No. 768,946. PATENTED AUG. 30, 1904.

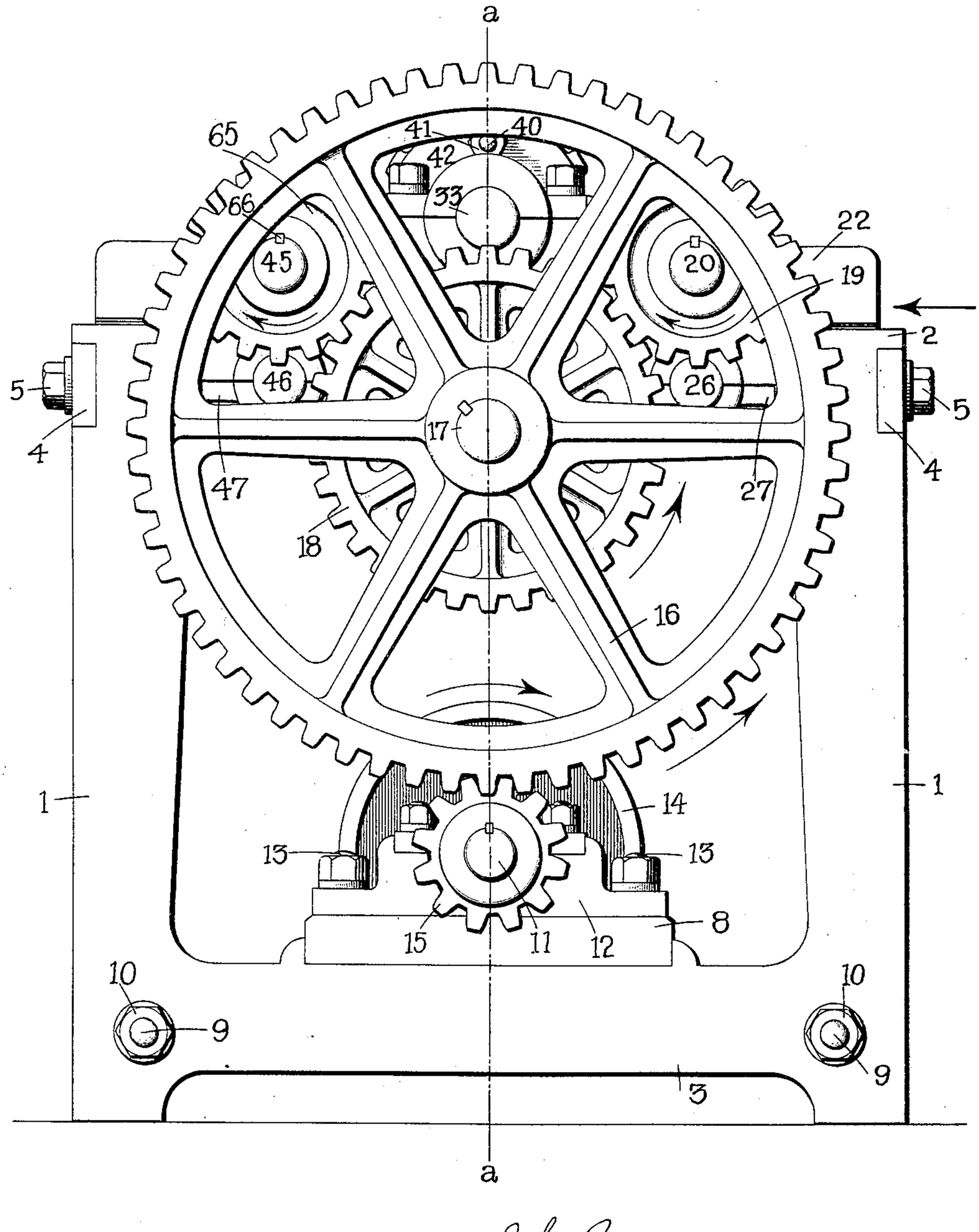
J. F. MALONE.

METAL LATH FORMING MACHINE.

APPLICATION FILED JAN. 16, 1904.

NO MODEL. 5 SHEETS—SHEET 1.

Fig. 1.



Witnesses.
L. M. Sangster.
Geo. A. Neubauer.

John F. Malone. Inventor.

By C. J. Sangster Attorney.

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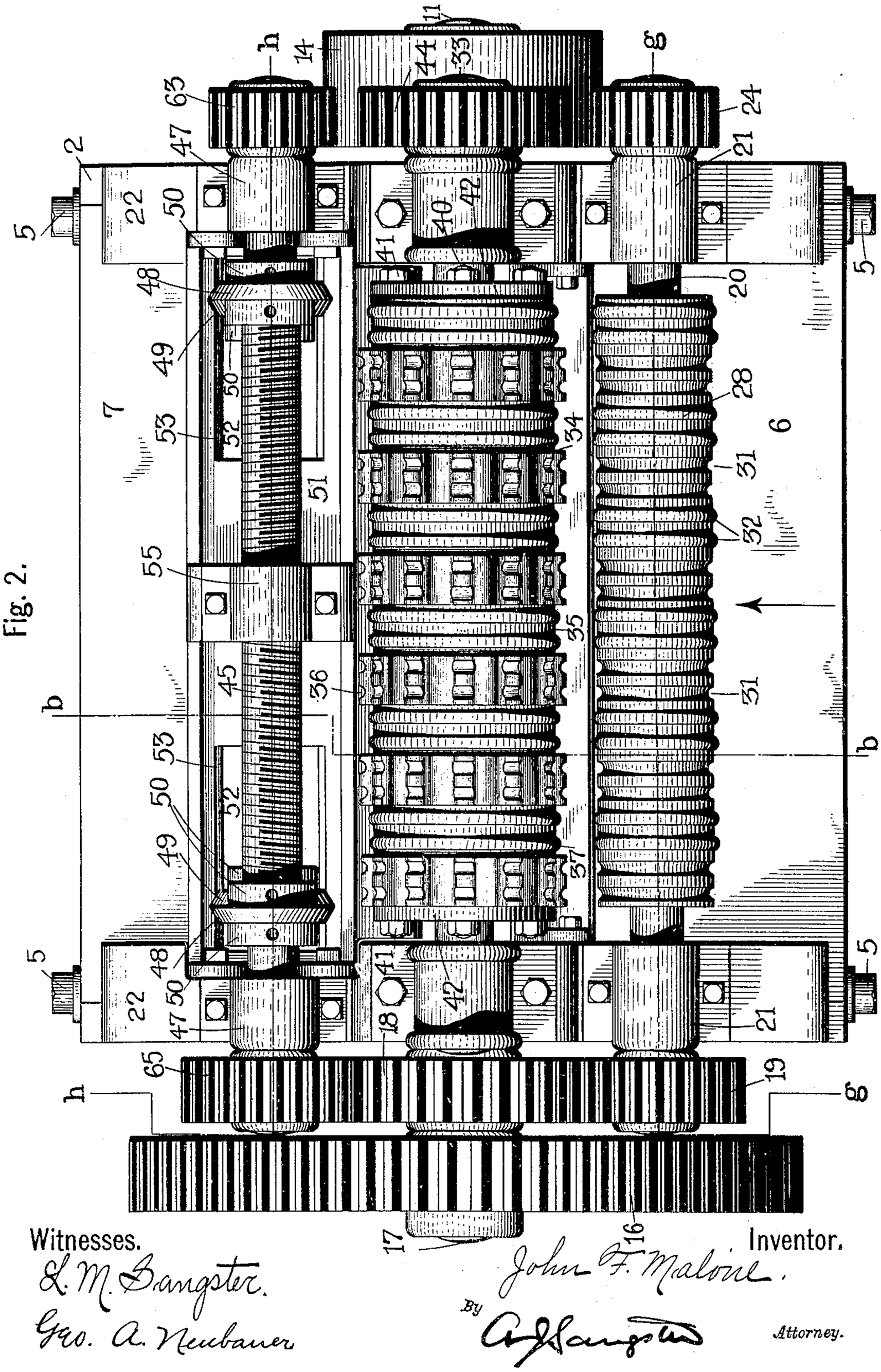
NO MODEL. 5 SHEETS—SHEET 2.

Fig. 2.



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NO MODEL. 5 SHEETS—SHEET 3.

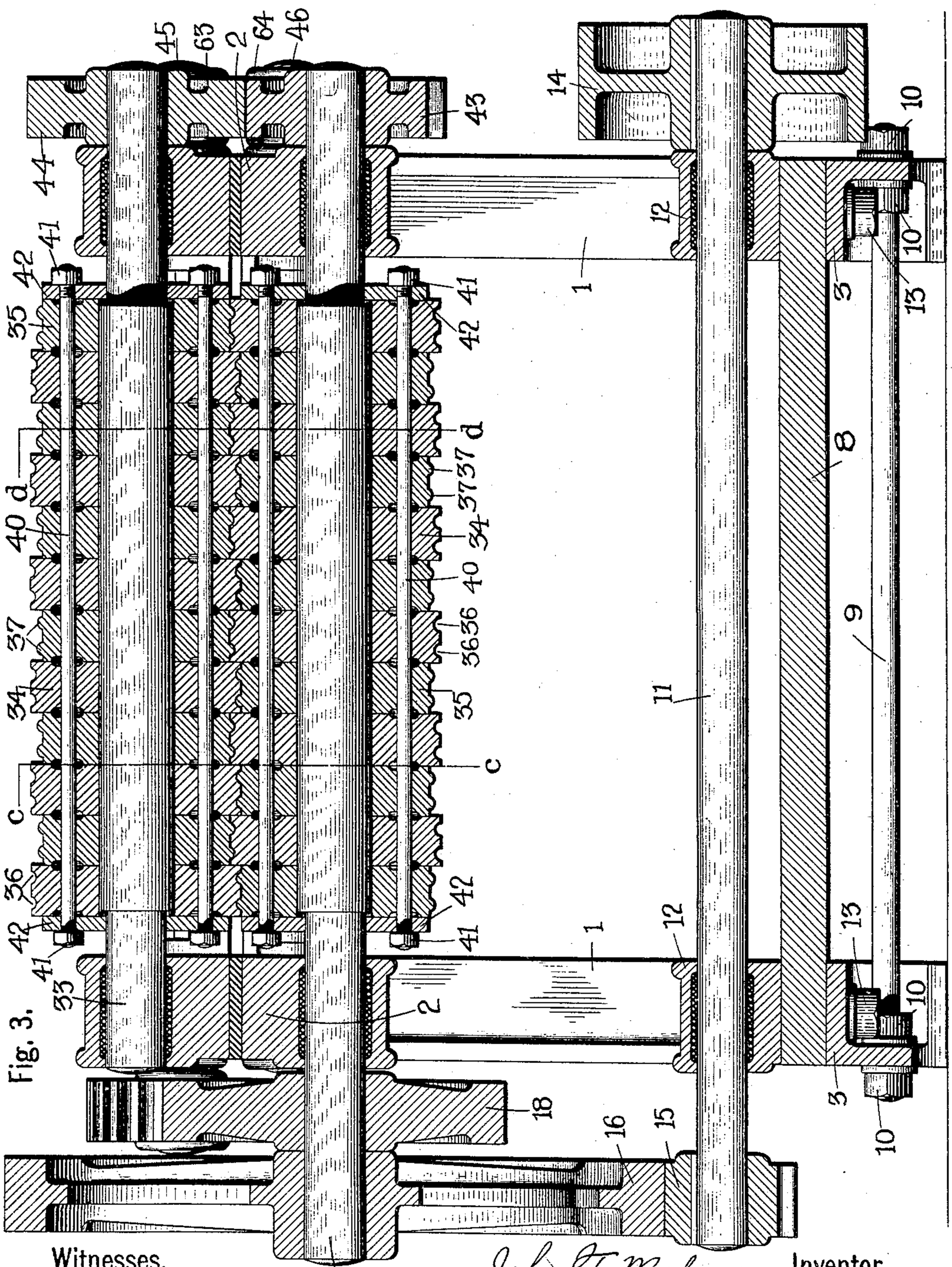

Fig. 3.

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NO MODEL. 5 SHEETS—SHEET 4.

Fig. 4.

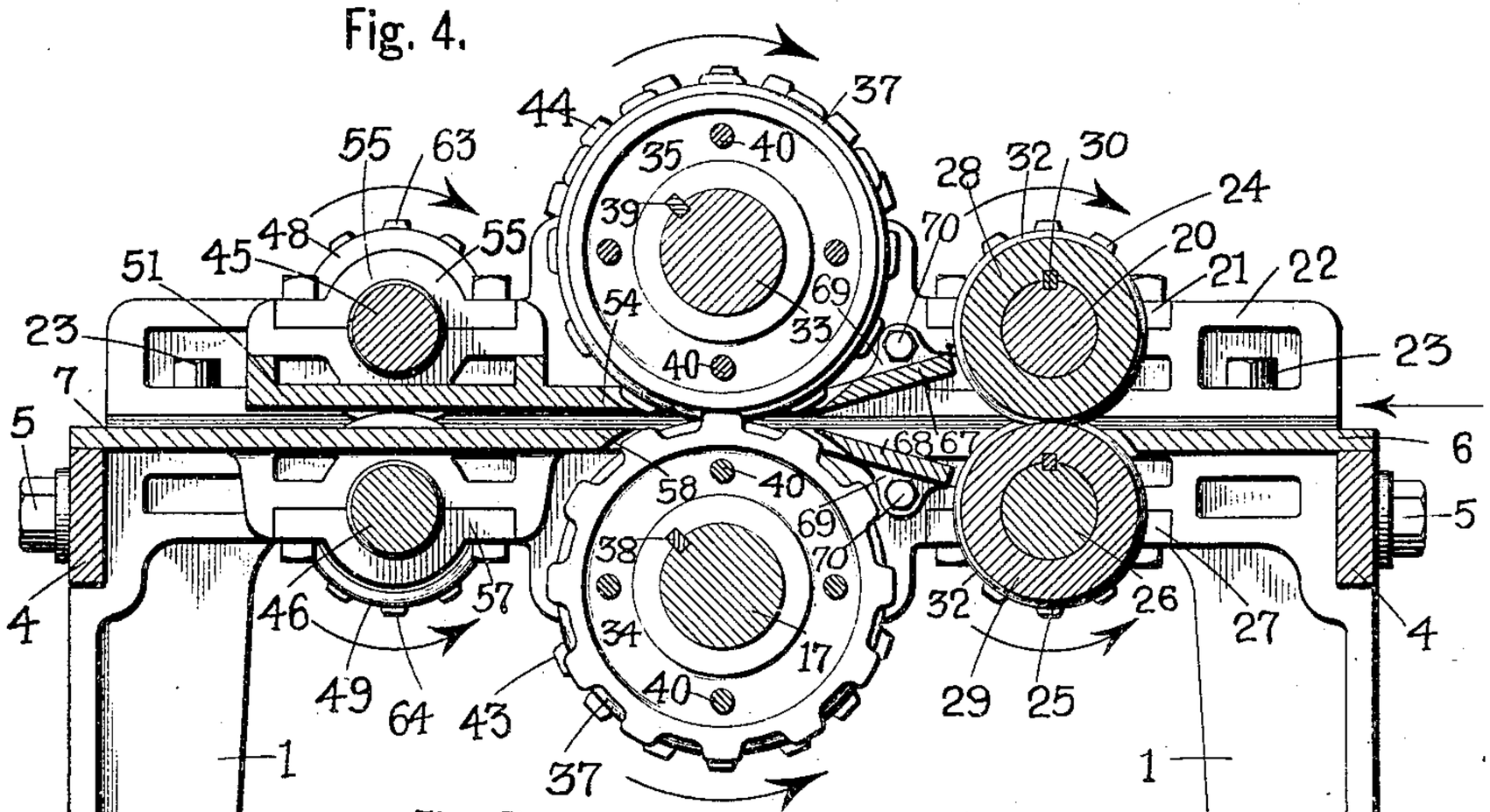


Fig. 7. Fig. 8.

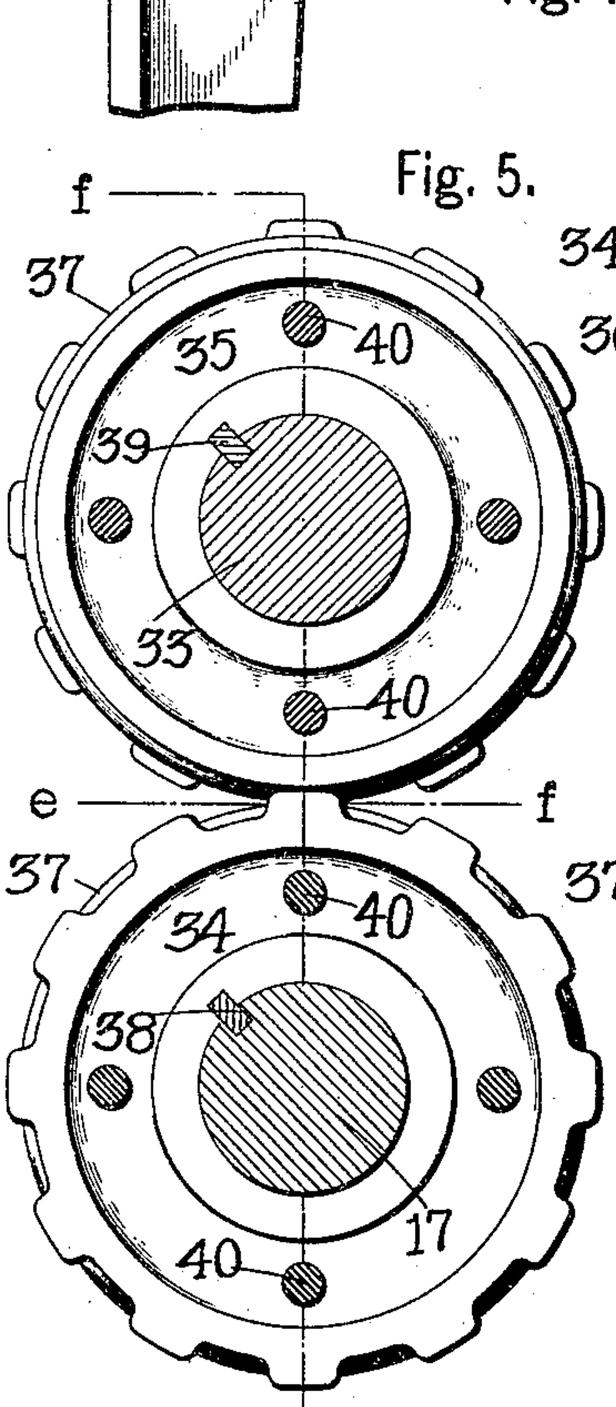


Fig. 5.

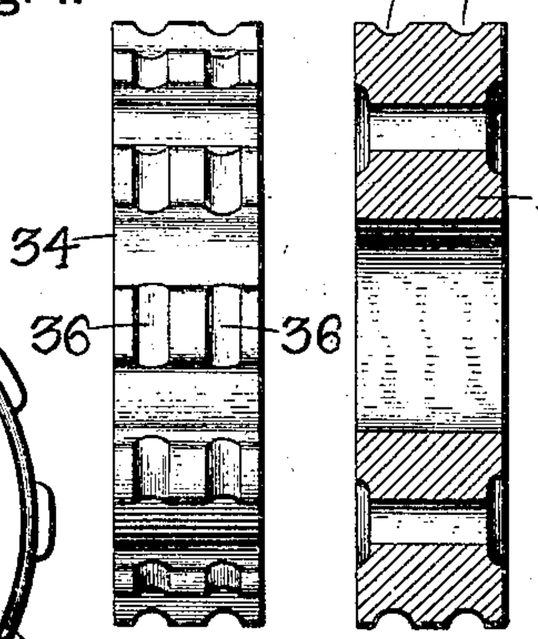


Fig. 9.

Fig. 6.

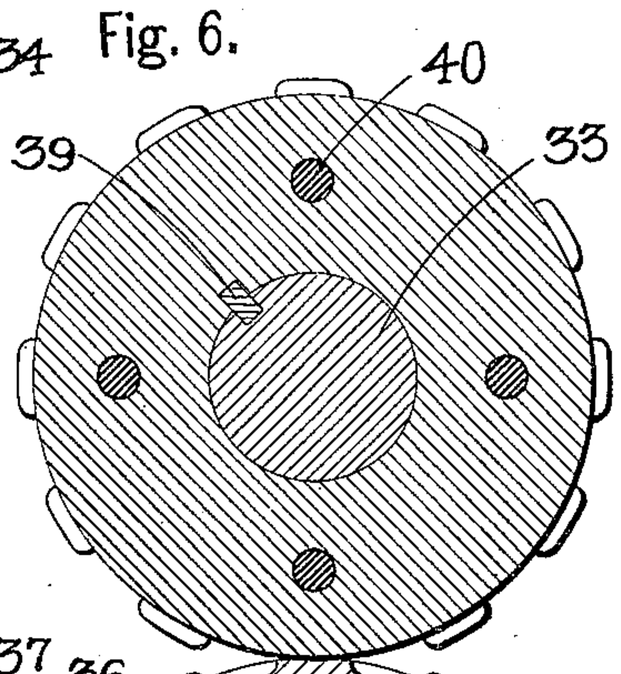
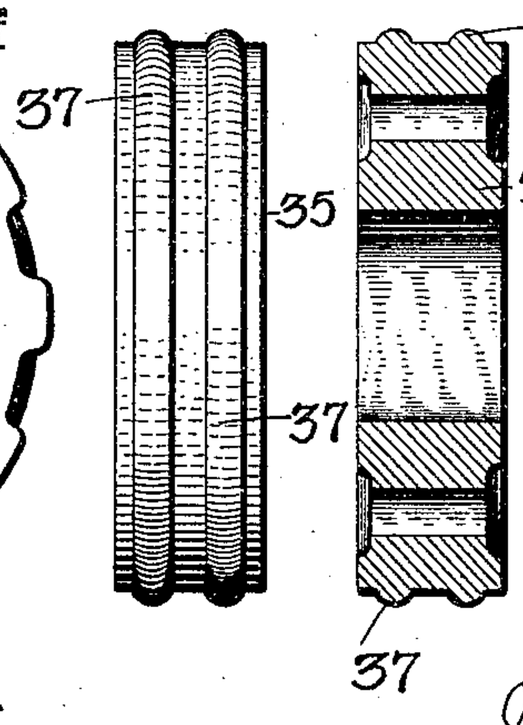
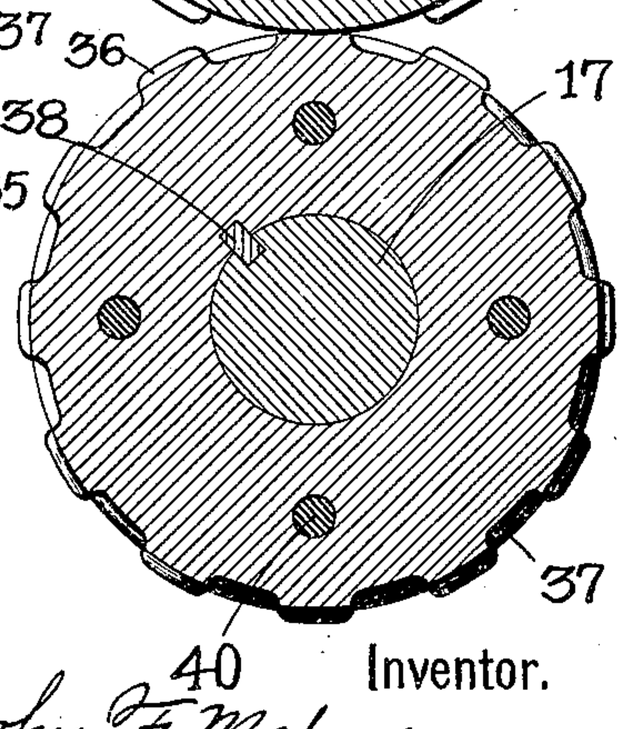


Fig. 10.





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NO MODEL. 5 SHEETS—SHEET 5.

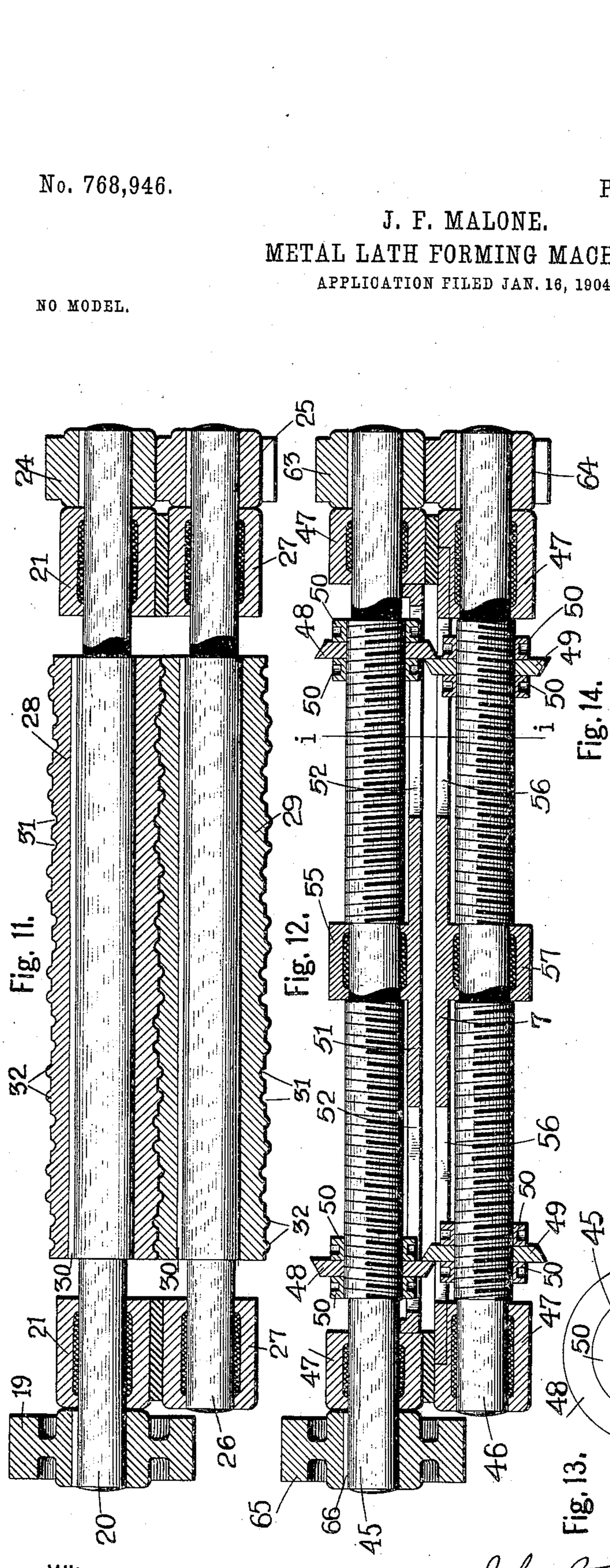

Fig. 11.

Fig. 12.

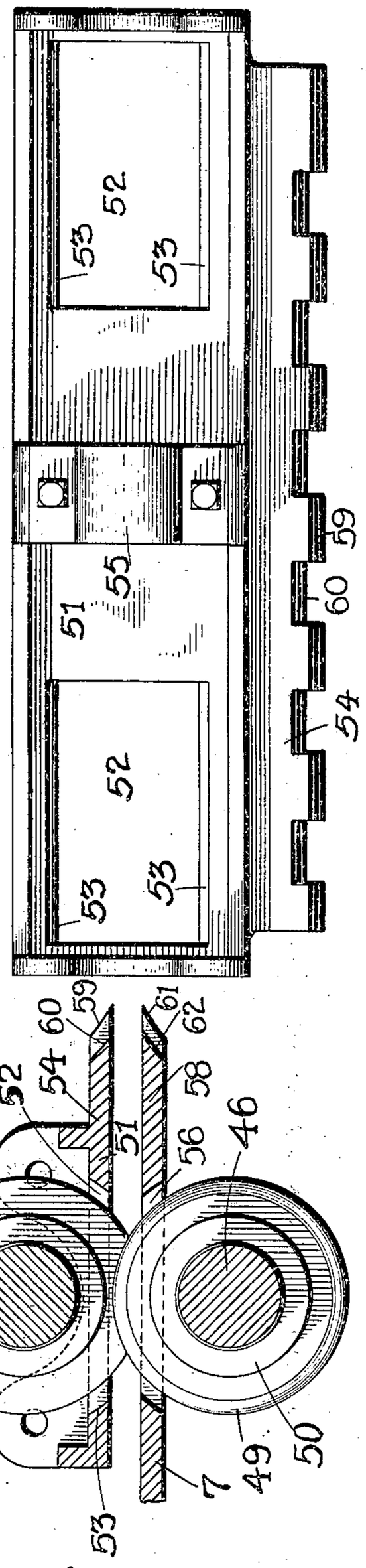

Fig. 14.

Fig. 13.

Witnesses.
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Geo. A. Neubauer.

John F. Malone. Inventor.

By A. J. Sangster Attorney.

No. 768,946. Patented August 30, 1904.

UNITED STATES PATENT OFFICE.

JOHN F. MALONE, OF BUFFALO, NEW YORK, ASSIGNOR TO BUFFALO FIRE PROOF LATH COMPANY, OF BUFFALO, NEW YORK, A CORPORATION OF NEW YORK.

METAL-LATH-FORMING MACHINE.

SPECIFICATION forming part of Letters Patent No. 768,946, dated August 30, 1904.

Application filed January 16, 1904. Serial No. 189,280. (No model.)

To all whom it may concern:

Be it known that I, JOHN F. MALONE, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Metal-Lath-Forming Machines, of which the following is a specification.

This invention relates to an improved metal-lath-forming machine; and it has for its object the production of metal lath of a uniform shape, size, and regularity.

The machine comprises several sets of mechanisms, among which are the following: corrugating mechanism, lath-forming mechanism, and trimming mechanisms and which are arranged in longitudinal alinement with each other, so that the lath will pass accurately from one mechanism to another and be of regular formation and are operated at substantially uniform speed to insure proper feeding of the material and resulting lath through all of the necessary mechanisms.

While the above sets of mechanisms are included in the preferred construction of my machine, I wish it understood that my invention is not necessarily limited to sets of mechanisms arranged or operated in the chronological order or the precise manner above set forth or embodying all of the above or to the number of mechanisms therein stated, as the same is simply set forth in this brief manner for convenience in describing the various elements or mechanisms that make up or constitute what I style the "preferred" type of my improved machine, the invention, broadly stated, embodying successively-arranged mechanisms for forming a blank into a lath which are in longitudinal alinement, so as to accurately form and finish a lath.

The invention also relates to certain details of construction of several of the above-enumerated mechanisms, which will be fully and clearly hereinafter described and claimed, reference being had to the accompanying drawings, in which—

Figure 1 is an end elevation of the improved machine. Fig. 2 is a plan view of the improved machine. Fig. 3 is a central vertical section through the machine on line *a a*, Fig. 1. Fig. 4 is a transverse section through the machine on line *b b*, Fig. 2, the lower portion of the machine-frame being omitted. Fig. 5 is an enlarged transverse section through the forming mechanism on line *c c*, Fig. 3. Fig. 6 is an enlarged transverse section through the forming mechanism on line *d d*, Fig. 3. Fig. 7 is a detached edge view of one of the toothed forming-rings. Fig. 8 is a section through one of the toothed forming-rings on line *e e*, Fig. 5. Fig. 9 is a detached edge view of one of the forming-rings provided with two annular beads or ridges. Fig. 10 is a section on line *f f*, Fig. 5, through one of the forming-rings shown in Fig. 9. Fig. 11 is a longitudinal section through the corrugating mechanism on line *g g*, Fig. 2. Fig. 12 is a longitudinal section through the trimming mechanism on line *h h*, Fig. 2. Fig. 13 is an enlarged transverse section through the trimming mechanism on line *i i*, Fig. 12. Fig. 14 is a detached plan view of the guide-plate and bearing for the upper trimming-shaft.

In referring to the drawings for the details of construction of the preferred type therein shown like numerals designate like parts.

In the adaptation of the invention shown in the drawings it consists of three practically independent mechanisms for corrugating, forming, and trimming, which are in longitudinal alinement and are operated at the same rate of speed.

The frame of the machine consists of two end members, each of which has two legs 1, a top cross-piece 2, and a bottom cross-piece 3, two longitudinally-extending side members 4, which are secured to the upper portion of the legs 1 by bolts 5, and a top member or plate which is formed in two portions 6 and 7 to provide room for the corrugating and lath-forming mechanisms. The bottom cross-pieces 3 of the end members are connected by a wooden plank 8, which is secured to the cross-

pieces 3 between upwardly-extending lugs. (See Fig. 1.) Two longitudinally-extending tie-rods 9 are also secured to the lower portion of the legs 1 by nuts 10, which screw upon the ends of the rods 9. (See Figs. 1 and 3.) The plank 8 and tie-rods 9 serve to strengthen the lower portion of the machine-frame.

A lower longitudinally-extending driving-shaft 11 is supported near its ends by bearings 12, which are mounted upon and secured to each end of of the plank 8 by bolts 13. These bolts 13 also serve to secure the plank 8 to the cross-pieces 3. The shaft 11 has a pulley 14 mounted upon one end and a gear-wheel 15 mounted upon its opposite end. (See Figs. 1 and 3.)

The gear-wheel 15 meshes with a large gear-wheel 16, mounted on the outer extremity of one end of a longitudinally-extending shaft 17, upon which is mounted the lower lath-forming mechanisms or rings and which is arranged in approximately a central position in the machine. The gear-wheel 16 constitutes the main driven gear-wheel and serves to transmit motion from the driving-shaft to all of the various mechanisms.

The shaft 17 has a gear-wheel 18 mounted on the same end as the gear-wheel 16 and just interior to said gear-wheel, which meshes with a pinion 19, mounted on one projecting end of an upper longitudinally-extending shaft 20. This shaft 20 is arranged diagonally above the shaft 17 and is supported in bearings 21, formed in the top surface of two transversely-extending members 22, which are secured by bolts 23 to the top cross-pieces 2 of the end frame members. (See Figs. 2 and 4.) The shaft 20 has a gear-wheel 24 mounted on its opposite end, which meshes with a similar gear-wheel 25 of equal size mounted on the end of a lower longitudinally-extending shaft 26, which is vertically beneath the shaft 20. This lower shaft 26 is supported in bearings 27, secured to the bottom surface of the upper cross-pieces 2 of the end frame members. (See Figs. 1, 3, and 4.) The upper and lower shafts 20 and 26 have upper and lower corrugating-rollers 28 and 29 secured thereto by keys 30. (See Fig. 11.) The peripheral configuration of these corrugating-rollers is peculiar, as shown in Fig. 11, each roller being provided with a series of annular grooves 31 and circular enlargements or ridges 32, which are arranged alternately in pairs—that is, two of the grooves 31, then two of the ridges 32, and so on. The ridges 32 of one roller are arranged to fit and engage in the grooves of the other roller, so that the sheet from which the lath is formed has longitudinal grooves and raised longitudinal ribs pressed therein in alternate pairs. These corrugating-rollers constitute what I term the "preliminary" corrugating mechanism.

The lath-forming mechanism proper consists of two rollers which are mounted in bearings in the frame and one vertically above the other. These rollers comprise the lower shaft 17, (previously described as being geared to the driving-shaft 11,) an upper shaft 33, and a series of toothed rings 34 and ribbed rings 35, mounted on said shafts. These rings are arranged in alternate order with each toothed ring 34 on one shaft opposed to a ribbed ring 35 on the other shaft.

The toothed rings 34 are each provided with two longitudinal grooves 36 in their outer or peripheral surface, as shown in Figs. 2, 3, and 7, and the ribbed rings with two longitudinal peripheral ribs 37, as shown in Figs. 2, 3, 9, and 10, which engage in the grooves 36, and these rings are so arranged on the shafts and the grooves 31 and ridges 32 on the corrugating-rollers so formed that they are in longitudinal alinement, whereby the corrugated sheet as it leaves the corrugating-rollers passes between the lath-forming rollers with the corrugations or ribs exactly in position with the grooves 36 and ribs 37.

The rings 34 and 35 are secured to the shafts 17 and 33 by feathers 38 and 39, (shown in Fig. 6,) and are additionally fastened in place by a series of tie rods or bolts 40, which pass through the rings at various points around the center and are fitted with lock-nuts 41 on their ends. (See Fig. 3.) End plates 42 are preferably interposed between the end rings and the lock-nuts, as shown in said Fig. 3.

One end of both of the shafts 17 and 33 project beyond the frame, and two intermeshing gear-wheels 43 and 44 of equal size are mounted thereon, so that the shafts rotate at a uniform speed. While the opposite end of the upper shaft 33 terminates at the outer surface of the side frame member, the lower shaft extends or projects on that side sufficiently to permit the inner gear-wheel 18 and the outer gear-wheel 16 to be mounted thereon.

After the lath-sheet has been corrugated by the corrugating-rollers and pressed into the shape of a metal lath by the lath-forming rollers it comes to the trimming mechanism, where the edges are trimmed off to finish the lath.

The trimming mechanism consists of two shafts 45 and 46, the ends of which are journaled in bearing-boxes 47, and cutting-disks or circular blades 48 and 49, mounted on the shafts so as to be longitudinally adjustable thereon. The upper and lower cutting-disks 48 and 49 are mounted in opposed position on the shafts 45 and 46, with their cutting edges overlapping each other, as shown in Fig. 13, and the shafts are screw-threaded to provide for the longitudinal adjustment of the disks, which screw thereon and are locked in place by lock-nuts 50.

A horizontal guide-plate is arranged between the shafts 45 and 46 and is cut away in places to allow for the adjustment of the cutting-disks. This guide-plate has an elongated body 51, which is provided near each end with a longitudinal rectangular slot or opening 52 for the passage of the upper disks 48, the side walls of the slots being beveled, as shown at 53 in Fig. 13, and with an inwardly-extending toothed rack 54, which fits closely to the upper lath-forming roller. A central bearing-box 55 is also mounted on the body 51, in which the middle portion of the upper shaft 45 is journaled, as shown in Fig. 2.

The member 7 of the top plate forms a lower guide-plate parallel with the upper guide-plate, which is provided with rectangular slots 56 for the passage of the lower cutting-disks 49, as shown in Fig. 12. The member 7 is also provided with a central bearing-box 57, in which the middle portion of the lower shaft 46 is journaled, and an inwardly-extending toothed rack 58, which fits closely to the lower lath-forming roller.

The teeth of the toothed racks and the inner wall of the spaces between the teeth are beveled or on a slant, as shown at 59, 60, 61, and 62 in Fig. 13, so that the racks can be fitted comparatively near to all parts of the toothed and ribbed rings 34 and 35, and thus positively guide the lath-sheet from the lath-forming rollers to the trimming mechanism.

The shafts 45 and 46 project at one end beyond the frame and are connected at said ends, so as to rotate at uniform speed by intermeshing gear-wheels 63 and 64, of equal size, which are mounted on said projecting shaft ends. The opposite end of the upper shaft 45 projects beyond the opposite side of the frame and has a pinion 65 secured thereon by a key 66, which meshes with the inner gear-wheel 18.

Two diagonally-extending guide-plates 67 and 68 are placed between the corrugating-rollers 28 and 29 and the lath-forming rollers. These guide-plates 67 and 68 are placed so as to guide the metal sheet from the corrugating-rollers directly between the lath-forming rollers. (See Fig. 4.) Each of the plates 67 and 68 is provided with a lug 69, through which a bolt 70 is passed to secure the plates to the machine-frame. The edges of the plates nearest the lath-forming rollers are toothed similarly to the inner edges of the plates 7 and 51, so as to fit closely to the lath-forming rollers and prevent the metal sheet from passing around the said rollers.

The great advantages of the preferred type of this machine are that it combines the operations of the lath forming and trimming mechanisms in one machine, in which they are arranged in longitudinal alinement, thereby enabling the lath-sheet to be accurately trimmed after formation, that the lath-sheet is both preliminarily corrugated and flattened by the machine before being pressed into lath shape, and that the feed of the lath-sheet through the several sets of mechanisms is uniform owing to the fact that all of the mechanisms are driven at the same speed.

I claim as my invention—

1. In a machine of the class described, corrugating-rollers having circumferential peripheral ridges and grooves in alternate pairs and lath-forming rollers in the rear of the corrugating-rollers; at least one of said rollers having teeth provided with circumferential grooves and at least another of said rollers having circumferential ridges engaging in said grooves, said ridges and grooves being in like pairs and in exact interfitting longitudinal alinement therewith.

2. In a machine of the class described, corrugating-rollers having a plurality of grooves and lath-forming rollers having portions thereof provided with grooves in alinement with the grooves in the corrugating-rollers.

3. In a machine of the class described, corrugating-rollers having a plurality of interfitting grooves and ridges arranged in alternately-extending pairs and lath-forming rollers having portions thereof provided with similar grooves and ridges in like alternately-extending pairs and in alinement with the grooves in the corrugating-rollers.

4. In a machine of the class described, corrugating-rollers having a plurality of grooves and ridges formed thereon in alternate pairs and lath-forming rollers in the rear of the corrugating-rollers having portions of their peripheries provided with grooves and ribs in alternation and in exact alinement with the grooves and ridges of the corrugating-rollers.

5. In a machine of the class described, a plurality of lath-forming rollers having teeth, trimming mechanism including two horizontal shafts and cutting-disks adjustably mounted on said shafts, and two horizontal guide-plates between the shafts having slots for the passage of the cutting-disks.

6. In a machine of the class described, a plurality of lath-forming rollers having teeth, trimming mechanism including two horizontal shafts and cutting-disks adjustably mounted on said shafts, and two horizontal guide-plates between the shafts having slots for the passage of the cutting-disks and sufficiently long to allow for the adjustment of said disks.

7. In a machine of the class described, a plurality of lath-forming rollers having teeth, trimming mechanism including two horizontal shafts and cutting-disks adjustably mounted on said shafts, and two horizontal guide-plates between the shafts having slots for the

passage of the cutting-disks and a central bearing in which the upper portion of one of the shafts is journaled.

8. In a machine of the class described, a plurality of lath-forming rollers having teeth, trimming mechanism including two horizontal shafts and cutting-disks adjustably mounted on said shafts, and two horizontal guide-plates between the shafts having slots for the passage of the cutting-disks and projecting toothed racks shaped to fit closely to the lath-forming rollers.

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