H. P. DOMINE.

TILE FORMING MACHINE.

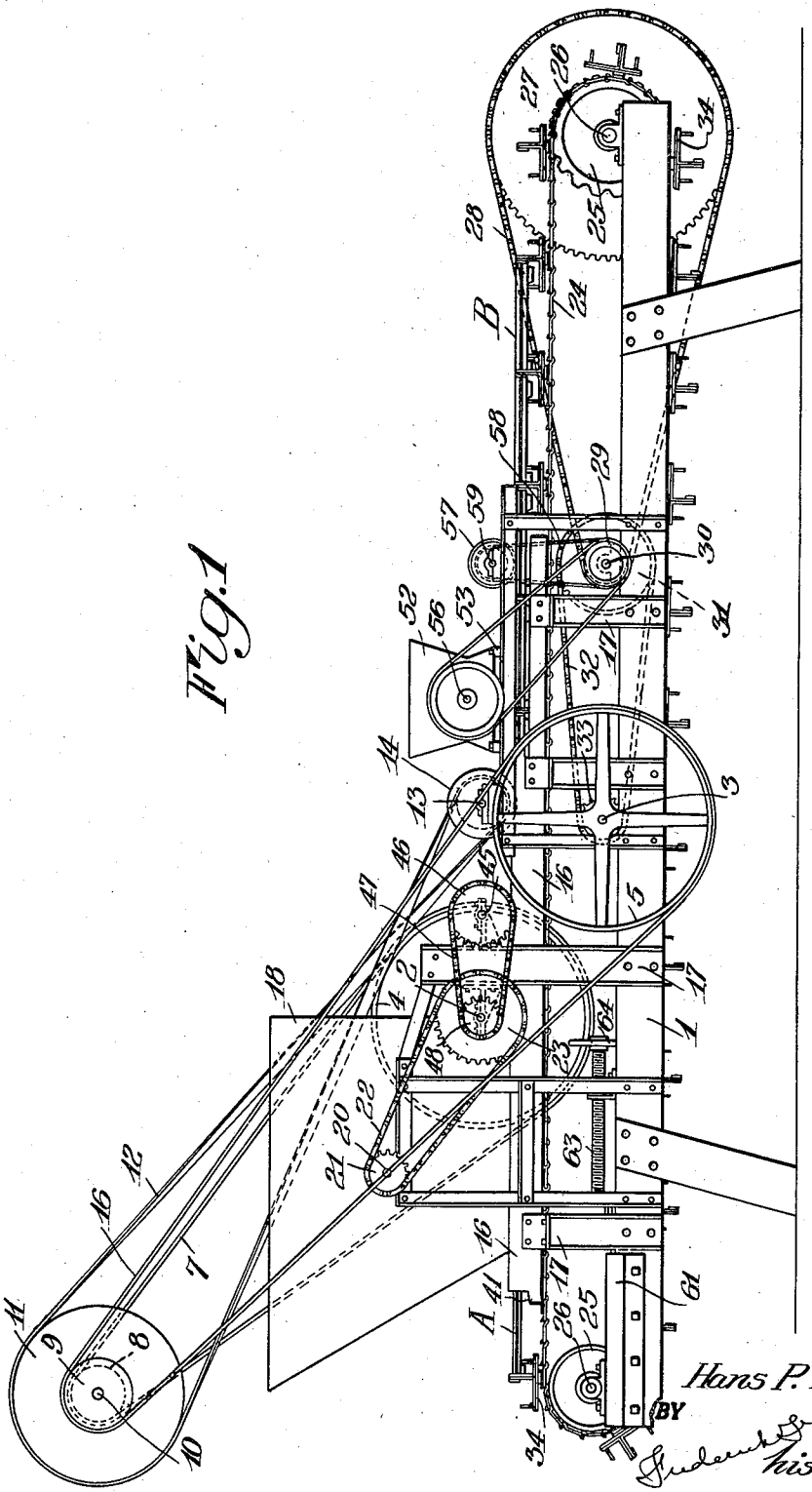
APPLICATION FILED DEC. 27, 1919.

1,377,188.

Patented May 10, 1921.

3 SHEETS—SHEET 1.

Fig. 1



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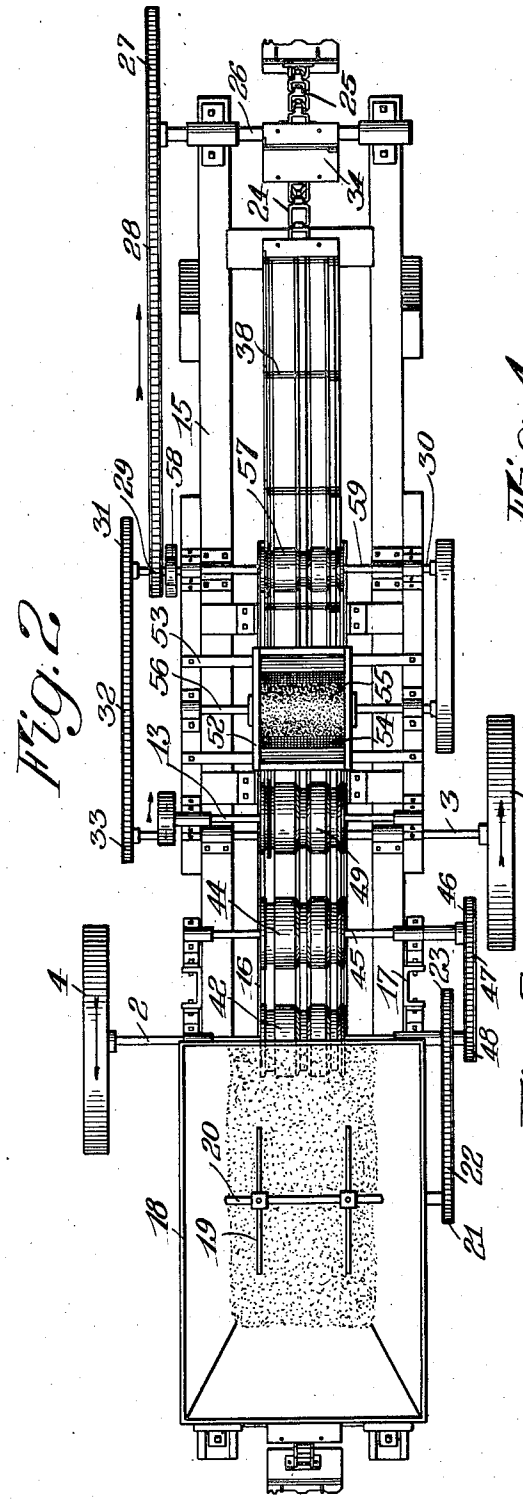


Fig. 2

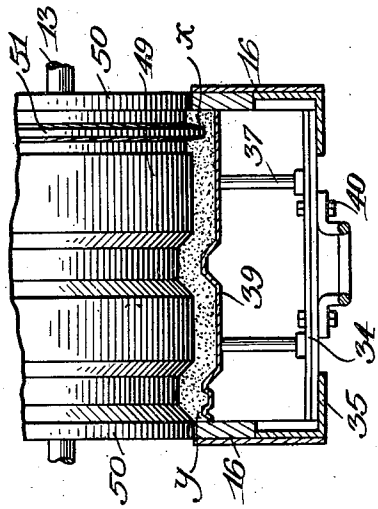


Fig. 4

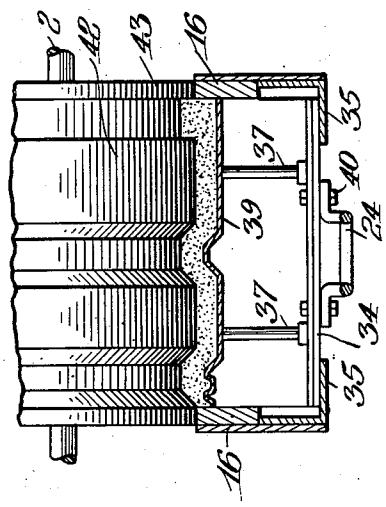


Fig. 3

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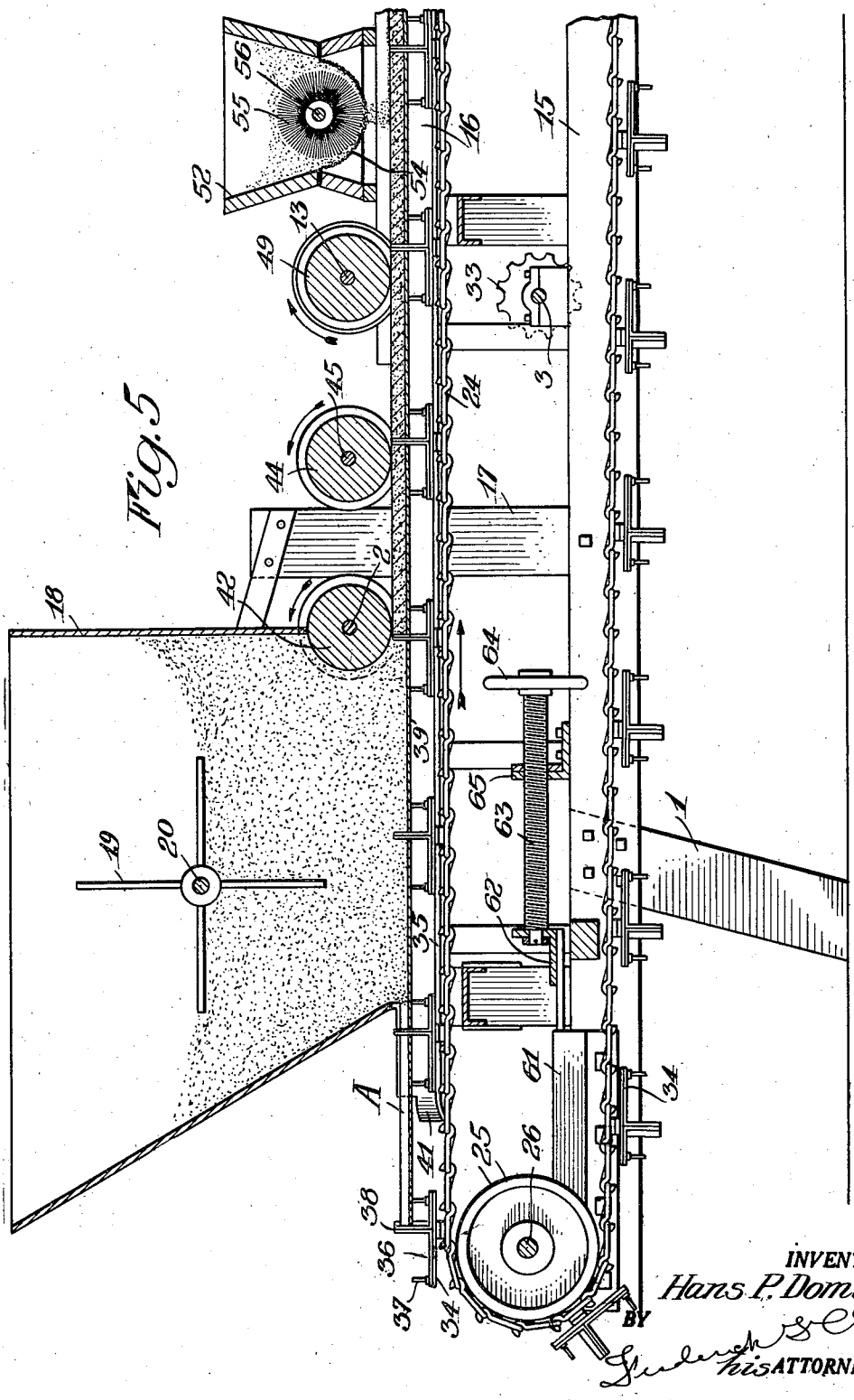
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3 SHEETS—SHEET 3.

Fig. 5



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UNITED STATES PATENT OFFICE.

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TILE-FORMING MACHINE.

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To all whom it may concern:

Be it known that I, HANS P. DOMINE, of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Tile-Forming Machines; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the reference-numerals marked thereon.

My present invention relates to plastics and more particularly to the manufacture of tiles, shingles, or slabs of a like nature from concrete or similar material and the invention has for its object to provide a simple and efficient machine for automatically forming articles of this kind as a continuous operation, the improvements being directed in part toward providing a machine that will turn the tiles out rapidly and of uniform quality. To these and other ends the invention resides in certain improvements and combinations of parts all as will be hereinafter more fully described, the novel features being pointed out in the claims at the end of the specification.

In the drawings:

Figure 1 is a side elevation of a tile making machine constructed in accordance with and illustrating one embodiment of my invention;

Fig. 2 is a top plan view thereof;

Fig. 3 is an enlarged fragmentary transverse section through the bed of the machine in the plane of the axis of one of the spreading rolls;

Fig. 4 is a similar view taken in the plane of the axis of the finishing roll, and

Fig. 5 is an enlarged fragmentary longitudinal section through that portion of the machine in the region of the hopper.

Similar reference numerals throughout the several views indicate the same parts.

The machine forming the present embodiment of the invention is designed for the manufacture of roofing tiles of the ribbed variety having interlocking flanges and grooves on their lateral edges permitting them to overlap at the sides as well as at the ends. This machine contemplates the use of a separate detachable mold plate that is inserted in the machine at one end and which is removed with the completed though soft tile, at the other. The mold plates are preliminarily treated to cause the finished tile to separate readily from the mold surface as by dipping them in kerosene, but they remain with the tile until the latter has set sufficiently to be self-supporting though not necessarily cured.

Referring more particularly to the drawings, and to Fig. 1 thereof, I will first describe the driving connections through which the source of power is distributed. The main frame of the machine is indicated generally at 1 and carries two principal driven shafts 2 and 3 having pulleys 4 and 5 on opposite sides of the frame (see also Fig. 2) rotated by belts 6 and 7 running from pulleys 8 and 9 on a shaft 10 representing the source of power. A third large pulley 11 on the shaft 10 carries a belt 12 running to a pulley on the shaft 13 of a finishing roll 14 on the bed 1 to give this roll the desired high speed for purposes later explained.

The frame 1 comprises lower rails 15 and upper rails 16 supported on the lower rails by uprights 17. Resting on the upper rails is a hopper 18 having an open bottom and containing an agitator comprising beater arms 19 on a shaft 20 journaled in the sides of the hopper. On the projecting end of the shaft 20 is a sprocket 21 through which is communicated power by a chain 22 running from a sprocket 23 on the shaft 2. An endless chain conveyer 24 travels beneath the hopper longitudinally of the machine in a direction to the right in the figures. It is supported on and driven by sprockets 25 at opposite ends of the frame carried on shafts 26 spanning the lower rails 15. One of these shafts 26 and its sprocket are driven by a sprocket 27 on the former over which runs a chain 28 from a sprocket 29 on a jack shaft 30 spanning the frame. This shaft 30 carries a sprocket 31 and is in turn driven through a chain 32 from a sprocket 33 on the shaft 3.

Secured at regular intervals on the carrier chain 24 are a plurality of mold supporting elements 34 best shown in Figs. 3, 4 and 5. Each comprises a pair of L-shaped members secured back to back on a plate or cross piece extending transversely of the conveyer 24 and having its ends resting on and adapted to slide upon horizontal flanged portions 35 of the frame 16 which thereby forms a track with high sides. The horizontal portions 36 of the L-shaped members carry upstanding pins or posts 37, while the

vertical contacting portions 38 form a web or wall separating one set of pins from the other. The separate detachable mold plates 39 rest freely on these pins 37 and their lateral edges ride against the frame or track 16. The respective ends of each mold plate rest upon the pins of two adjacent supporting elements 34 on the carrier and the webs 38 constitute end walls for shaping the end faces of the contents while the lateral faces are shaped and retained by the track portions 16 of the frame. Each supporting element 34 is bolted at 40 to a single link of the conveyer chain 24 so that it has no difficulty in rounding the sprockets 25 and alining itself with the track flanges 35 which have suitable flared portions 41 at their left hand ends to receive the cross pieces.

The mold plates 39 have the conformation desired in one flat face of the tile, the bottom in the present instance, and they are inserted on the conveyer at the point marked A in Figs. 1 and 5. As a mold plate so inserted is drawn beneath the hopper 18, the concrete or other plastic material within the latter settles upon it and as the mold issues from the opposite side of the hopper, a spreading roll 42 located partly within and partly without the hopper and extending transversely of it and the conveyer, compresses the concrete and causes it to be packed solidly therein. This roll 42 is mounted on the shaft 2 and its periphery, as shown in Fig. 3, has the conformation desired in the upper surface of the tile except for the groove indicated at X in Fig. 4 which, when the tiles are laid, receives the flange Y of the adjacent tile. The ends of the roll 42 have flanges 43 that run closely against the top edges of the lateral track portions 16 of the frame to prevent the concrete from escaping at the point of pressure from the roll.

After leaving the first packing and spreading roll 42, the mold and its contents travels beneath a second roll 44 that is a duplicate of the first and which further evenly spreads and settles the concrete in the mold. This roll is mounted upon a shaft 45 having suitable bearings in the frame and carrying a sprocket 46 by means of which it is driven with a sprocket chain 47 from a sprocket chain 48 on shaft 2. All of the rolls now being described run with their peripheries substantially tangent to the upper edges of the partition members 38 of the carrying elements 34. The partly finished tile receives its final shaping and its surface is smoothed by a smoothing roll 49 similarly provided with end flanges 50, as shown in Fig. 4 and of the same peripheral conformation as the preceding roll except that it is provided with an annular rib 51 for forming the groove X in the tile. The packing and spreading rolls 42 and 44 have a low peripheral speed just a little greater than that of the conveyer 24 and in the same direction at the point of contact, as indicated by the arrows in Fig. 5. The smoothing or finishing roll 49, however, rotates at a high speed and in the opposite direction which imparts a smooth finish to the work.

In its further travel, the work runs beneath a hopper 52 supported above the conveyer on rails 53 spanning the frame 16 and having a semi-cylindrical screen 54 for a bottom. An agitating and discharging brush 55 on a shaft 56 running through the hopper rotates against the screen bottom and dusts powdered coloring matter in the hopper upon the finished surface of the tile, as indicated in Fig. 5. This coloring matter is pressed into the soft surface and the latter given a final polish by a polishing roll 57 having a periphery conforming to the surface of the tile and driven at high speed in the same direction as the finishing roll 49 by a belt 58 running to a pulley on its shaft 59 from a pulley on the jack shaft 30. This is the final operation and as the mold reaches the position marked B in Fig. 1, it is lifted off by an operator and placed upon a rack where the soft tile it carries may dry. It will be noted that the side portions of the track 16 terminate short of the position B so that the operator may readily place his fingers beneath the mold plate at the sides to lift it off. The end and side faces of the tile formed by the partition members 38 and the tracks, respectively, no longer require support.

To run at full capacity, the machine requires two operators, one to stand at the point A and insert the mold plates and the other to stand at the point B and remove and rack the tiles.

In Fig. 5 is shown as adjustment for placing the chain conveyer 24 under the desired tension. The bearings of the sprocket shaft 26 are carried on slides 60 running in guides 61 and connected by a cross bar 62. One end of a screw 63 having a hand wheel 64 is rotatably secured in this cross piece and travels in a nut 65 secured to the frame whereby the distance between the shafts 26 may be adjusted.

I claim as my invention:

1. In a tile making machine, the combination with a hopper for the plastic material having an open bottom, of a conveyer arranged to travel beneath said hopper, a plurality of separate detachable mold plates arranged to rest upon the conveyer and laterally arranged fixed tracks paralleling the conveyer above the level of the floors of the molds and adapted to guide the molds and to shape the lateral faces of their contents.

2. In a tile making machine, the combination with a hopper for the plastic material

having an open bottom, of a conveyer arranged to travel beneath said hopper, plurality of separate detachable mold plates arranged to rest upon the conveyer and laterally arranged fixed tracks paralleling the conveyer above the level of the floors of the mold and adapted to guide the molds and to shape the lateral faces of their contents and means on the conveyer for shaping the end faces thereof.

3. In a tile making machine, the combination with a hopper for the plastic material having an open bottom, of a conveyer arranged to travel beneath said hopper, a plurality of separate detachable mold plates arranged to rest upon the conveyer, laterally arranged fixed tracks paralleling the conveyer above the level of the floors of the molds and adapted to guide the molds and to shape the lateral faces of their contents and a roller above the conveyer for shaping the top surface of the work, the ends of the roller being arranged to run close against the respective tracks.

4. In a tile making machine, the combination with a bed having tracks and a hopper for the plastic material supported thereon and having an open bottom, of a conveyer arranged to travel beneath said hopper and between the tracks, cross pieces on the conveyer adapted to slide upon the track and separate detachable mold plates arranged to rest upon the cross pieces of the conveyer.

5. In a tile making machine, the combination with a bed having tracks and a hopper for the plastic material supported thereon and having an open bottom, of a conveyer arranged to travel beneath said hopper and between the tracks, cross pieces on the conveyer adapted to slide upon the tracks, posts rising from the cross pieces and separate detachable mold plates arranged to rest upon the posts.

6. In a tile making machine, the combination with a bed having L-shaped tracks and a hopper for the plastic material supported thereon and having an open bottom, of a conveyer arranged to travel beneath said hopper and between the tracks, cross pieces on the conveyer adapted to slide on horizontal portions of the tracks and separate detachable mold plates arranged to rest upon the cross pieces of the conveyer and have the lateral faces of their contents shaped by vertical portions of the track.

7. In a tile making machine, the combination with tracks and a conveyer running between the same, of a plurality of elements fixed to the conveyer at intervals and running on the tracks, and a separate detachable mold supported between each pair of adjacent elements, each of the latter being adapted to support one end of each of two adjacent molds and to shape the proximate end faces of the contents of both.

8. In a tile making machine, the combination with tracks and a conveyer running between the same, of a plurality of elements fixed to the conveyer at intervals and running on the tracks, and a separate detachable mold supported between each pair of adjacent elements, each of the latter being adapted to support one end of each of two adjacent molds and to shape the proximate end faces of the contents of both, and portions of the tracks being adapted to shape the lateral faces of the contents of all of the molds.

9. In a tile making machine, the combination with a hopper for plastic material having an open bottom, a conveyer arranged to travel beneath said hopper and molds carried by the conveyer, of a low speed spreading roller above the conveyer arranged to first contact and pack the material in the molds and a high speed finishing roll adapted to subsequently smooth the surface of the work.

10. In a tile making machine, the combination with a hopper for plastic material having an open bottom, a conveyer arranged to travel beneath said hopper and molds carried by the conveyer, of a low speed spreading roller above the conveyer arranged to first contact and pack the material in the molds and turning with the conveyer and a high speed finishing roll adapted to subsequently smooth the surface of the work and turning in a direction against that of the conveyer.

11. In a tile making machine, the combination with a hopper for plastic material having an open bottom, a conveyer arranged to travel beneath said hopper and molds carried by the conveyer, of a spreading roller above the conveyer arranged to first contact and pack the material in the molds and adapted to preliminarily shape it and a high speed finishing roll adapted to subsequently smooth the surface of the work and to complete the shaping thereof.

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