F. E. GOLDSMITH.

TILE COATING MACHINE.

APPLICATION FILED APR. 27, 1907. RENEWED OCT. 9, 1909.

948,012. Patented Feb. 1, 1910.

3 SHEETS—SHEET 1.

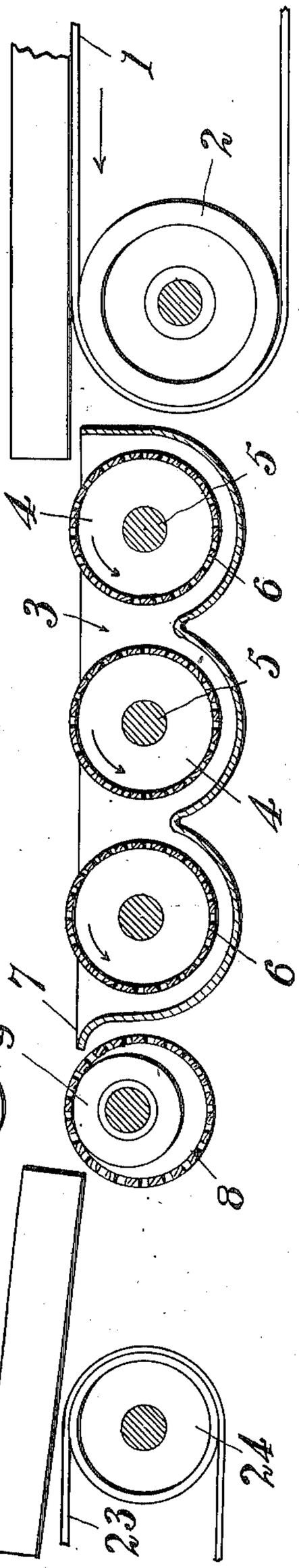

Fig. 1.

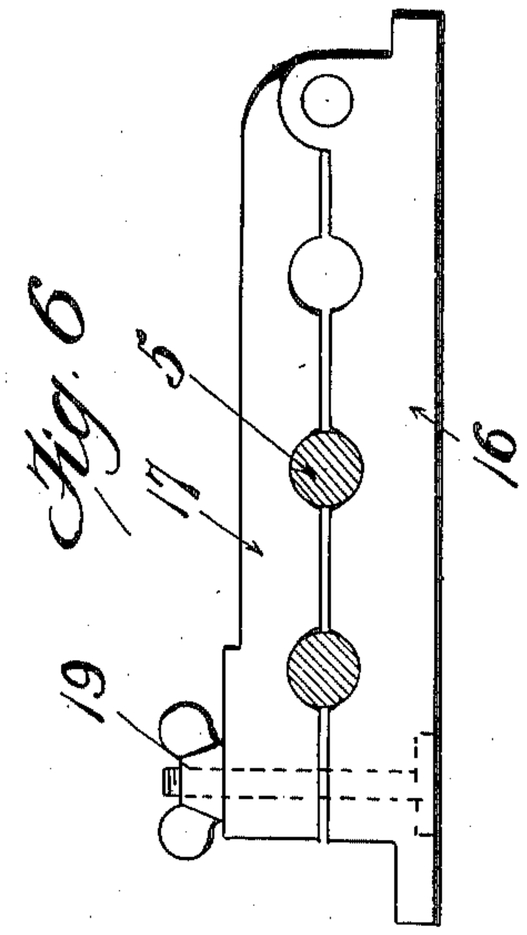

Fig. 6.

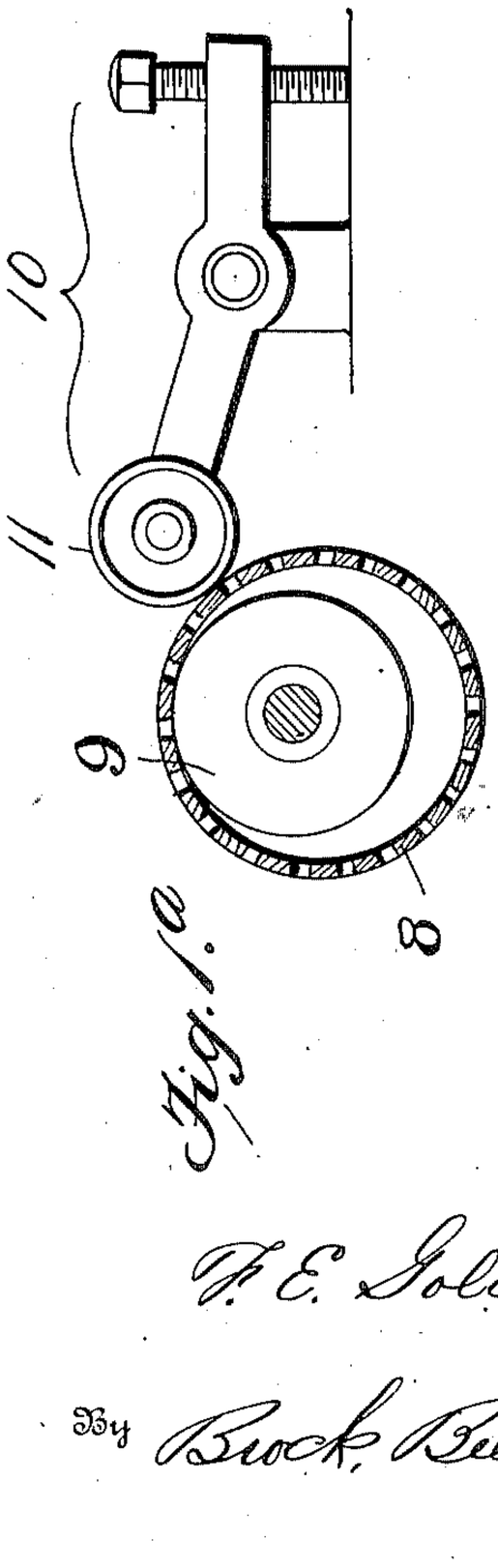

Fig. 1a.

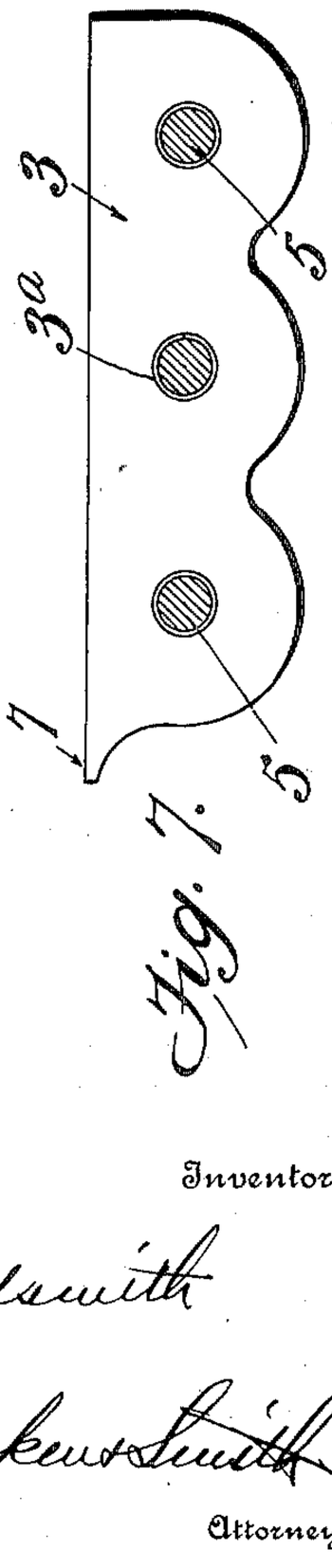

Fig. 7.

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3 SHEETS—SHEET 2.

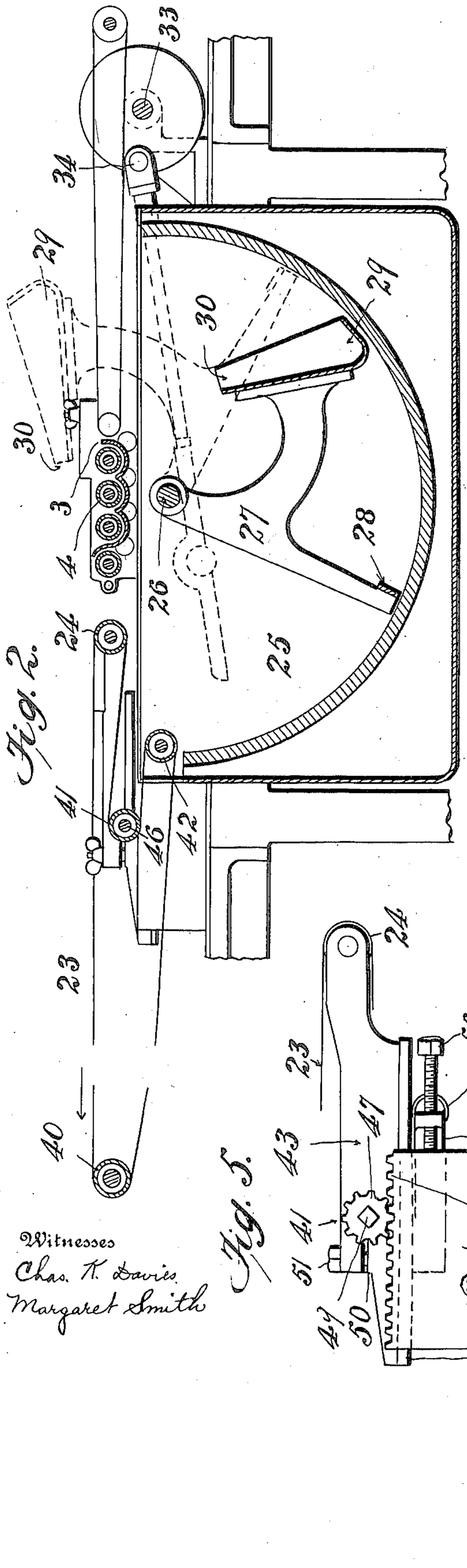

Fig. 2.

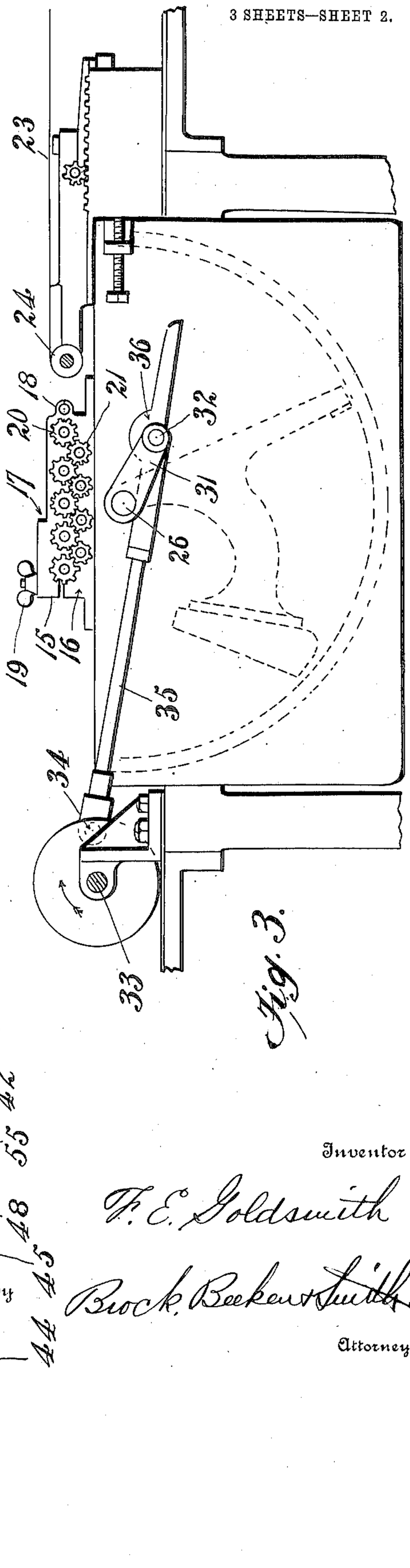

Fig. 3.

Fig. 5.

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3 SHEETS—SHEET 3.

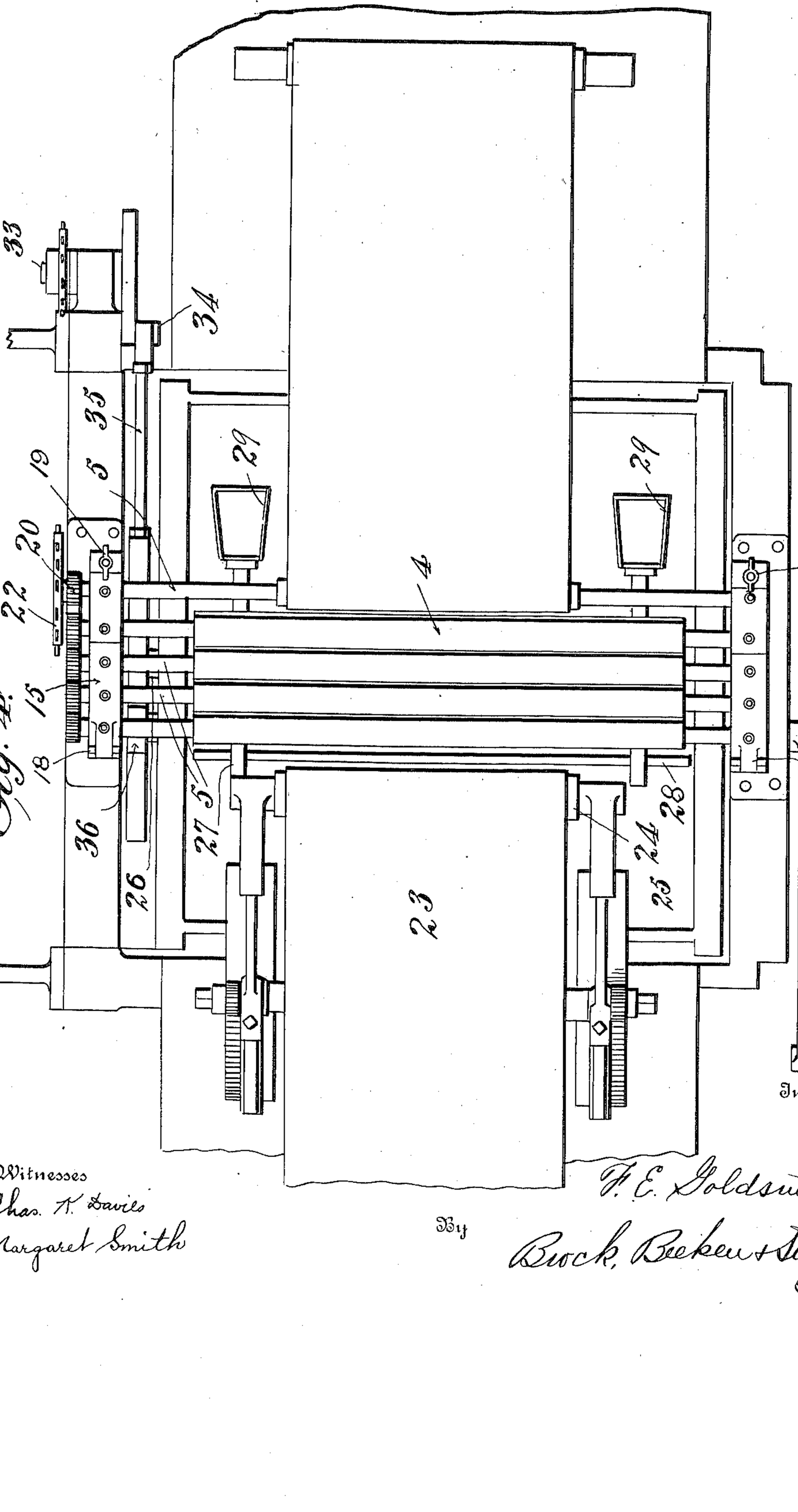

Fig. 4.

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UNITED STATES PATENT OFFICE.

FREDERICK E. GOLDSMITH, OF MIDDLETOWN, OHIO, ASSIGNOR TO THE CERAMIC MACHINERY COMPANY, OF HAMILTON, OHIO.

TILE-COATING MACHINE.

948,012. Specification of Letters Patent. **Patented Feb. 1, 1910.**

Application filed April 27, 1907, Serial No. 370,656. Renewed October 9, 1909. Serial No. 521,953.

To all whom it may concern:

Be it known that I, FREDERICK E. GOLDSMITH, a citizen of the United States, and a resident of Middletown, in the county of Butler and State of Ohio, have invented a certain new and useful Tile-Coating Machine, of which the following is a specification.

The invention relates to mechanism for coating tile.

A special object is to provide improved means for applying coating to the tile.

A further object is to provide improved means for keeping the coating material in proper condition during the operation of the machine, and for supplying the coating material to the coating device proper; and a still further object is to provide improved means for adjusting the feed or delivery aprons.

The invention is hereafter described fully in connection with the accompanying drawing, which shows exemplifying structures in which the invention is embodied.

Figure 1 is a sectional view of the coating device; Fig. 1ª, a detail of adjustment for the bead-breaker; Fig. 2, a sectional view of the agitating and the coating supplying mechanism; Fig. 3, an elevation of the machine viewed from the opposite side to Fig. 2; Fig. 4, a plan view of the machine; Fig. 5, a detail of the apron adjusting mechanism; Fig. 6, a detail of bearings for the roll-shafts, and Fig. 7, a detail of the coating trough.

Referring first to Fig. 1, reference numeral 1 designates a feed apron traveling over pulleys or spools 2, of which the one adjacent to the coating device is shown.

3 is a trough for coating material, located near the delivery end of the feed apron and slightly below the level of the lower surfaces of the tile.

4 are supports for carrying tile across the trough at the proper determined height above it; in practice the supports usually consist of rolls or spools, as shown, carried by shafts 5 and rotated in the direction of the arrows.

6 are the surfaces of supporting rolls 4, which may vary considerably in construction; the surfaces may be of wire-mesh, perforated metal, or may consist of pins carried by a suitable core with their ends terminating in a cylindrical contour, depending upon the particular manner in which the coating device is used, as will appear later; the rolls are placed in relation to the trough so that their upper surfaces are more or less above the upper edge of the trough.

7 is a lip or roll at the delivery side of the trough; 8, a "bead breaking" device, consisting in the exemplification shown of a cylindrical shell of perforated metal, although other material may in some cases be used; 9, a roll preferably having a surface of soft rubber smaller than the shell and passing through it eccentrically so that the shell is supported with its upper face in the line of the lower surfaces of the tile; 10, an adjusting device (see Fig. 1ª), comprising a roller 11 bearing against the shell 8, which may be moved toward or away from roll 9 so as to vary the angle of eccentricity of the shell in relation to the roll (see Figs. 3 and 5).

15, are bearing blocks, one at each side of the machine consisting of bottom parts 16, and tops 17 hinged to the bottoms at 18 and secured by thumb nuts 19; these parts have semi-cylindrical sockets formed on their adjacent faces which accommodate and provide bearings for shafts 5 of rolls 4 and 9 and spool 2 of the feed apron. These shafts may be readily removed and replaced by unscrewing thumb nuts 19 and raising the cover 17.

20, are pinions on the ends of shafts 5 and 21, other pinions conveniently rotatably mounted on the bases 16 of the bearing blocks intermediate pinions 20; when one of shafts 5 is rotated in the indicated direction all the other shafts connected by the pinions are similarly rotated.

22 is a sprocket on the end of one of shafts 5 driven from any suitable source of power and serving to impel the coating device.

Tile are placed upon feed apron 1, which moves in the direction of the arrow and conveys the tile to supporting rolls 4. These rolls may be placed at such a level in relation to the trough that as the tile begin to move over the trough, their lower surfaces come in contact with the coating material therein which continues to adhere to the tile during their passage across the trough, during which they are supported and impelled by rolls 4.

In some cases the tops of rolls 4 may be considerably above the edge of the trough

and in such cases it may be necessary to make the surface of the first roll 4 of such a nature that coating material is carried by it to the lower surface of the tile in order to establish adhesion between the tile and the coating material. In other cases, the relative level of the rolls may be lower and the roll surfaces may be of pervious material so that they do not carry coating material but allow it to pass freely through and serve only to support the tile which pass over the trough in substantially the same level as that of the coating material therein. The precise nature of the coating action depends also upon the level of the coating material in the trough and this in turn depends upon the rapidity with which the material is supplied to and leaves the trough. In almost all cases material used for coating tile is of such a composition that it requires to be continually and thoroughly stirred or mixed and kept in circulation to and from the coating device in order to produce proper results. Therefore, preferably I supply coating material to trough 3 greatly in excess of the amount required to coat the tile, and this excess runs off and returns to the main coating receptacle, either by overflow at the upper edges of the trough, or by other passages, as will appear later. Depending on the rapidity with which the material is supplied to the trough it will either stand at substantially the same level as the upper edge of the trough or will rise slightly above this level and the exact manner of applying the coating may be varied therefor, not only by varying the position of the rolls but by varying the manner of supplying the coating material to the trough. The supply of coating to the trough may also be at such a rate that the coating material stands in the trough at a level considerably below the tops of the roll or rollers therein and in this case the rolls act as a true coating device carrying up coating material from the mass in the trough and applying it to the under face of the tiles.

The number of supporting rolls and similarly the width of the trough, and, therefore, the length of the travel of the tile during the actual coating action, may be varied at will, depending on the particular conditions. As shown in Fig. 1, preferably the bottom of the trough is conformed, more or less, to the shape of the rolls. This enables the trough to be filled with a smaller amount of coating material and causes the rolls to stir the coating material more effectively than if the bottom of the trough were flat.

In coating tile an excess amount of coating is frequently deposited, which, if it is not removed, results in the formation of an uneven surface, a ridge or "bead" at the edge of the tile, usually the edge which last leaves the coating device. The bead breaker 8 is provided to remove this bead. As the tile leave the coating trough they pass over the shell which is in rotation over its spool or roll 9. The breaking of contact between the rubber surface of the roll and the perforations of the shell, which, in effect form radial tubes, creates more or less vacuum in these perforations on the side of the roll away from the trough. This suction effectively withdraws excess coating deposited upon the tile from it and destroys the bead. As the tile leave the bead breaker they pass onto the carry-off or delivery apron 23, the receiving end of which is carried by a pulley or spool 24, adjustable (as will later appear) toward and from the bead breaker. By adjusting this spool properly for the length of tile being coated, the rear ends of the tile are caused to drop more or less, as seen in Fig. 1. This enables the bead breaker to remove the excess material deposited upon the rear end surface of the tile.

In order to further prevent formation of a bead, carry-off apron 23 is preferably driven at a higher speed than feed apron 1 and also higher than that imparted to the tile by rolls 4 and bead breaking roll 8. By this means when the tile pass through the delivery apron they are quickly removed from the trough and the bead breaker and there is insufficient time for the formation of the bead. Accelerated movement of the delivery apron also insures that the tile are carried away from the trough as fast or faster than they can be supplied to it.

(See Fig. 7.) At the points where the roll shafts 5 pass through the ends of trough 3, the holes 3ª in the trough are made considerably larger than the shafts. This prevents the coating material, which frequently contains gritty and abrasive substances, from wearing the trough or shafts. Considerable coating material flows through the holes around the shafts but this is not objectionable and, in fact, is desirable, as it increases the circulation of the material.

Referring to Figs. 2 and 3, 25 is a main coating receptacle consisting in the exemplification shown of a tub of semi-cylindrical shape placed below the coating device so that it catches all the excess coating falling from trough 3.

26 is a rock shaft having arms 27.

28 is an agitator consisting of a bar or slat connected to the lower ends of arms 27, and reaching across the tub near the bottom.

29 are ladles or buckets carried by arms 27 having mouths 30.

When the machine is in operation, shaft 26 is rocked so that agitator 28 moves back and forth in the tub near its bottom and continuously stirs and keeps the coating material in circulation and especially prevents the settling of the heavier constituents of the material to the bottom of the tub. At

every oscillation of the shaft, buckets 29 dip into the coating material and carry it up until they reach the position shown in dotted lines in Fig. 2, when the material is discharged from the mouths 30 of the buckets into trough 3. One or more of the buckets may be employed as conditions require. The rapidity of movement of the buckets may be varied by any suitable means to supply the required amount of coating material to the trough, as has been before set forth.

31 is a crank arm on one end of the shaft 26; 32, a pin thereon; 33, a driving shaft, which may or may not impel other parts of the machine, having a crank pin 34; 35, a pitman connected to crank pin 34 and having a socket 36 resting on crank pin 32, shaped so as to engage the pin but permit the pitman to be readily raised and removed from the pin when desired.

As shaft 33 rotates the pitman is reciprocated and rock shaft 26 is oscillated to impel the agitator and buckets. By removing the pitman at any time the buckets may be held up in the position shown in dotted lines in Fig. 2 to permit of cleaning, or shaft 26 may be rotated in the opposite direction further than its normal movement to permit cleaning the agitator. Delivery apron 23 is carried at its delivery end by a spool 40 which is driven in any suitable manner and in turn drives the apron in the direction of the arrow. The apron passes around adjustable spool 24, as before mentioned, around another movable spool 41, and a normally fixed spool 42.

43 are movable heads, one at each side of the apron, having gibs 44 moving in sockets provided in stationary blocks 45. These heads carry revolubly the shafts of spools 24 and 41.

46 is the shaft for spool 41 upon which the spool is revoluble.

47 are pinions on the ends of shaft 46; 48, rack teeth carried by blocks 45 engaging the teeth of the pinions; 49, the squared ends of shaft 46 or other devices, such as hand wheels by which the shaft may be rotated, and, 50, a cleft in head 43, in which shaft 49 is mounted and which may be tightened by means of a set screw 51 to hold the shaft irrevoluble.

To adjust the position of the receiving end of delivery apron 23, set screw 51 is loosened and shaft 49 rotated in the proper direction, moving heads 43 toward or away from the coating device. During this movement the apron moves freely in relation to spools 24 and 41 and its length is not affected. By tightening set screw 51 the adjustment is made permanent. In some cases the rack and pinion and locking device may be omitted since the tension of the belt does not tend to affect its adjustment, and heads 43 will tend to remain in the position in which they are placed. To permanently adjust the tension of the apron, spool 42 is mounted upon carriers 55 which run in sockets in blocks 45. Set screws 56 passing through lugs on the carriers bear against the blocks 45 and by turning the set screws, the carriers may be moved further out from the blocks and the tension of the apron adjusted.

Many variations in the specific structures described may be made without departing from the spirit of my invention and I do not intend in any way to limit myself to details.

Reference is hereby made to my co-pending applications, Serial No. 327,921, filed July 26, 1906, for tile coating machine, and Serial No. 465,589, filed December 2, 1908, for machines for coating tile, etc.

What I claim is:

1. In a coating machine, the combination of a coating device, a receptacle for coating material, a shaft, means for continuously oscillating the shaft, a dipper connected to the shaft for conveying coating material from the receptacle to the coating device and an agitating element connected with the shaft and moving within the receptacle.

2. The combination of a coating roll, a bead breaking roll, a trough beneath said coating roll and having a part intervening between said rolls, a receptacle for coating material, and means for conveying coating material from the receptacle to the coating roll.

3. In a coating machine, a coating device, means for supplying coating material thereto, a conveying belt for removing coated objects from the coating device, means for adjusting the permanent tension of the belt, and means for varying the position of the end of the belt adjacent to the coating device without disturbing the tension of the belt.

4. The combination of a coating roll, a trough beneath the roll, a feed apron and a carry-off apron, a receptacle for coating material beneath the roll, an agitator within the receptacle and a conveying device for carrying coating material from the receptacle to the roll, and means for continuously driving said aprons for rotating said roll and oscillating said agitator and conveying device.

5. In coating apparatus, the combination of a trough, a roll therein, a bead breaker adjacent to the trough, a reservoir for coating material, and means for continuously circulating coating between the reservoir and the trough.

6. In a machine for coating tiles or the like, the combination of a trough, a plurality of rolls therein, a bead breaker adjacent to the trough comprising a supporting and driving roll, and a pervious shell hung eccentrically thereon, a coating reservoir, and

means for continuously supplying coating material from the reservoir to the trough in excess of the amount required for coating, the excess returning from the trough to the reservoir.

7. In a coating machine the combination of a coating device and bead breaking mechanism comprising a pervious shell and a roll within the shell.

8. In a coating machine the combination of a coating roll and bead breaking mechanism comprising a pervious roll and a supporting roll within the shell.

9. In a coating machine, the combination of a coating device and a bead breaking means comprising a pervious metal shell and a rubber roll within the shell.

10. In a coating machine, the combination of a trough having an overflow, a coating roll within the trough, a pervious shell without the trough adjacent to the overflow, and a rubber supporting roll within the shell.

11. In a coating machine the combination of a coating device and a bead breaking device comprising a roll and pervious shell eccentrically mounted on the roll.

12. In a coating machine, the combination of a coating device and a bead breaking device adjacent thereto comprising a roll and a pervious shell eccentrically mounted on the roll.

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