Oct. 16, 1923. 1,471,043

T. J. LORDS ET AL

ROOFING MACHINE

Filed Nov. 5, 1920 5 Sheets-Sheet 1

Fig. 1

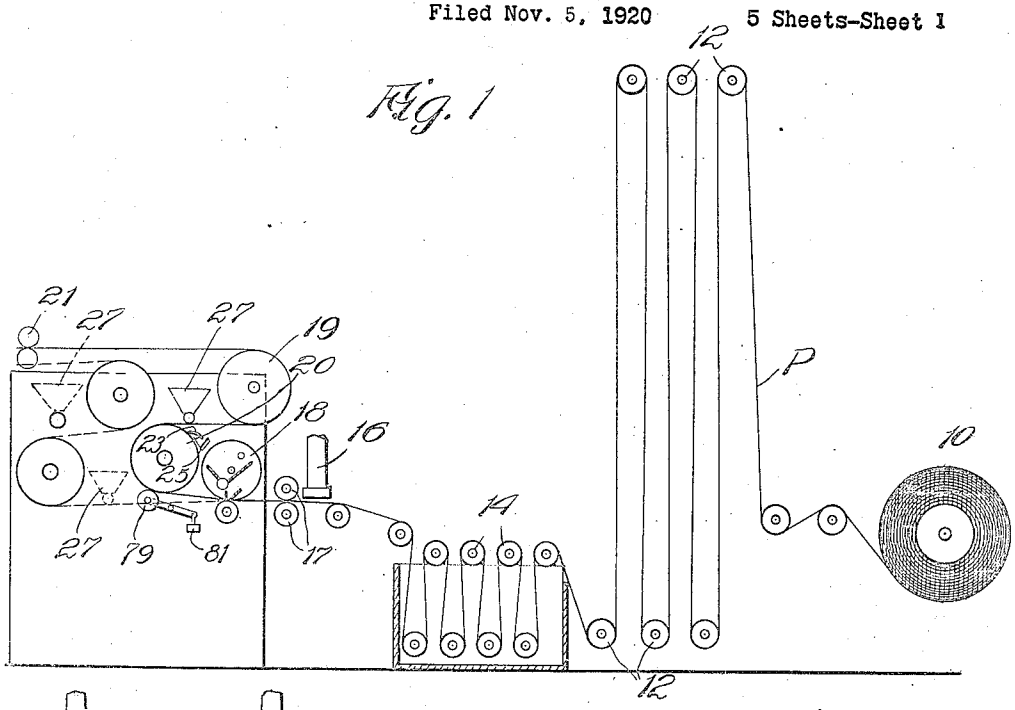


Fig. 7

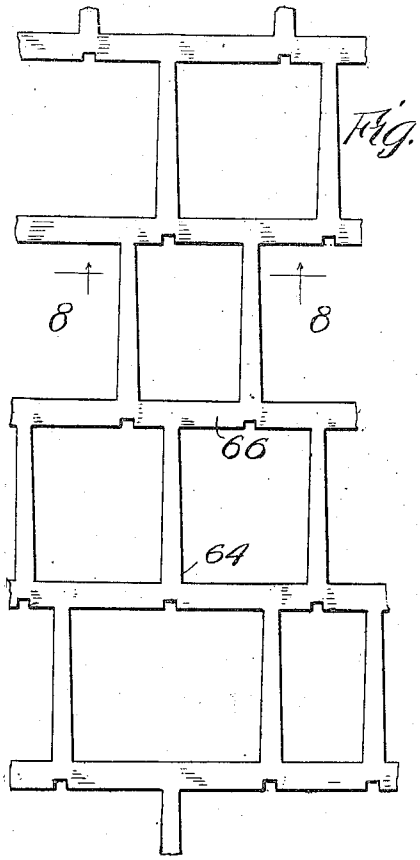
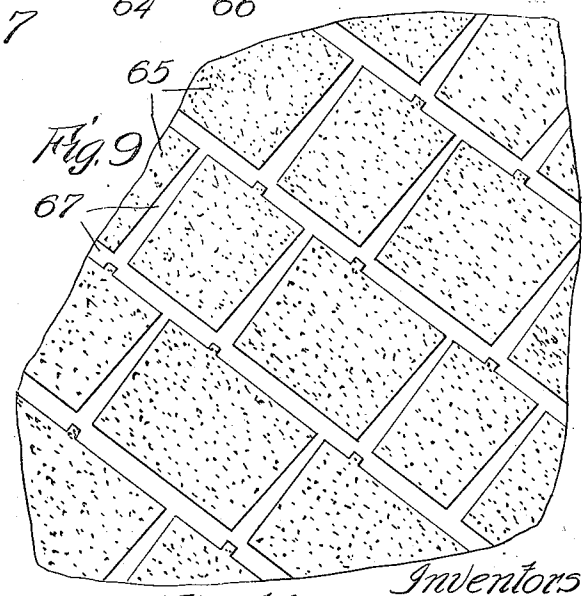


Fig. 8



Fig. 9



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5 Sheets-Sheet 2

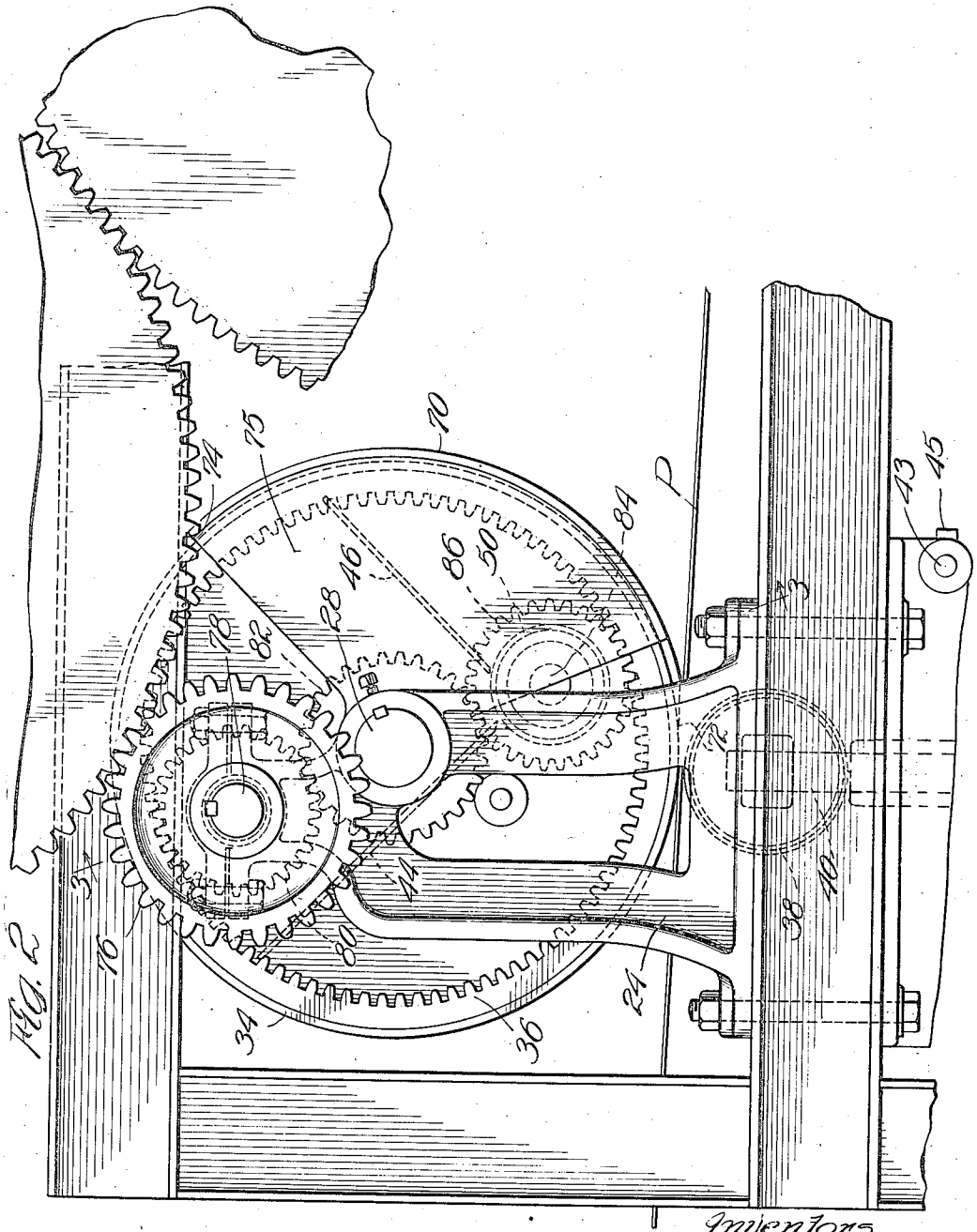


FIG. 2

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5 Sheets-Sheet 3

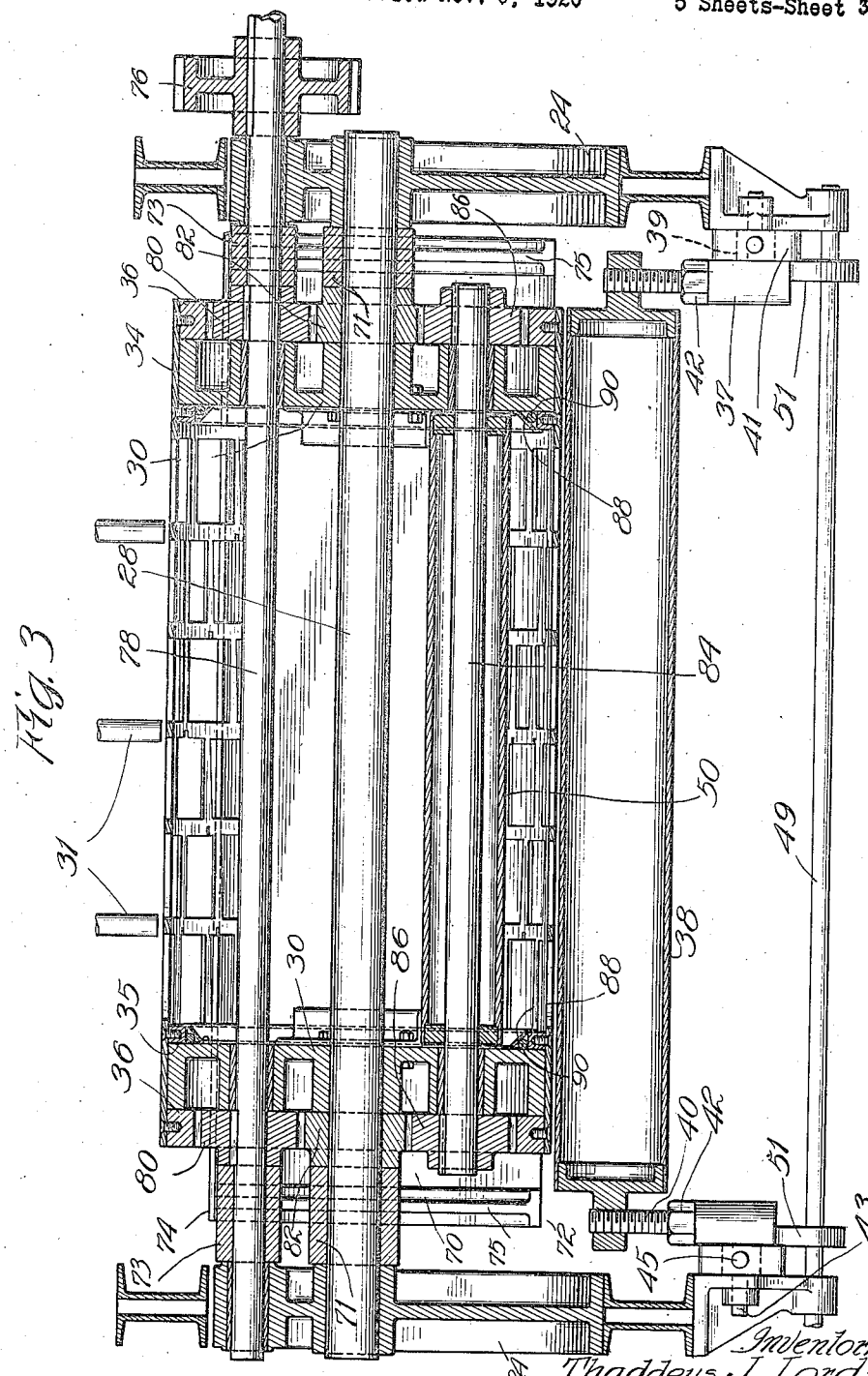


Fig. 3

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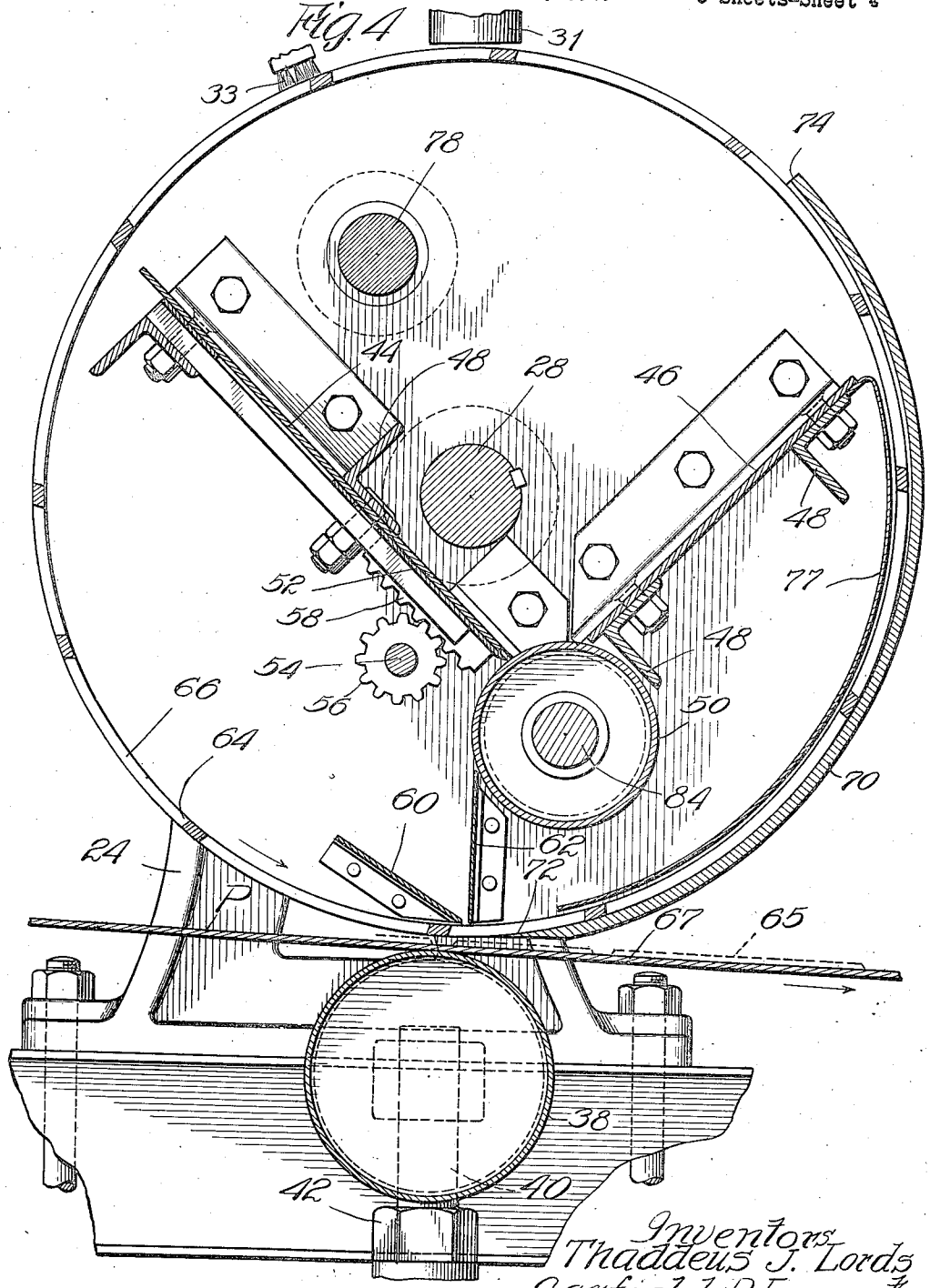
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ROOFING MACHINE

Filed Nov. 5, 1920

5 Sheets-Sheet 4

Fig. 4



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Oct. 16, 1923. 1,471,043

T. J. LORDS ET AL

ROOFING MACHINE

Filed Nov. 5, 1920 5 Sheets-Sheet 5

Fig. 5

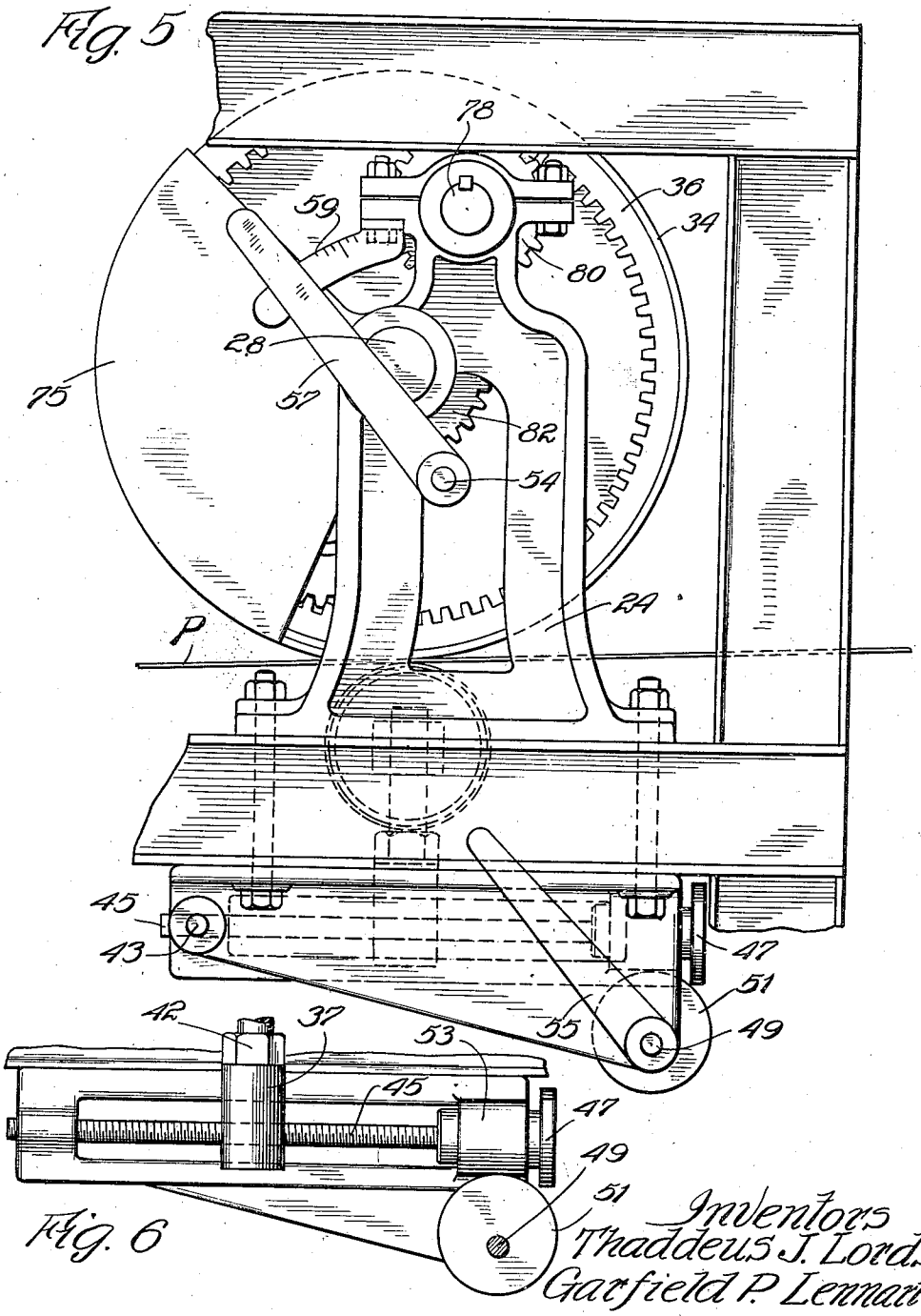


Fig. 6

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UNITED STATES PATENT OFFICE.

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ROOFING MACHINE.

Application filed November 5, 1920. Serial No. 521,911.

To all whom it may concern:

Be it known that we, THADDEUS J. LORDS and GARFIELD P. LENNARTZ, citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Roofing Machines, of which the following is a specification.

Our invention relates to the manufacture of protective material for covering the roofs and walls of buildings and more specifically to an improved machine for manufacturing roofing. Such roofing is ordinarily covered with a surfacing of ground slate or other weather resisting material, and roofing having a pattern formed thereon, so as to look like shingles or tile for instance, presents a much more attractive appearance than roofing having a uniform surface.

The main object of our invention is to provide a machine for producing such roofing quickly and economically.

Another object is to produce a pattern by the interruption of a stream of material in such a way as to secure clean outlines. We accomplish this chiefly by dropping the material through as short a distance as possible and by employing an interrupting member of special shape.

Another object is to prevent blurring of the outlines during the operation of pressing the surfacing material into place.

Another object is to provide means to avoid fouling of the parts used in applying the ground surfacing material when starting the machine.

Another object is to dispose of the ground material interrupted by returning it to the original supply of ground material.

Another object is to provide an arrangement of parts capable of operating in the presence of considerable quantities of grit without jamming or excessive wear.

Further objects and advantages of our invention will become apparent as the description proceeds.

In the accompanying drawings, Figure 1 is a diagrammatic view of an entire roofing machine of which our improved surfacing device forms a part. Fig. 2 is an end view of the device itself and Fig. 3 is a longitudinal section on the line 3—3 of Fig. 2. Fig. 4 is a transverse section of the device. Fig. 5 is an end view of the end opposite that shown in Fig. 2 and Fig. 6 is a detail of the raising and lowering means for the paper support. Fig. 7 is a fragmentary view of part of the stencil as it would appear if developed or rolled out flat, and Fig. 8 is a detail section on the line 8—8 of Fig. 7. Fig. 9 is a fragmentary view of the product manufactured in our machine.

In the embodiment of our invention selected for illustration, the paper P may be drawn from a suitable source of supply such as a roll 10 and is first passed through take-up rollers 12. The upper rollers are movably mounted and may be lowered at a constant rate to permit the rest of the machine to receive paper for a short time without taking paper from the roll 10. This makes it possible when the end of a roll is reached for the workmen to fasten the end of the old roll to the end of a new roll without stopping the entire machine. After passing over rollers 12 the paper passes over other rollers 14 into and out of a bath of tar, asphaltum or other suitable substance with which it is more or less thoroughly impregnated. From this bath it passes under a pipe 16 which deposits material on the moving strip and between a pair of stationary rolls 17 by means of which the material is spread out into a smooth, uniform coating over the surface of the paper. Excess coating material may fall off the edges of the strip of paper and be collected in a suitable receptable, not shown. The upper roller 17 is preferably made vertically adjustable for controlling the thickness of the coating spread on the paper. The foregoing elements being old and well known in the art and constituting no part of our present invention, more detailed disclosure of the same is deemed unnecessary.

Various combinations or sets of devices for applying ground material or surfacing to one or both sides of the roofing may act on the same after it passes between rolls 17. We have shown two such arrangements in Fig. 1, the one shown in full lines comprising means for passing the paper under a feeding device 18, around a large roller 20 which presses most of the surfacing deposited by the device 18 into the coating applied by pipe 16, another roller 19 employed merely for convenience in reversing the direction of the strip, and a final pair of rollers 21 which press the material car-

ried by the strip a second time after the temperature of the strip has been considerably reduced from that prevailing adjacent the roller 20. A scraper blade 23 is preferably provided to direct surfacing in excess of what will adhere to the strip off the descending side of roller 20 into a receiving chute 25 to convey it back to the main supply. A hopper 27 is ordinarily positioned so as to coat the reverse side of the paper with ground material, usually fine powdered mica. The same plant may be employed to produce paper coated with fine powdered mica on both sides by passing the paper along the path shown in dotted lines to receive coatings of suitable material on both sides from other hoppers 27.

The device 18 for feeding the surfacing material onto the strip in such a way as to produce a pattern is illustrated more in detail in Figs. 2 to 6. A pair of spaced standards 24 support a stationary shaft 28 which in turn supports two spiders 30. A cylindrical stencil 34 is rotatably supported at its ends on the spiders 30 by peripheral engagement of the spiders with the element and by engagement of the faces of the spiders with guide rings 35 and with combined guide rings and internal gears 36. The paper is carried past beneath the cylinder almost in contact with it over a support 38.

When the machine is temporarily stopped for any reason, the mass of material lying in front of rolls 17 will cool below the proper temperature and when the machine is subsequently restarted the cold material will be forced through the rolls in such a way as to produce lumps in the coating which would be apt to make contact with the cylinder 34, contaminating it and interfering with the operation of the machine. In Figs. 5 and 6, we have illustrated means for temporarily withdrawing the support 38 from operative position to prevent such contamination of the cylinder. The support 38 is supported at its ends by vertical screws 40 entering tubular members 37 with respect to which their height may be adjusted by nuts 42. Each tubular member carries a laterally extending portion 39 slidably mounted in a rocking frame 41 pivoted at 43 to the supporting framework. For adjusting the horizontal alinement of the support to position it correctly under the cylinder 34 we provide a screw 45 threaded through the portion 39 and rotatable by means of a hand wheel 47. A transverse shaft 49 journaled in the supporting framework carries eccentrics 51 abutting lugs 53 on the pivoted frames 41, and a handle 55 fastened at one end of the same. By rotating the handle the pivoted frames 41 and support 38 may be dropped downwardly a sufficient distance to allow the excess material carried by the strip to pass by the cylinder 34 without touching it after which the parts may be thrown back into the position shown in Figs. 5 and 6.

Within the stencil 34 is a hopper comprising inclined plates 44 and 46 suitably reinforced by angle members 48 and cooperating with a feed roller 50 to hold the ground material with which the paper is to be surfaced and deliver it at a uniform rate. The supply of material in the hopper may be replenished through one or more chutes 31, and a brush 33 is preferably provided to brush off any material deposited on top of the stencil by the chutes. The rate of discharge may be conveniently adjusted by means of a gate 52 in the nature of a slidable plate the position of which may be controlled by rotating a shaft 54 carrying pinions 56 meshing with racks 58 mounted on the plate 52. The end of the shaft may carry a suitable adjusting lever 57 (see Fig. 5) which, in the position illustrated in the drawings cuts off the discharge. It may be moved to the right from the position shown in Fig. 5 into various positions indicated by markings on a suitable scale 59 to secure various rates of discharge. The material discharged is carried out by the roller and dropped in front of a vertical plate 62 upon an inclined plate 60. The edges of the plates 60 and 62 define a slot spaced above the moving strip only by the clearance necessary to permit movement of the cylinder, and the material striking the plate 60 slides down it into the slot and is thus deposited upon the strip.

It will be seen that if the flow of material between the plates to the moving paper were entirely unobstructed, the paper would receive a uniform layer of ground material over its entire surface.

We have illustrated means for interrupting the flow of material to produce a pattern on the paper. For this purpose the central portion of the cylinder 34 is cut to form a stencil having portions 64 extending parallel to the axis of the cylinder and other portions 66 extending circumferentially around it. The cylinder is driven at a surface speed identical with that of the paper P. Each part of the stencil will therefore prevent the deposit of surfacing on the area which it covers as it passes through the stream of material, producing an uncoated area. To secure clean outlines for these areas portions 64 have their leading and following edges formed at an angle as clearly shown in Figs. 4 and 8, which angle should obviously be the antitangent of the downward velocity of the ground material divided by the peripheral velocity of the cylinder. Particles passing the upper edge of the leading face will therefore not make contact with any part of the stencil but fall

freely through the short distance separating them from the paper and come to rest.

To take care of the material interrupted by the stencil we provide a shield 70 extending around a trifle more than 90 degrees of the periphery of the cylinder beginning just in front of the stream of material where it strikes the paper. The shield may be supported in any suitable manner. We have illustrated bearings 71 supported by shaft 28 and bearings 73 supported by shaft 78, formed as integral portions of the end pieces 75 which are also integral with the body of the shield. This shield receives any material bounding or falling off the portions 64, which material will be moved up the shield by the wiping action of the stencil itself to a level with the axis where it will ride upon the then horizontal leading edges of the portions 64 and be dropped by the tipping caused by further rotation back into the hopper. To avoid any tendency toward a binding or grinding action of particles of material caught between the stencil and the shield 70, the shield is preferably constructed of a slightly different radius than the stencil and positioned so that the clearance between the shield and the stencil increases very gradually from practical contact at 72 to a considerable clearance at 74 (see Fig. 4). This practically eliminates binding as well as the grinding action and wear on the stencil and shield.

To further eliminate spattering back of the material being elevated by the stencil, we prefer to provide an inner shield 77 (see Fig. 4) having enough clearance between it and the stencil to prevent grinding and cooperating with the outer shield 70 to define an arcuate passageway extending from adjacent the bottom of the cylinder up to the edge of the hopper. This completely eliminates the possibility of an occasional deposit of particles falling off portion 64 and rebounding from shield 70 onto the moving strip.

The roofing produced by the stencil shown will comprise surfaced areas 65 (see Fig. 9) separated by dividing lines 67 of paper free from surfacing, to form a pattern. It will be obvious that an unlimited number of designs may be readily produced by the use of different stencil cylinders.

As the strip passes around the roller 20 and is tipped into an approximately vertical position, particles of surfacing not yet pressed into the strip would naturally tend to fall from the edges of the covered areas into the adjacent uncovered areas and blur the outlines of the pattern. To eliminate this tendency we provide means for applying a preliminary pressure to the strip before it has been tipped by movement around roller 20 to an angle steep enough to permit of such falling action. In Fig. 1 we have illustrated a roller 79 pressed against the lower side of roller 20, preferably by a counterweight such as 81. Rollers 21 and the mechanism receiving the strip therefrom ordinarily exert a considerable tension on the strip so that during its entire passage around roller 20 the strip is firmly pressed against the roller, but the use of roller 79 forces the material into place sufficiently to prevent subsequent blurring of the outlines during the passage of the strip over the upper portion of the roller 20. In changing over to use hoppers 27 roller 79 may obviously be shifted out of the way, or even removed entirely.

Any suitable power driven transmission may be employed to actuate the parts above described. We have illustrated a gear 76 on the longitudinally extending shaft 78 which shaft carries two pinions 80 each meshing with one of the gears 36 carried by the cylinder and also with an intermediate transmission gear 82 rotatably mounted on the main supporting shaft 28. The shaft 84 for the roller 50 carries gear 86 at each end meshing both with the transmission gears 82 and the internal gears 36 carried by the cylinder. To prevent the ground material from working into the bearings supporting the cylinder we preferably provide a shield 88 in the nature of a sheet metal ring fastened to each of the spiders 30 and overlying the guide ring 35. A fiber filler 90 saturated with lubricant may conveniently be placed inside the shield to assist in keeping the parts properly lubricated.

While we have illustrated and described in detail the preferred embodiment of our invention, it should be clearly understood that the disclosure is merely for purposes of illustration and that many modifications and variations will naturally occur to those skilled in the art. We aim in the subjoined claims to cover all such legitimate variations and modifications.

We claim as our invention:

1. In a device of the class described, spaced standards supporting a stationary shaft, stationary circular heads on said shaft, a tubular stencil rotatably supported by peripheral engagement with said heads, and means for rotating the stencil.

2. In a device of the class described, storage means for ground material, means for discharging a uniform stream of material from storage, means for periodically interrupting the discharge stream, and conveying means associated with said interrupting means for returning the material interrupted to storage.

3. In a device of the class described, means for moving a strip past a given point, means for depositing material on the strip, stencil means moving adjacent the strip for interrupting the deposit of material, and a shield

to prevent the material interrupted from spattering over the strip.

4. In a device of the class described, spaced standards supporting a stationary shaft, stationary heads supported by the shaft, a tubular stencil rotatably mounted on said heads, a drive shaft journaled in said heads, and a gearing connection between said drive shaft and said stencil.

5. In a device of the class described, spaced standards supporting a stationary shaft, stationary heads on said shaft, a tubular stencil supported on said stationary heads, a stationary hopper inside said stencil, a feed roll for delivering material from said hopper, and means for rotating said feed roll and stencil.

6. In a device of the class described, a hopper, and means for delivering a concentrated stream of material from said hopper in a definite vertical plane, said means comprising a feed roller, a gate cooperating with said feed roller to permit the roller to carry material out of the hopper, a vertical guide placed almost in vertical alinement with the descending periphery of the roller, and an inclined guide opposite said vertical guide for interrupting material leaving the roller with a horizontal velocity and directing it back into the desired vertical plane.

7. In a device of the class described, means for moving a strip past a given point, means for depositing material on the strip, stencil means moving adjacent the strip for interrupting a deposit of material, and a shield cooperating with the stencil to convey interrupted material away.

8. In a device of the class described, means for moving a strip past a given point, means for depositing material on the strip, stencil means moving adjacent the strip for interrupting a deposit of material, and a shield cooperating with the stencil to convey interrupted material to the upper portion of the stencil and there drop it.

9. In a device of the class described, a rotary stencil, means for moving a strip past below said stencil, a support for guiding the strip, a secondary support carrying said guiding support, means for quickly shifting said secondary support through a predetermined displacement, and means for adjusting the guiding support on the secondary support.

10. In a device of the class described, means for delivering a stream of material in a predetermined vertical plane, a stencil, and means for moving said stencil through said stream of material, the leading edges of said stencil being beveled downwardly and rearwardly at an angle determined by the relative velocities of the falling material and the stencil.

11. In a device of the class described, means for delivering a stream of material in a predetermined vertical plane, a stencil, and means for moving said stencil through said stream of material, the leading and trailing edges of said stencil being beveled downwardly and rearwardly at an angle determined by the relative velocities of the falling material and the stencil.

12. In a device of the class described, means for depositing plastic material on a moving strip, means for depositing additional material on the plastic material, said last-mentioned means operating in close proximity to the strip, means for adjusting the normal spacing of said last-mentioned depositing means and the strip, and additional means for removing the strip temporarily from proximity to said last mentioned depositing means without disturbing the adjustment of said adjusting means.

13. In a device of the class described, a rotary stencil, storage means inside said stencil, means for delivering a stream of material from said storage means, and means for checking the downward velocity of the material delivered just above the path of movement of the stencil.

14. In a device of the class described, a rotary stencil, means inside the stencil just above the path of movement of its lowermost portion for delivering a stream of material, and additional feeding means above said delivering means for feeding material to the delivering means, said feeding means including means for determining the rate of flow of material.

15. In a device of the class described, a stencil, storage means for material inside said stencil, means above said stencil for dropping material through said stencil to replenish the supply in said storage means, and means engaging said stencil after it passes through said supply means for dislodging material carried by said stencil.

16. In a device of the class described, a rotary stencil having peripherally extending portions and other portions extending parallel to the axis of rotation, the leading edges of said last mentioned portions being beveled outwardly and back with respect to the direction of motion.

17. In a device of the class described, means for coating the upper surface of a horizontally moving strip with granular material, a main mechanism for pressing the granular material into the strip and simultaneously inverting the strip, and auxiliary mechanism for applying a predetermined amount of pressure to the strip before it has been tipped to such an angle as to displace any of the granular material.

In testimony whereof we have hereunto set our hands.

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