

No. 820,139.

PATENTED MAY 8, 1906.

A. T. SAUNDERS.
BALL ROLLING MACHINE.
APPLICATION FILED NOV. 20, 1905.

3 SHEETS—SHEET 1.

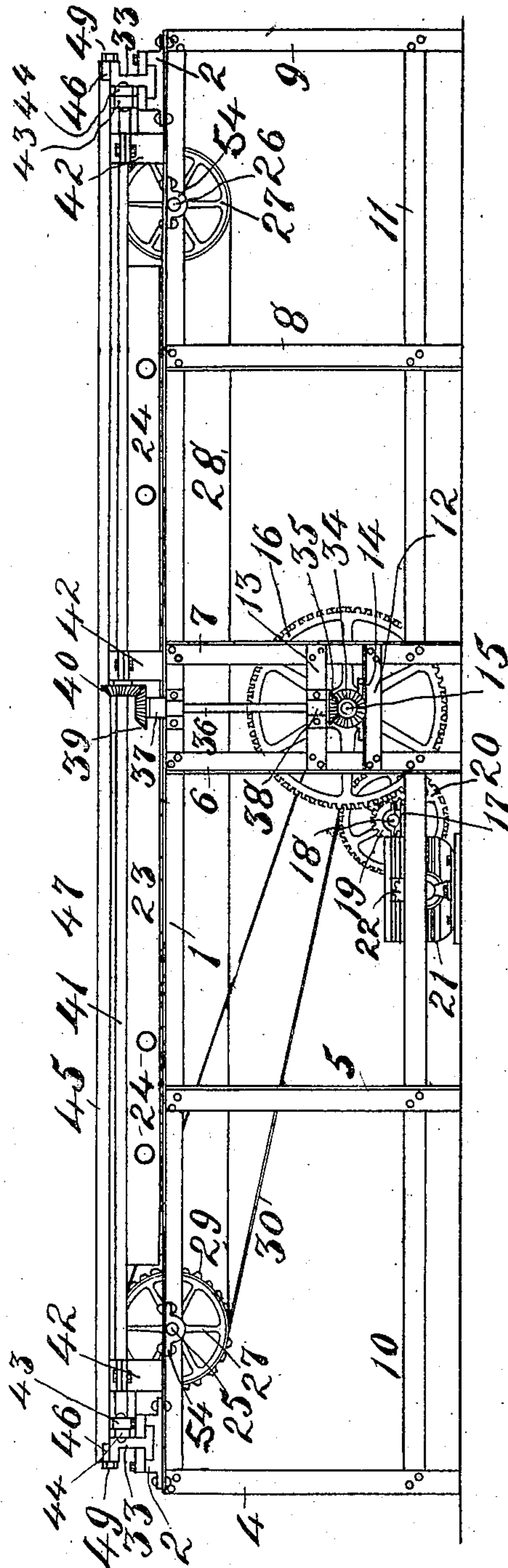


Fig. 1.

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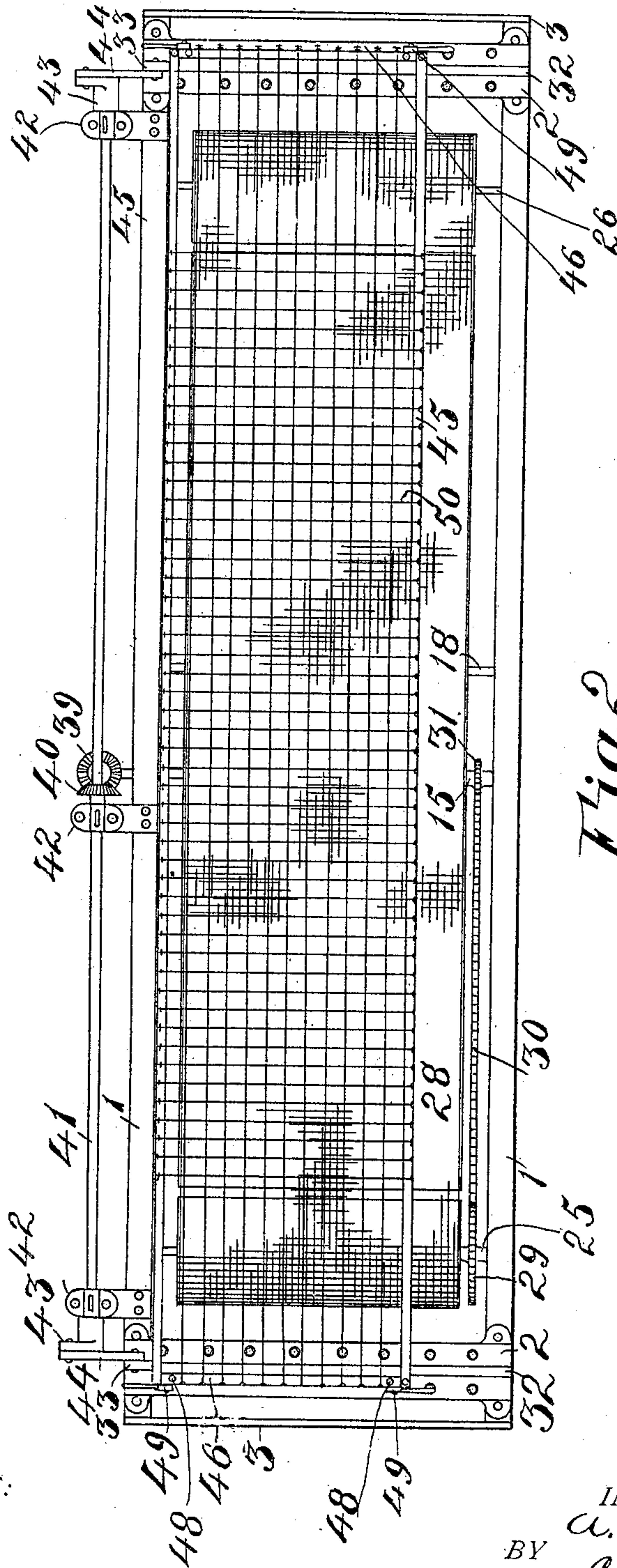


Fig. 2.

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3 SHEETS—SHEET 3.

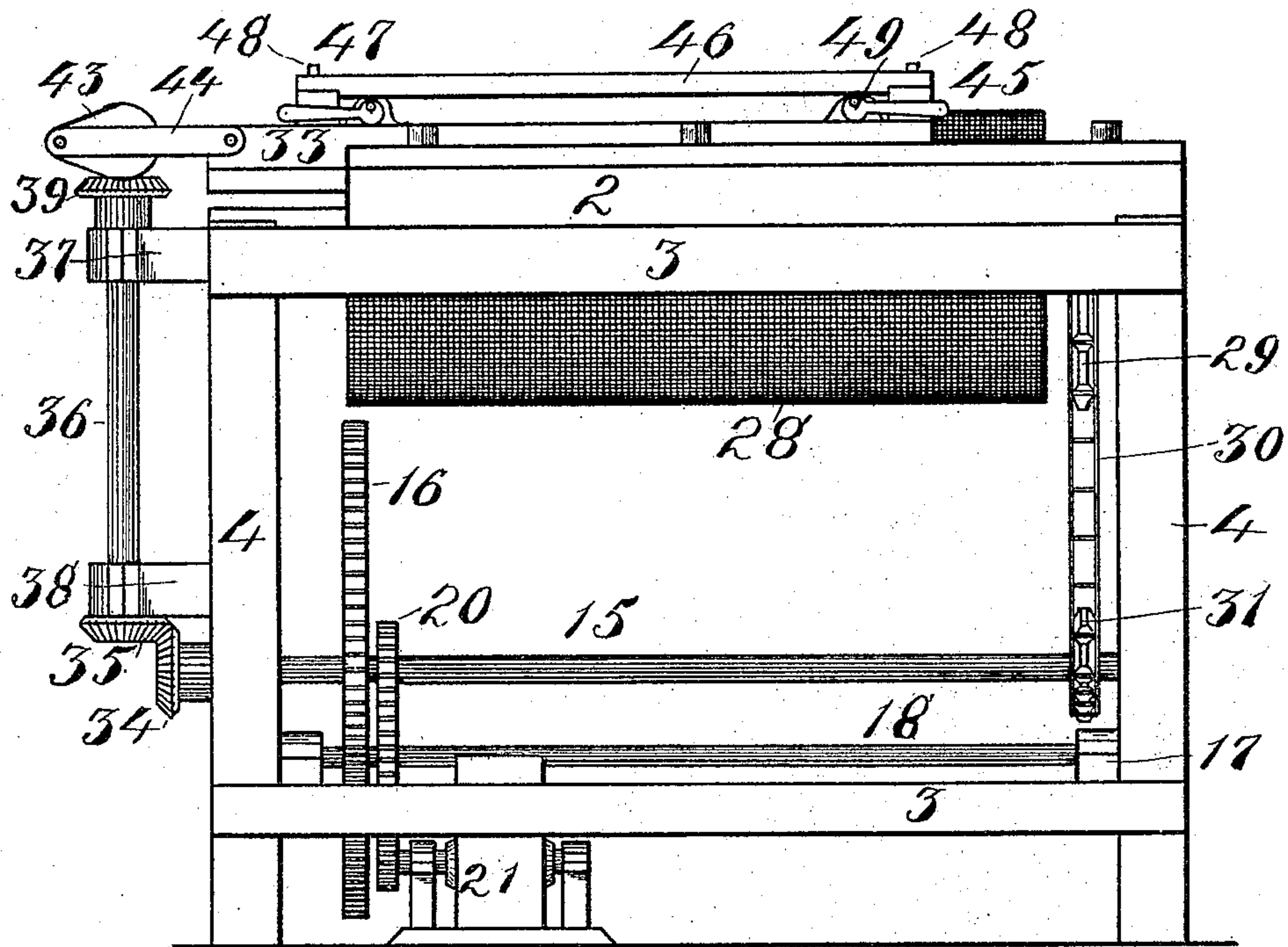


Fig. 3.

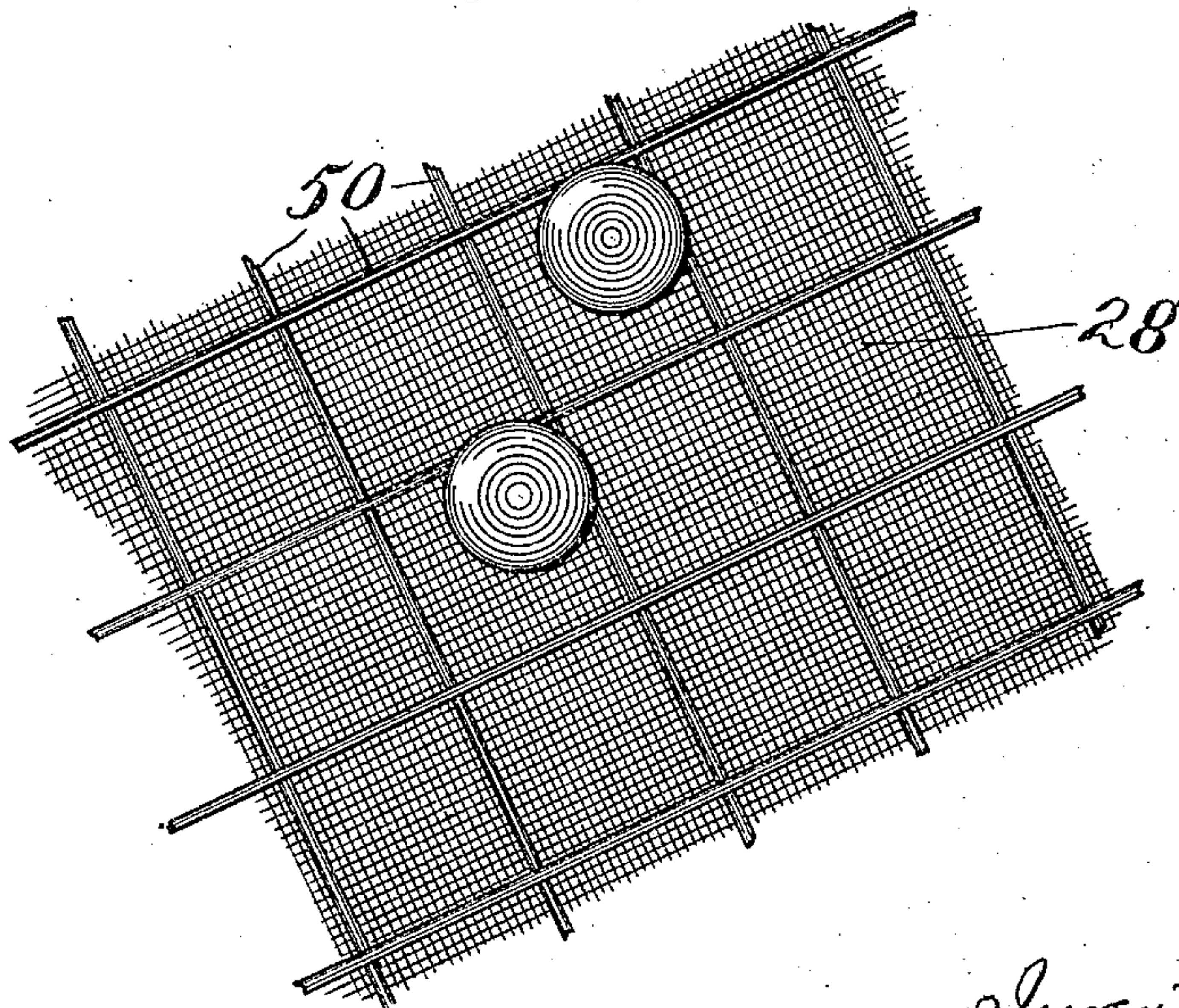


Fig. 4.

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UNITED STATES PATENT OFFICE.

ADDISON T. SAUNDERS, OF AKRON, OHIO, ASSIGNOR OF ONE-HALF TO
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BALL-ROLLING MACHINE.

No. 820,139.

Specification of Letters Patent.

Patented May 8, 1906.

Application filed November 20, 1905. Serial No. 288,198.

To all whom it may concern:

Be it known that I, ADDISON T. SAUNDERS, a citizen of the United States, residing at Akron, in the county of Summit and State of Ohio, have invented new and useful Improvements in Ball-Rolling Machines, of which the following is a specification.

This invention has relation to devices for performing one step in the manufacture of certain articles; and it consists in mechanism for continuously rolling the articles, so that their axes of rotation are constantly changing.

This invention, while suitable for other purposes, is primarily designed to roll a hollow sphere constituting either a playing-ball or a nucleus therefor, so that a fluent or semifluent air-proof material placed therein will be formed into a uniform lining therefor and be distributed evenly and effectually within the shell of the sphere.

It has been found that a hollow sphere, especially when constructed wholly or in part from rubber and whether used alone as a playing-ball or as a nucleus for golf or similar balls, is not perfectly air-proof under a charge of fluid placed therein. Hence it has been found necessary to place within said sphere some form of lining which will render the same fluid-tight. In providing linings of this character for spheres which are to be used either as playing-balls or as a nucleus for the superimposition thereon of other coverings to adapt them for other uses it is preferable to place the lining within the ball in a fluent or semifluent condition and subsequently roll or rotate the sphere continuously until the fluent lining sets and becomes either solid or semisolid. There are two classes of linings which may preferably be used, one class being designed to set when the article on which it is placed is cooled and the other when the temperature of the article is raised sufficiently to coagulate the fluent lining.

The object of this invention therefore is to provide a simple and suitable device for receiving the hollow spheres containing the fluent lining which will constantly roll them about on constantly-changing axes until the fluent material contained therein has been sufficiently distributed to constitute an even lining and has set enough to be approximately self-maintaining.

The invention further aims to supplement

the mechanism for imparting a rotary motion with suitable means for maintaining or changing the temperature of the spheres during the rolling thereof.

With the foregoing and other objects in view the invention consists of the novel construction, combination, and arrangement of parts constituting the invention, to be hereinafter referred to and illustrated in the accompanying drawings, which form a part of this specification, in which is shown the preferred embodiment of the invention; but it is to be understood that changes, variations, and modifications can be resorted to which come within the scope of the claims hereunto appended.

In the drawings, in which similar reference-numerals indicate like parts in the different figures, Figure 1 is a side elevation of my improved device. Fig. 2 is a plan thereof. Fig. 3 is an end elevation looking from the left of Fig. 2, and Fig. 4 is an enlarged detail in perspective of the mechanism for sustaining the sphere while it is being rolled to set the lining therein.

It will be stated that while the mechanism described herein is equally applicable for the rolling of various articles the description herein for the purpose of this application will be confined wholly to rubber spheres adapted for use as playing-balls or as nuclei for playing-balls.

In the drawings, 1 1 denote two longitudinal side bars of a frame or table on which the balance of the mechanism to be herein described is supported. These two side bars 1 1 are connected near their ends with transverse bars 2 2 and are further braced by end bars 3 3. These longitudinal bars 1 1 and cross-bars 2 2 are supported on a plurality of pairs of legs 4, 5, 6, 7, 8, and 9, the members of each pair being oppositely disposed with respect to each other. Extending between the legs 4 and 6 are longitudinal brace-bars 10, and between the legs 7 and 9 are similar brace-bars 11. Extending between the pairs of legs 6 and 7 are horizontal cross-pieces 12 and 13. Mounted in bearings 14 on the cross-piece 12 is a shaft 15, bearing a large spur-gear 16. Mounted in bearings 17 on the cross-piece 10 is a shaft 18, which bears a pinion 19, meshing into the gear 16. This shaft 18 also bears a spur-gear 20, tightly mounted thereon. Mounted

on a suitable foundation adjacent to the mechanism just described is an electric motor 21, having mounted on its armature-shaft a spur-pinion 22, which meshes into the spur-gear 20. It will be seen from the foregoing description that the rotation of the shaft 15 will be relatively slow compared to the rotation of the armature-shaft.

Mounted on the longitudinal side bars 1 1 is an elongated hollow chamber 23, provided with a suitable number of openings 24, into which may be inserted the threaded ends of pipes for conveying to the interior of the chamber 23 suitable fluids for the maintaining or changing of the temperature of the entire member 23. Mounted in bearings 54 on the longitudinal bars 1 1 are two shafts 25 and 26, each of which bears a wide-faced roller 27. Arranged to be mounted on the two rollers 27 is a belt 28, preferably constructed of fine wire-gauze. The position of the wide-faced rollers 27 is such that the belt 28, extending between the upper portions of their peripheries, will lie along and travel on the upper surface of the chamber 23. Mounted on the shaft 25 is a sprocket-wheel 29, on which is arranged to run a sprocket-chain 30, which also passes around a sprocket-wheel 31 on the main shaft 15, so that motion is communicated from the driving-shaft 15 to the pulley-shaft 25.

In the upper portions of the cross-piece 2, extending between the longitudinal side bars 1 1, are formed parallel ways 32, in each of which is adapted to slide a carriage 33. These two carriages 33 are adapted to reciprocate transversely of the frame of the machine by means of the following mechanism: On one end of the shaft 15 is a beveled gear 34, into which meshes a beveled gear 35, fastened to the lower end of a shaft 36, supported rotatably in a bracket 37, attached to the outside of one of the longitudinal bars 1, and in a second bracket 38, suitably fastened to the cross-bar 13. The upper end of the shaft 36 bears a beveled gear 39, which meshes into a beveled gear 40, mounted on a longitudinal shaft 41, rotatable in brackets 42, attached to one of the side bars. This shaft 41 bears two cranks 43, each of which is mounted adjacent one of the carriages 33 and connected thereto by a link 44.

Mounted on the carriage 33 is an open rectangular frame made up of side bars 45, connected by end bars 46. This frame, hereinafter designated as an entirety by the reference-numeral 47, is capable of slight vertical motion and is prevented from transverse or longitudinal displacement by such means as a plurality of dowel-pins 48 or other equivalent means. On each of the carriages 33 is a pair of manually-operable cams 49, by which the vertical position of the frame with respect to the upper surface of the chamber 23 may be maintained or changed.

Extending between the end pieces 46 of the frame 47 and between the side bars 45 are a plurality of tightly-drawn wires 50. These wires 50 are so spaced apart from each other that they will divide the space bounded by the sides of the frame into a plurality of openings. (Shown best in Figs. 2 and 4.) It is preferable to so place the longitudinal wires 50 that they will be parallel with the side bars 45 and so locate the transverse wires 50 that they will intersect the longitudinal wires at substantially right angles, whereby the openings formed by the intersecting wires are nearly perfect squares. These wires 50 are normally adapted to be drawn sufficiently tight by any suitable means to properly maintain themselves and be substantially free from any appreciable sag. Of course it will be obvious that the raising of the frames 47 by means of the cams 49 will also raise the wires 50 a corresponding distance above the top of the chamber 23, on which the belt 28 travels.

The operation of this device is as follows: Motion being communicated to the shaft 15, as already described, the belt 28 is caused to travel slowly and progressively along the top face of the chamber 23, and at the same time the frame 47 is reciprocated transversely in unison with the movements of the carriages 33, driven by the cranks 43 on the longitudinal shaft 41. A suitable number of hollow spheres containing a fluent or semifluent material are placed on the belt, (preferably at the left end in Fig. 1,) and these spheres are distributed in such a manner that each sphere will be placed in one of the openings bounded by the longitudinal and transverse wires 50. The wires 50 will be raised a sufficient distance above the belt 28 to engage the spheres at or near a horizontal line drawn through their centers. The motion of the belt 28 constantly rotates the spheres in one direction, and the movement of the frame 47 and wires 50 causes a reciprocal transverse travel of these spheres across the top of the belt 28, whereby there is imparted thereto such a rolling motion as will constantly change their axes of rotation. The rolling of these spheres is kept up until the lining placed in them has reached the consistency desired by the operator, and this may be determined either by timing them or any other suitable or preferred means. After remaining on the belt 28 a sufficient length of time they are removed and replaced by other spheres, upon which the same process is used. If the material which is placed within the spheres is of a nature to be set or brought to a proper condition by the application of heat, steam is forced into the chamber 23.

It will be obvious, of course, that the chamber 23 may be divided by any number of partitions which it is not deemed necessary to show, and various portions of this chamber

may be heated to different temperatures to suit the requirements of various cases. It will also be apparent that if the material placed within the spheres is of a nature which requires cooling to bring it to the proper condition then any other fluid of a suitable nature may be conveyed to the interior of the chamber 23 through the openings 24.

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

1. A machine of the class described comprising a constantly - traveling instrumentality, means for loosely confining articles thereon, means for operating said confining means whereby said articles are prevented from progressive movement on said instrumentality but are constantly rotated on constantly-changing axes by the movement of said instrumentality.

2. A machine of the class described comprising a constantly - traveling instrumentality, means for loosely confining articles thereon, means for independently operating said confining means and means for controlling the temperature of said articles during their confinement.

3. A machine of the class described comprising a constantly - traveling instrumentality, means for loosely confining articles thereon, and means for reciprocating said confining means transversely to the movement of said instrumentality.

4. A machine of the class described comprising a constantly - traveling instrumentality, means for loosely confining articles thereon, means for reciprocating said confining means transversely to the movement of said instrumentality, and means for controlling the temperature of said articles during their confinement.

5. The combination in a machine of the class described, of a constantly-traveling instrumentality, means for imparting motion to said instrumentality, means for loosely confining articles on said instrumentality and means for actuating said confining means.

6. A machine of the class described comprising in combination a constantly-traveling instrumentality, means for imparting

motion to said instrumentality, means for loosely confining articles on said instrumentality, and means for imparting a transverse reciprocal movement to said articles on said instrumentality during their confinement. 55

7. A machine of the class described, comprising in combination a constantly-traveling instrumentality, means for imparting motion to said instrumentality, means for loosely confining articles on said instrumentality, means for imparting a transverse reciprocal movement to said articles during their confinement, and means for controlling the temperature of said articles when on said instrumentality. 65

8. The combination in a device of the class described, of a temperature-controlling means, a conveying-belt arranged to travel along one face of said first-named means, and means to reciprocate articles across said belt. 70

9. The combination in a device of the class described, of a temperature-controlling means, a conveying-belt arranged to travel along one face of said first-named means, means to impart a continuous movement to said belt, and means to reciprocate articles across said belt. 75

10. The combination in a device of the class described, of a temperature-controlling means, a member arranged to support articles within the influence of said first-named means, and an openly - divided horizontal frame arranged to reciprocate said articles across said supporting means. 85

11. The combination in a device of the class described, of a temperature-controlling means, a member arranged to convey articles in juxtaposition to said first-named means, means to reciprocate said articles across said member, and means to raise and lower said reciprocatory means. 90

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

ADDISON T. SAUNDERS.

Witnesses:

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GLENARA FOX.