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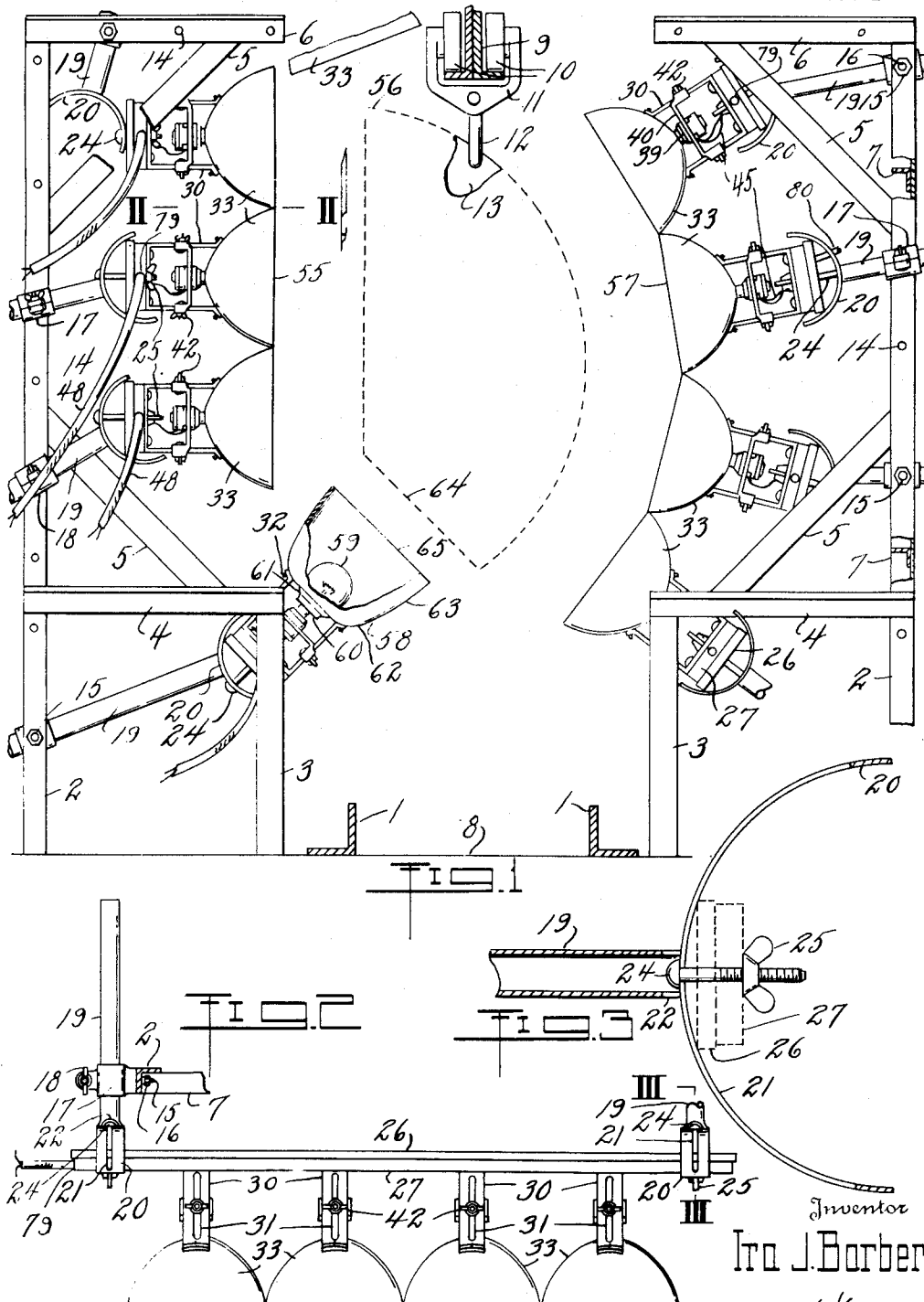
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RAY TREATMENT FOR SURFACES

Filed March 7, 1940

2 Sheets-Sheet 1



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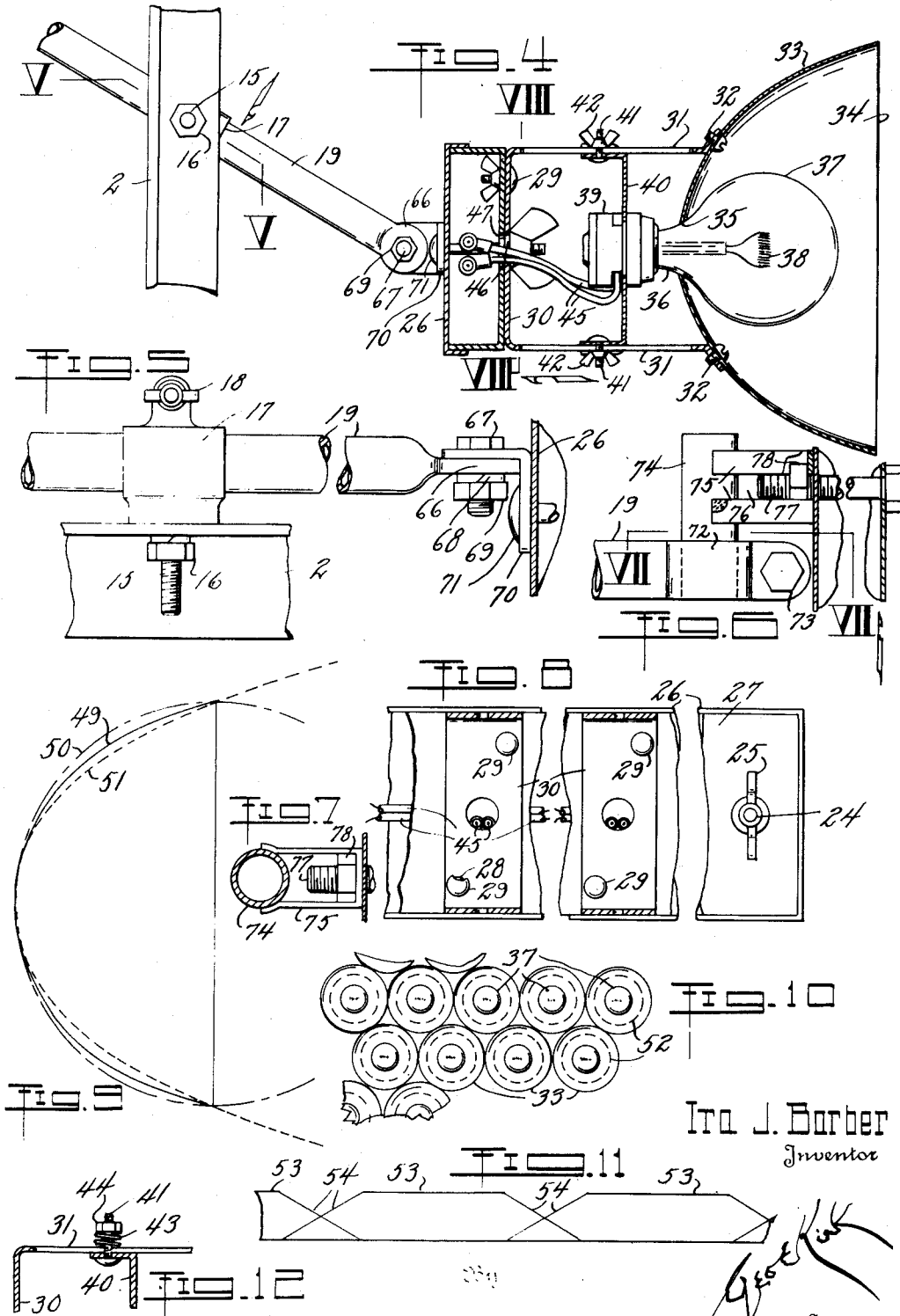
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RAY TREATMENT FOR SURFACES

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RAY TREATMENT FOR SURFACES

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3 Claims. (Cl. 219—35)

This invention relates to means for adjusting ray projecting apparatus for use in ray treatment of objects, which apparatus may be of the conveyor type.

Referring to the drawings:

Fig. 1 is an end elevation, with parts broken away, of an oven tunnel or passage showing ranges of adaptation of the invention herein;

Fig. 2 is a section on the line II—II, Fig. 1, showing a gang of the reflectors as to their assembly on a conduit and the conduit-carrying arms;

Fig. 3 is a section on the line III—III, Fig. 2, showing an adjustable mounting for the conduit relatively to the arm;

Fig. 4 is a sectional view through the reflector and its carrying jack as fixed to an adjustable arm of a different type than that of Fig. 3 as to its mounting with the conduit;

Fig. 5 is a view on the line V—V, Fig. 4, showing the arm and its connection to the conduit;

Fig. 6 is a conduit mounting on an arm in which the tubular member as assembled with the conduit has clamp assembly with the arm;

Fig. 7 is a view on the line VII—VII, Fig. 6, showing this clamp mounting;

Fig. 8 is a section on the line VIII—VIII, Fig. 4, showing the portion of the conduit and assembly of the jacks therewith;

Fig. 9 is a diagrammatic view showing the development of the reflector of Fig. 4;

Fig. 10 is a view looking into gangs of the reflectors, with the reflectors staggered in the ganging up thereof, and diagrammatic as to a focal range therefor;

Fig. 11 shows diagrammatically the overlapping and distribution of rays from adjacent projectors; and

Fig. 12 is a detail view of a variant form of the slide adjustment.

In carrying out of this ray treatment, work may be in a car on rails 1 (Fig. 1) forming a track between frames having outer uprights 2 and inner legs 3 connected by horizontal strips 4, diagonal braces 5, and top piece 6. These are end portions of sections connected by horizontal strips 7. Inasmuch as these two frames rest independently upon floor 8, their spacing as to the track 1 may be straight or tapered clearance as to the car or work carrier as may be desirable. Therefore, instead of lower track 1 there may be upper, or even non-straight track 9 for rollers 10 of carrier 11, which may have hook 12 for engaging work 13. These articles of work may be propelled along the tracks 9 or 1 at a desired rate

or by pushing the work through with succeeding work in progressive manufacturing operations. The rate of travel or extent to which the frames are set up with the gangs of conduits may be according to the desired condition sought, even straight, slant, helical or varied.

These frames have in the various angle iron portions 2, 6, openings 14 which may be engaged by bolt 15 (Fig. 2) with nut 16 to locate sleeve portion 17 in a swivel telescopic mounting as to the frame 2. This sleeve portion is split ring and has wing nut clamp 18 as a friction or grip holder for adjusting the length of the arm 19 of tubular form. This arm 19 is shown as having fixed therewith arc terminus 20 with slot 21 for the arc past the mounting portion of the arc with the arm 19, for at this portion there is clearance 22 (Fig. 3) for bolt 24 effective by wing nut 25 for clamping conduit having base pan portion 26 and body portion 27. This conduit has its assembly effected terminally by these bolts 24 and wing nuts 25. Additionally, intermediate these terminal mounting portions, the conduit 26, 27 (Fig. 8) has openings 28 in diagonal pairs to receive bolts 29 (Fig. 4) in anchoring jack or U-shaped bracket 30. This U-shaped bracket 30 has upright leg portions as away from the conduit providing opposing parallel ways 31. The free termini of this U-shaped jack has screws 32 anchoring this jack in fixed assembly with reflector 33. This reflector 33 has open front 34 and axially thereof entrance port 35 for stem 36 of bulb 37 having infra-red ray emanating filament 38. This bulb stem 36 is mounted in fixture 39 carried by bridge or slide 40 readily clamped by bolts 41 extending through the slots 31 in the parallel legs of the jack 30.

This adjustment may take care of pear or spheric type of bulb 37 for the desired location of the filament or ray emanation source accurately in the projector or reflector 33. This clamp adjustment 41 may be one requiring accuracy for attention and range of placement with great particularity. In some instances, the twisting of the wing nuts at the adjusted position may be a disturbing factor in quick operation. Accordingly, in lieu of the wing nuts 42 (Fig. 4) there may be placed on these bolts 41 compression springs 43 (Fig. 12), the compression of which may be adjusted by nuts 44. There is thus a desired frictional holding in this clamping, permitting ready adjustment, but a holding effective even at considerable vibration in factory operation. Electric current leads 45 (Fig. 4) from the fixture 39 may be through opening 46 of the jack

registering with opening 47 of the conduit, to be there connected with the electric current supply line, say having flexible conduit leads 48 (Fig. 1) thereto.

This reflector 33, as herein shown, is desirably of contour 49 (Fig. 9) which is intermediate spheric contour 50 and parabolic contour 51. This is efficient in ray control functioning for the bulb energy source in instances when the bulb 37 may be between 3 and 5 inches in diameter, and the opening or reflector 34 in a range of 10 inches in diameter. With this location, an efficient position for the work may be approximately 9 to 10 inches from the opening 34 of the reflector. At such region, the rays from the filament 38 as direct and as reflected have a region of greater ray intensity 52 (Fig. 10) say approximately 6½ to 7 inches in diameter. These regions of greater intensity approximate a region of intensity 53 of B. t. u. uniformity (Fig. 11). As these regions of uniformity are spaced from each other, there is in practice hereunder a course or line of progress for the work to traverse therebetween. However, from these regions of intensity 53, there is a spread or less active region 54. These regions 54 as in line reflectors of the gang overlap and build up toward uniformity between the regions 53. However, supplementing these regions are the rays from the adjacent gang, and when the adjacent gang is in staggered relation (Fig. 10) this uniformity for ray treatment, as far as 18", approximates a constant intensity throughout the path of movement for the work.

The arms 19 allow for a range of adjustment beyond that of the reflector as to the bulb or ray source. However, between the ray source and the reflector this adjustment for the slide 40 as to the jack 30 may be not merely for adaptation to the different types of bulbs but may be such as to permit a departure from the focal point. Thus by slight shifting of the bulb 37 into the port 35, there is a spread of greater divergence for the rays as emanating, while contrary direction of shifting or moving of the bulb outward further into the reflector 33 means a greater concentration. Accordingly, at this diverging set-up there may be a lessening of the ray intensity which may be desirable on classes of work, say where ignition problems or burning might be undesirable, as with certain plastics or with certain stock which might be undesirably discolored by too great a heat treatment or ray action. This ray action is even effective for the drying of objects in manufacture, even wire or coating thereon or washing therefrom. It may be used for fabrics; or foodstuffs, or the cooking or baking thereof, and in the coating or drying of materials.

The ranges of adjustment of the reflector as to the energy source or bulb are thus adaptable to a wide range of commercial requirements. This range is further extended in the placement for the reflectors as to the gangs thereof. This may be in staggered or parallel relation (Fig. 10), tapered, or in parallel and vertical relation. Furthermore, the grouping may be for the embracing region or tunnel as provided on opposite sides of the tracks for the carrier by regions approximately straight 55 (Fig. 1), concentrated region 56, arc region 57, or even variations therefrom. To this end, the adjustable arms 19 with the adjustable mountings for the conduit boxes 26, 27, are the factor. Supplemental thereto, in lieu of the reflector 33 there may be reflector 58

(Fig. 1) being specially adaptable for large diameter bulb 59, say up to 5 inches. This reflector 58 in this set-up has adjacent its port 60 a spheric socket region 61, a larger-radius zone portion 62, with a forwardly extended zone portion 63. This in practice say for a 10 inch reflector has worked out for region 64 of uniform density approximately 4 to 5 inches from reflector front opening 65.

The arm 19 (Figs. 4, 5) is herein shown as having terminal eye 66 for bolt 67 having lock washer 68 and nut 69 as a swivel clamp for L-bracket 70 to be engaged by bolt 71 for mounting the conduit 26, 27. There is thus a rockable mounting readily clamped for determining the angle of direction for this conduit and its jack as thereon of wider range than that for the slotted arc 20.

The arm 19 may terminate in eye 72 (Figs. 6, 7) having clamping bolt 73 for tubular section 74 protruding from one side thereof and carrying bracket or U-shaped portions 75 with opening 76 therebetween to receive bolt 77 through the conduit 26, 27, and thereby have its nut 78 engage the bracket portion 75 in anchoring the conduit therewith. In this set-up, loosening of the clamping bolt 73 will permit rocking of the tubular section 74 as to the arm 19 for the desired angular placing of the conduit.

In practice hereunder, the purpose primarily has to do with efficient ray reflection and control especially in that portion away from the more luminous and into the infra-red region. Accordingly, these reflectors with the openings 34, 65, have the walls inwardly therefrom efficiently reflective for such infra-red region. A gold or gold alloy or gold leaf has been found a very helpful factor to the ends of the treatment herein disclosed.

It is convenient to establish, according to the character of electric current supply, definite lengths for these conduit sections 26, 27, as ganged. Close connection may warrant, instead of terminal inlet 79, for such conduit inlet 80 in rear or back portion 26 (Fig. 1). This would mean that even were the parts aligned instead of slanting, tapering, or giving a twist or helical turn, there may be abutting proximity.

The degree of treatment, even with the spacing similar, may be different when the body at such treated region be different, say in its thickness or absorption qualities for the rays, even to the character of coating or treatment thereon or therefor. The speed for operation may permit initial intensity to be maintained, initial intensity to be graded off, or a mild initial intensity to be built up. Staggering, twisting, helical or slant setting for the conduit gangs may be employed to avoid localized heating and streaking. The variance of this spacing as permitted by the telescopic arms is a factor which may be employed in reaching a desired degree of refinement in the operation of the apparatus disclosed.

What is claimed and it is desired to secure by United States Letters Patent is:

1. Ray treating equipment including a bulb having a stem, a reflector having an open front, and rearwardly therefrom an axial port to embrace the stem of the bulb, there being adjustable mounting means between the bulb and reflector, said reflector in axial cross section conforming to a curve approximately midway between curves defined by symmetrical semi-spherical and paraboloidal reflectors of the same diameter and depth.

2. Ray treating equipment including a bulb having a stem, a reflector having an open front, and rearwardly therefrom an axial port to embrace the stem of the bulb, a mounting fixed with the reflector, a slide coacting with the mounting, and a fixture assembled with the slide to provide a seat for the stem with the bulb, said slide being adjustable as to the mounting for range of adaptation to bulbs of different stems, said reflector in axial cross section conforming to a curve approximately midway between curves defined by symmetrical semi-spherical and paraboloidal reflectors of the same diameter and depth.

5 having a stem, a reflector having an open front, and rearwardly therefrom an axial port to embrace the stem of the bulb, a mounting fixed with the reflector, a slide coacting with the mounting, and a fixture assembled with the slide to provide a seat for the stem with the bulb, said slide being adjustable as to the mounting for range of adaptation to bulbs of different stems, said mounting having frictional means for holding the same in adjusted position, said reflector in axial cross section conforming to a curve approximately midway between curves defined by symmetrical semi-spherical and paraboloidal reflectors of the same diameter and depth.

10 3. Ray treating equipment including a bulb 15

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