 10, adapted in its reciprocation to descend upon a row of balls borne by

the conveyor and by pressure, together with heat, to transfer a legend or other device laid in suitable ink, from a carrier or carriers of flexible sheet material interposed between the balls and the head, to the surfaces of the balls. The reciprocation of the head 9 is effected through a cam-wheel 11 driven by motor 3, and conveyor travel and head reciprocation are so correlated that the head descends upon the balls when the balls sustained by the conveyor are at rest. And it will be understood that, at the point in its course where it sustains the thrust of this head, the conveyor itself is suitably supported from beneath. In this instance two reciprocating heads 9 are shown, spaced apart along the upper horizontal reach of the conveyor; and it will be understood that this is a provision for branding each ball twice. To such end, each ball is, in the course of advance from one branding mechanism to the next, raised by an attendant, turned, and seated again in its trough, with a fresh area of its surface uppermost, to receive the second brand.

Strips *d* of flexible material (ordinarily paper) are preliminarily prepared, bearing each in repetition and at regularly and suitably spaced intervals a legend or device laid in suitable ink. Paper and ink are such that under pressure (and heat) the ink in substantial and sufficient quantity is transferred from the paper and permanently applied to the surface of the felt-covered ball. Preferably, in association with each reciprocating head three strips of paper are provided; and ordinarily the legend borne by the strips of one set of three is different from the legend of the other set of strips. For example, in the machine shown in which two reciprocating heads 9 are present, one set of strips bears the manufacturer's name and the other set bears the legend Championship. Each strip advances from a stock reel 12, over guide rollers 13, 14, and 15, and thence over a positively and continuously driven feed roller 16, and in this course it is guided in horizontal plane immediately above one of the balls *b*, at the point where the ball comes to rest beneath the head 9, as is most plainly indicated in Fig. V. Engagement with the feed roller 16 is frictional, and the strip is alternately drawn forward in consequence of such tension and (resistance increasing) it slips upon the roller which then continues to turn beneath it.

Cooperating with the strip *d* (and, for simplicity, it will suffice in what follows to speak of a single strip: it will be understood that the apparatus is elaborated, to deal with a multiplicity of identical strips) and on the delivery side of the reciprocating head 9 means are provided for drawing the strip *d* forward beneath the head 9 through an accurately measured interval of feed (the precise interval at which the legends succeed one another in their placement upon the strip) during the time when the head is raised, and for insuring quiescence from travel during the time of engagement of the head with the strip. These means include a beam 17, reciprocable transversely of the general line of strip advance and two rollers 18, 18, mounted upon pairs of lever arms 19, 19 and adapted by the swinging of the lever arms to clamp the strip to the beam, and yet rotating to allow the beam to move while clamping action continues. The pairs of lever arms assume normally, under gravity, strip-releasing position, and from this position they are pair by pair shifted to engage bar 17 in strip-clamping position, by the energizing of the electro-magnate 20, 20. The strip *d* is trained beneath the rollers 18 and over the edge of bar 17; and the bar 17 is linked with the head 9, so that, as head 9 rises, the shifting bar develops a bight in the strip, and as the head descends the strip responds to tension and the previously developed bight disappears. A make-and-break device whose position is indicated at 21 is, by the driving connections indicated, caused to operate in synchronism with the head-reciprocating means (all being driven from motor 3), to the end that, as the head rises (the electro-magnet on the right being de-energized) the electro-magnet 20 on the left (Fig. VI) is energized; and, as the head descends, it is the magnet on the right which is energized while the companion magnet on the left is de-energized. Accordingly, as the head rises the strip *d* is clamped by roller 18 on the left to the beam 17 and the simultaneous rising of the beam draws the strip from the reel 12 and along its path beneath the head, the path defined by rollers 13 and 14; and the distance through which the strip is thus drawn forward is precisely the interval at which the legends succeed one another on the strip. When the head descends, it is the roller 18 on the right which clamps the strip to the beam 17 and (the strip being thus held firm against advance beneath the head, as beam 17 descends) the slack is taken up by the frictional pull of roller 16 upon the strip.

The rise and descent of beam 17 in synchronism with head 9 are effected by mounting the beam on vertically swinging arms 24, pivoted at 25, and articulating the arms with bars 26 between which the head 9 is carried.

Additional means are provided for affording sufficient slack to allow the strip to shape itself to the spherical ball beneath the correspondingly shaped face of the descending head. To that end the roller 14 on the delivery side of the recpirocating head is mounted on arms 21 and yieldingly held, as by a spring 22, in the full-line position of Fig. V. The descending head, as it engages the strip *d*, engages also an arm 23, which is integral with arm 21, and in consequence of such engagement shifts the roller 14 gradually as it descends from the full-line to the dotted-line position. The slack so developed is sufficient to allow the strip to respond and shape itself between the approaching surfaces of head and ball.

Provision is found for easing the tension upon the strip, to allow passage of a splice through the clamping apparatus 17, 18, 18, such provision consisting in a mounting of a roller 36 (over which the strip is bent in its advance to the clamping apparatus) in such manner that, by the turning of a crank 27, the roller may be shifted transversely of the path of strip travel.

The present invention has to do with such a machine as that which has been described, and, specifically, the object of invention is to overcome certain difficulties—difficulties which tend to prevent accurate placement of the brands upon the balls. These difficulties are due in part to an inevitable variability in the character of the materials used and in part to the uncertainty involved in feeding the machine by hand.

The strips of paper *d* which carry the brands until they are transferred to the balls are inevitably responsive to atmospheric conditions, particularly in that as the degree of humidity of the atmosphere varies the strips vary in length; and variation in the lengths of the strips means variation in the interval at which the brands

borne by the strips succeed one another. This variation is, under normal variations in humidity, so slight as between two brands as to be utterly negligible; but in the operation of the machine the variation is cumulative and thus becomes important and may involve a serious disturbance in machine operation. Of that disturbance the invention affords corrective.

The bars 24 which carry the beam 17 are, as has been noted, pivoted at 25 in the frame of the machine. The pivot 25 is by this invention made adjustable vertically, and means are provided for making minute adjustment manually. The pivot 25 is carried by a bolt 28 and the bolt is positioned in an eye 29 formed in the frame of the machine by a wing-nut 30 and an oppositely-effective spring 31. By turning the nut 30 the attendant may shift the location of pivot 25, vary the throw of beam 17, and thus make minute compensation for variations in the spacing of the strip-borne brands. A gauge is provided, by means of which the attendant may detect variation in brand spacing, and determine accurately the proper degree of correction. This gauge consists of a window 32 carried by the frame of the machine and so set that, adjacent the place where transfer is effected, the strip (or strips) is visible through it. The attendant, sighting through window 32, observes, as machine operation progresses, slight deviation in the strips from true position, turns one and another of nuts 30 accordingly, and thus makes correction and compensation. In the drawings the window is shown conveniently placed on the delivery side of the transfer means. The removal of the brand from the strip and the application of it to the ball will be in no case so complete, but that a trace will still remain on the strip and a trace sufficient for detection through the window for the purposes described.

Explanation has been made above that an attendant places the balls *a* in groups of three in the troughs 2 as the conveyor advances from right to left in its horizontal upper range, and that the balls so placed advance to and are acted upon by the branding means. Tennis balls are covered by two duplicate, round-ended, narrow-waisted strips, and the seams formed at the meeting lines of the strips lie in symmetrical pattern upon the finished ball. It is important that the brands laid upon the balls shall be accurately placed with respect to these seams, and, accordingly, each ball must be set in its trough with precisely the right point in its surface uppermost and its seams accurately oriented, and this, done necessarily by hand, is difficult to do. I provide a guide and gauge at this point, by the use of which manual placement of the balls is facilitated, and their orientation is made possible with such accuracy that defect on this account may be substantially eliminated.

Circumstances forbid or render inadvisable a corporeal, structural gauge member with which the ball comes into contact. I have provided a light source 33, arranged above conveyor 1, and a grid 34, arranged between light source and conveyor. These parts are conveniently arranged within a vertically set hood 35, and parts are so arranged that the light casts the shadow of a grid bar upon the path of the conveyor, and the shadow is minutely so positioned that by it as a gauge the attendant may with facility set and orient the ball with utmost accuracy. In Fig. IV I show diagrammatically shadows *s* as cast by a set of grids 34 upon balls *a* set in troughs 2 of the conveyor; and in the enlarged diagram which accompanies Fig. IV it will be perceived with what accuracy the ball *a* may be set, and how its seam lines may readily be oriented to the shadow *s*.

The hood with its contained parts will be so spaced above the conveyor as at once to cast sharply defined shadows and as to afford the attendant unobstructed view of and free access to the conveyor.

In Fig. I a single shadow-casting gauge is shown, associated with the first of the two sets of branding instrumentalities. It is entirely practicable, and in some cases it may be altogether desirable, to provide a second shadow-casting gauge in association with the second set of branding instrumentalities; in the actual installation of the machine which is being described one shadow-casting gauge has, however, sufficed. The intervals of space and time within which the balls, after passing the first set of branding instrumentalities, may be raised from, turned, and replaced in the troughs of the conveyor are greater than those available for the initial placement, and, as happens, are sufficient for accuracy, without the aid of a gauge.

I claim as my invention:

1. In branding apparatus a branding press, means for advancing a succession of articles to the press, means for sustaining a brand-bearing strip with a portion thereof extending through the press, means for developing periodically and in synchronism with the operation of the article-advancing means a bight in such strip and in so doing causing the strip to advance through the press, and means for varying the effective range of such bight-developing means.

2. In branding apparatus a branding press, means for advancing a succession of articles to the press, means for sustaining a brand-bearing strip with a portion thereof extending through the press, means for developing periodically and in synchronism with the operation of the article-advancing means a bight in such strip and in so doing causing the strip to advance through the press, and manually operable means for varying the effective range of such bight-developing means.

3. In branding apparatus a branding press, a conveyor associated with the press and adapted to receive a succession of articles to be branded, means for casting upon the conveyor a position-defining shadow for the placement of articles upon the conveyor, means for advancing to the press in synchronism with the advance of the conveyor a strip bearing a succession of brands, and means for adjusting minutely the strip-advancing means relatively to conveyor advance.

4. In apparatus for duplicate operation upon a succession of articles and in combination with the operation-performing means, a conveyor leading thereto, and means for casting upon the conveyor a position-defining shadow for the placement of articles thereon.

5. In branding apparatus and in combination with a branding press of a conveyor leading to the press, and means arranged at an interval above the conveyor for casting downward upon the conveyor a position-defining shadow for the placement of articles thereon.

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