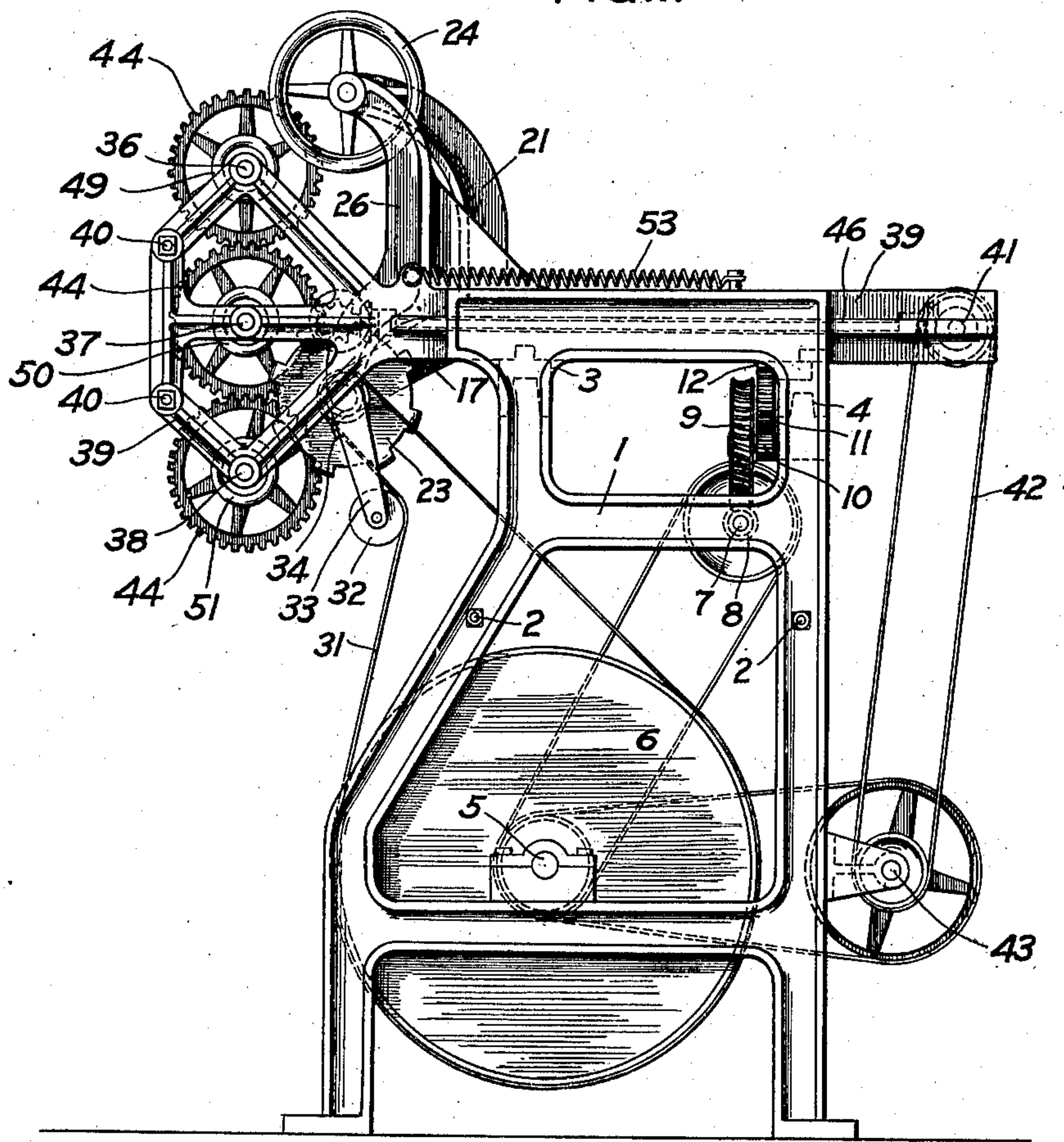


H. F. LOEWER.
MACHINE FOR TURNING IRREGULAR FORMS.
APPLICATION FILED OCT. 11, 1909.

963,601.

Patented July 5, 1910.
5 SHEETS—SHEET 1.

FIG. 1.



WITNESSES:

Clarence W. Carroll
H. Gurnee

INVENTOR:

Henry F. Loewer
by Clifford W. Harris
his attorney

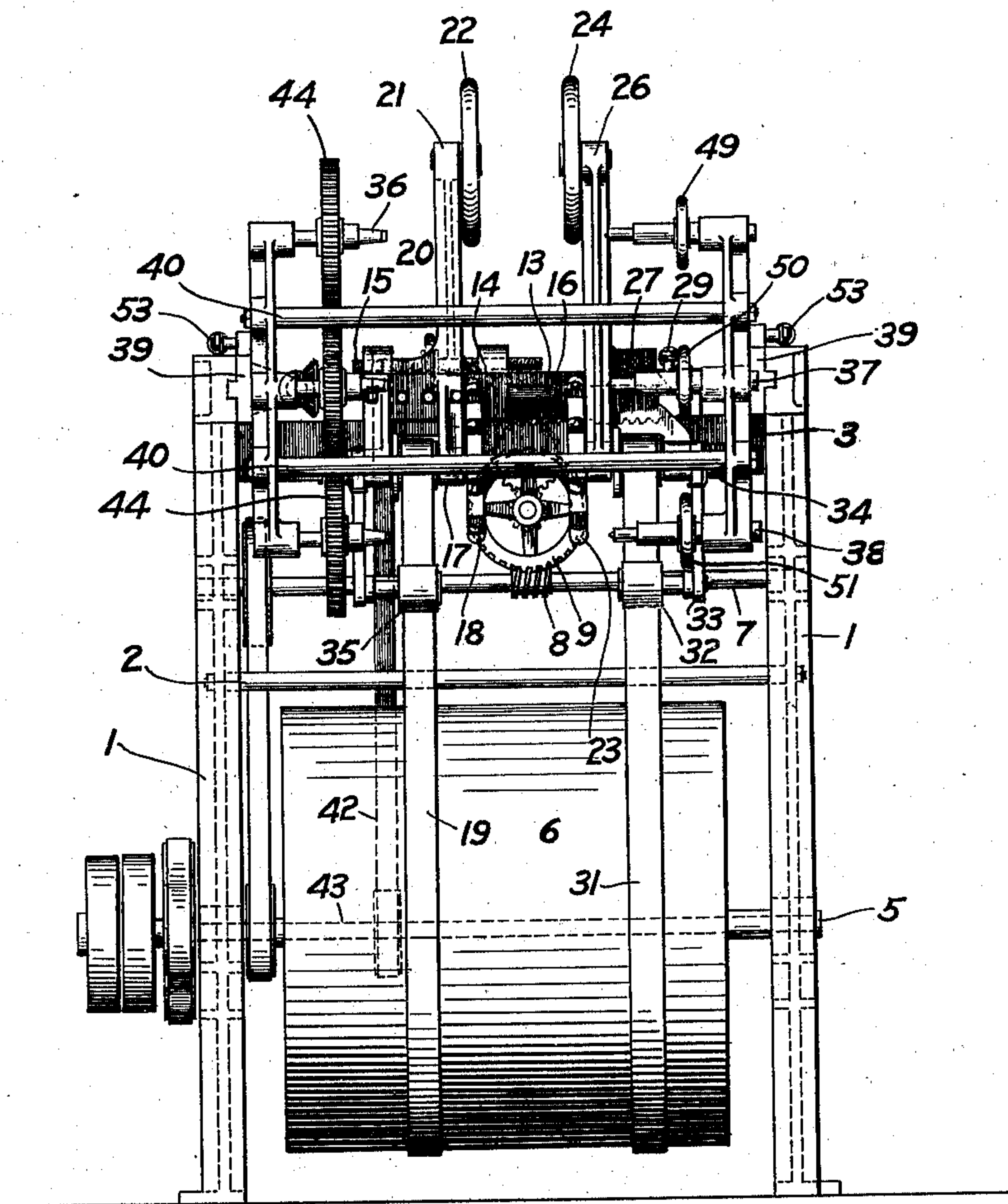
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5 SHEETS—SHEET 2.

FIG. 2.



WITNESSES:

Clarence W. Carroll
H. Gurnee

INVENTOR:

Henry F. Loewer
by David W. Davis
his attorney

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5 SHEETS—SHEET 4.

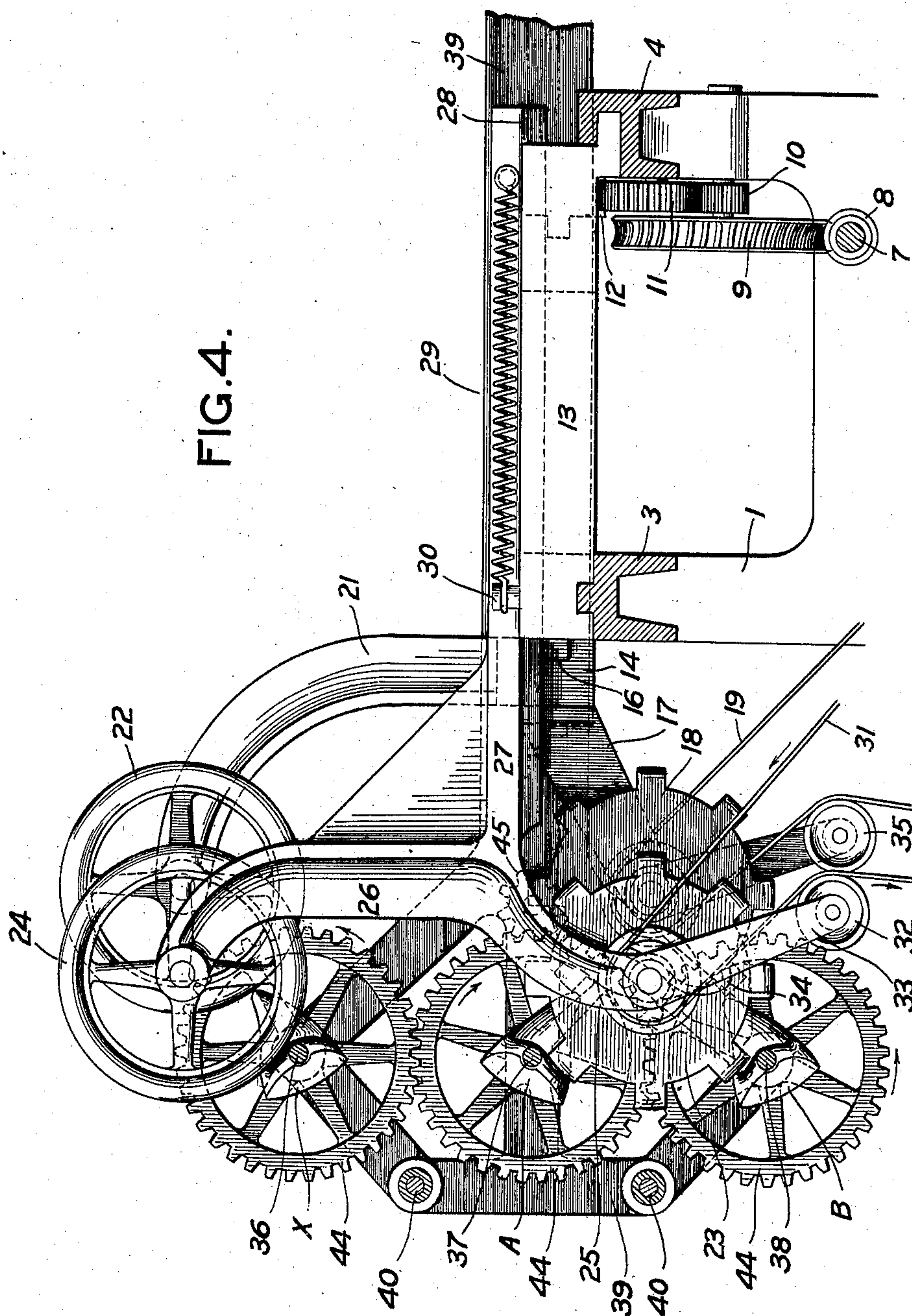


FIG. 4.

WITNESSES:

Clarence W. Carroll
W. Gurnee

INVENTOR:

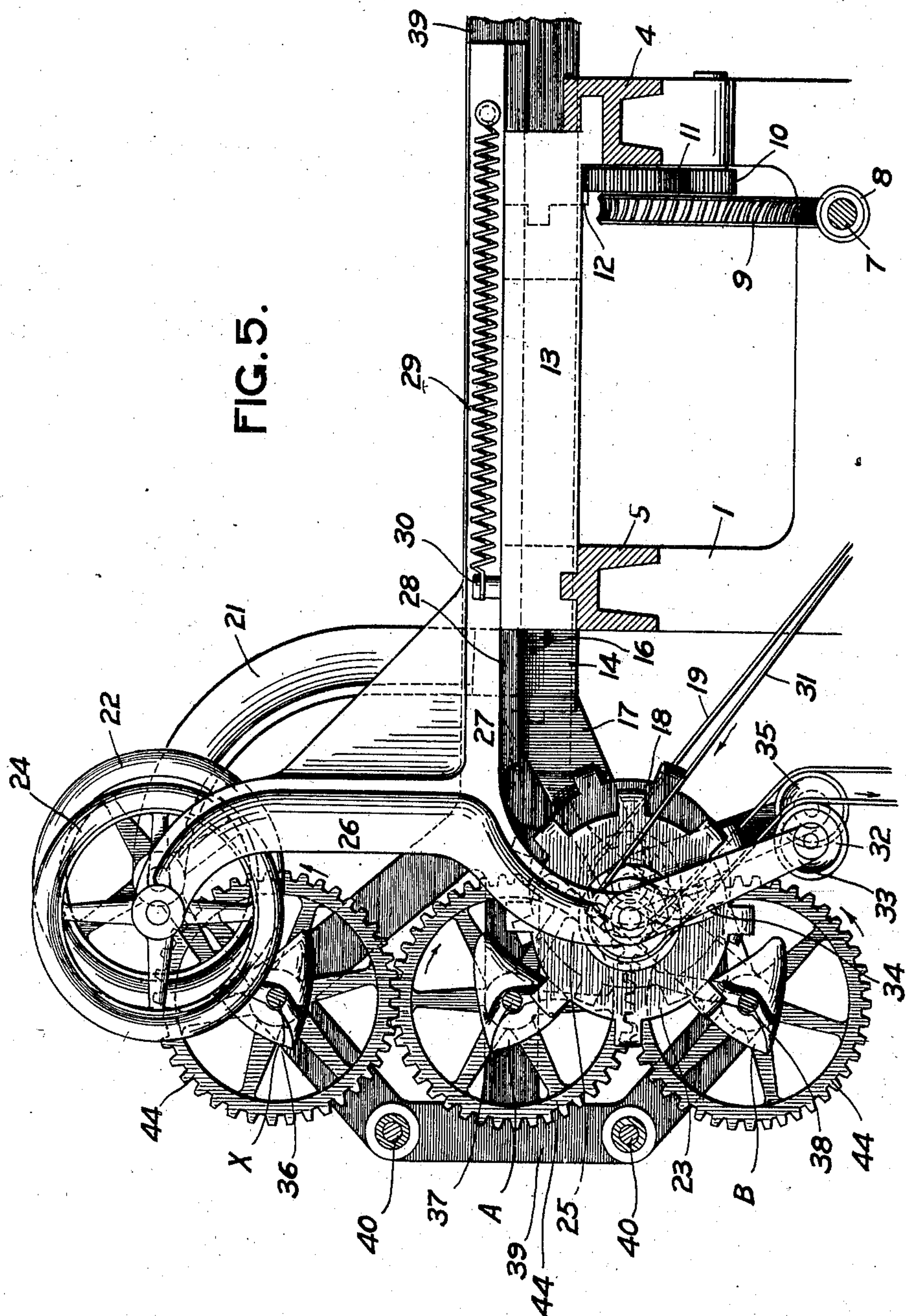
Henry F. Loewer
by Osgood W. Davis
his attorney

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5 SHEETS—SHEET 5.



WITNESSES:
Clarence W. Carroll
D. Gurnee

INVENTOR:
Henry F. Loewer
by Clifford W. Harris
his attorney

UNITED STATES PATENT OFFICE.

HENRY F. LOEWER, OF ROCHESTER, NEW YORK.

MACHINE FOR TURNING IRREGULAR FORMS.

963,601.

Specification of Letters Patent.

Patented July 5, 1910.

Application filed October 11, 1909. Serial No. 522,189.

To all whom it may concern:

Be it known that I, HENRY F. LOEWER, a citizen of the United States, and resident of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Machines for Turning Irregular Forms, of which the following is a specification.

This invention relates to machines for turning irregular forms, and the particular object of the invention is to accomplish the turning of a certain piece of work in less time than has been required heretofore. This result is obtained by the use of a plurality of cutters, which operate simultaneously and independently on different portions of the same block.

The present embodiment of the invention illustrates a last lathe, in which a pair of blocks, revolving in synchronism with a single model, are acted upon by two longitudinally-movable cutters, one of which begins at the middle of the block and turns it to shape from that point to one end, and the other of which begins at the opposite end and moves with the first cutter, turning the block to shape from the end to the point where the first cutter began. Two lasts are thus finished in one-half the time that is required on an ordinary last lathe to turn one, and therefore the machine herein described performs four times as much work as a lathe employing but one cutter and one block.

In the drawings:—Figure 1 is an end elevation of the complete lathe; Fig. 2 is a front elevation; Fig. 3 is a plan view; Fig. 4 is a cross-section (enlarged) on the line 4—4 of Fig. 3, the movable parts being in one position; and Fig. 5 is a similar view, the movable parts being in another position.

The machine has upright end frames 1, 1, connected by bolts 2, 2, and front and rear upper rails 3 and 4, respectively. Said end-frames support the driven shaft 5, which carries the drum 6. A countershaft 7 is driven from the shaft 5, and carries a worm 8 that coöperates with a worm-wheel 9. A pinion 10 on the latter drives a gear 11, and said gear engages a rack 12 on the under side of the main cutter-carriage 13 (Fig. 4), and so moves said carriage along on the rails 3 and 4.

The carriage 13 is a U-shaped frame that is connected with a similar frame or carriage 14 (Fig. 3) by a right-and-left screw

15. By turning the latter, the frames 13 and 14 may be moved toward or away from each other, and are thereby maintained in the desired relative positions. Tongues 16 may be provided on one of said frames, which enter grooves in the other, and so prevent mis-alinement thereof.

On the front of the carriage 14 (which also slides on the rails 3 and 4), is a bracket 17, in which is pivoted a circular cutter or knife 18. Said cutter is revolved at a high rate of speed by a belt 19, that passes over a pulley 20 and the drum 6. A bracket 21 is also fixed to the carriage 14 and revolvably supports a guide-wheel 22. This guide-wheel is of the same diameter and thickness as the cutter 18, and lies in the same vertical plane.

From the foregoing it will be seen that the cutter 18 and guide-wheel 22 move together in a lateral direction, but are incapable of movement from front to back upon the machine.

A second cutter 23 and corresponding guide-wheel 24 are carried on brackets 25 and 26 that form part of a plate 27. Said plate extends transversely to both the rails 3 and 4, and is slidable toward the front or rear of the machine upon the carriage 13, in ways 28. A spring 29, one end of which is fastened to a pin 30 on the carriage 13, and the other end of which is fastened to the plate 27, tends to pull the latter forward continuously.

The cutter 23 is driven by a belt 31 that extends over the drum 6, and is held tight by an idler 32. The latter is hung on an arm 33 that swings on the cutter-shaft, and is forced against said belt by the action of a coiled spring 34. A similar idler 35 is provided for the belt 19.

The model and the blocks from which the lasts are to be turned are carried on spindles 36, 37 and 38. The said spindles are revolvably supported in frames 39, that are slidably supported in the end-frames 1, 1, of the machines (Figs. 2 and 3). The frames 39 are tied together at their front ends by rods 40, and at their rear ends by a shaft 41 that is driven by a belt 42 from a countershaft 43. The frames 39 and the spindles 36, 37 and 38 constitute a reciprocating last-and-model-carriage.

The spindles 36, 37 and 38 are revolved synchronously by gears 44, that are carried on said spindles, and mesh together. A

pinion 45 (Fig. 3) meshes with one of the gears 44, and receives motion from the shaft 41 through a countershaft 46, that is connected to said pinion and said shaft 41 by bevel gears 47 and 48, respectively.

The axes of the cutters 18 and 23 are midway between the axes of the spindles 37 and 38. The axes of the guide-wheels 22 and 24 are in the same position relatively to the spindle 36 that the axes of the cutters are with respect to the axis of the spindle 38.

The model X is held in the spindle 36, which may be set up by a suitable hand-nut 49 (Fig. 2). The spindles 37 and 38 hold the blocks A and B from which the lasts are to be turned, and said spindles are set up by similar hand-nuts 50 and 51.

The last-and-model-carriage is continuously pulled toward the rear of the machine by suitable means, thereby pressing the model X up against the guide-wheel 22, and the blocks A and B against the cutter 18. In the present instance said means are the springs 53, 53 (Fig. 3), the front ends of which are fastened to the slidable frames 39, and the rear ends of which are fastened to the machine-frames 1, 1. At the same time, the guide-wheel 24 and the cutter 23 are pressed against the model X and the blocks A and B, respectively, by the action of the spring 29.

When the machine is to be started, the carriages 13 and 14 are so placed on the rails 3 and 4 that the guide-wheel 22 is at the center of the model X, and the guide-wheel 24 is at one end thereof (Fig. 3). The machine then being set in motion by suitable means, the worm 8 and its connected parts feeds the carriages 13 and 14 together along the rails 3 and 4, and the guide-wheels and cutters move correspondingly along the model X and the blocks A and B. At the same time the spindles 36, 37 and 38, and therefore the model X and the blocks A and B, are revolved as indicated in Figs. 4 and 5. As the model X revolves, an irregular surface is presented to the guide-wheel 22. Some parts of the surface are nearer to the spindle 36 than other parts. The guide-wheel being immovable transversely to said spindle, and the model X being held tightly against it by the springs 53, it follows that when a part of the model face that is comparatively near the spindle 36 is presented to the wheel, the model must move backward, and when a part that is farther from said spindle touches the wheel, the model must move forward. For instance, if the top of the instep of the model rests against the wheel 22, as shown in Fig. 4, the model is thrown forward. After a quarter-revolution of the spindle 36, the side of the model rests against the wheel, as shown in Fig. 5, and as this portion is nearer the axis of the spindle 36 than the

top of the instep, it follows that the model must move backward to still press against the guide-wheel 22.

Whenever the model moves, the frames 39, the spindles 37 and 38, and the blocks A and B must also move. The latter are therefore brought into the same position with respect to the cutter 18 that the model X occupies with respect to the guide-wheel 22, and said cutter then trims the blocks A and B to the exact size of the model. As the spindles 37 and 38 revolve in opposite directions, the lasts are turned out as rights and lefts.

The cutter 23 and guide-wheel 24, instead of having the blocks and model pressed against them, are pressed against the said blocks and model, respectively, by the action of the spring 29. The latter is weaker than the springs 53, and the guide-wheel 24 and cutter 23 are therefore carried backward when the model moves backward. But although the model X and the blocks A and B may be moving backward under the pull of the springs 53, to press against the wheel 22 and the cutter 18, if a depression in the model is presented to the wheel 24, the latter is carried forward into said depression by the spring 29, and the blocks A and B are cut by the cutter 23 to correspond with said depression. Similarly, if the model is moving forward, because of a greatly eccentric portion being in contact with the wheel 22, the wheel 24 may also encounter a hump on another portion of the model, and said wheel must then move backward, together with the cutter 23, and the blocks A and B are formed like the model all around.

It will be plain from the foregoing that although both cutters and both guide-wheels move along the rails 3 and 4 together, they do not move together in a direction at right angles to said rails, but, on the contrary, one cutter and guide wheel may move separately and independently of the other cutter and guide-wheel. The model is pressed against the front of the immovable guide-wheel in a backward direction, and the other or movable guide-wheel is pressed against the back of the model in a forward direction.

As each cutter has to traverse only half the length of the lasts or blocks A and B, it is obvious that said lasts are turned out in one-half the time which would be required if the cutters traversed the full length of the lasts.

By adjusting the relative position of the frames 13 and 14, by means of the screw 15, the guide-wheels may be moved farther apart or nearer together (the cutters moving also) to adjust the mechanism for lasts of different length.

The general arrangement of the mechan-

ism by which each cutter is controlled by the corresponding portion of the model is not a portion of the present invention, but is disclosed and claimed in my application filed 5 October 12, 1908, Serial No. 457,326, for improvements in lathe lathes.

What I claim is:—

1. In a machine for turning irregular forms, the combination with a suitable supporting frame, of a cutter-wheel with its carriage, adapted to move horizontally across the supporting frame; a model wheel on the carriage in fixed relation to the cutter wheel; another cutter-wheel and model wheel in 15 fixed relation to each other corresponding to that between those first mentioned, located, respectively, adjacent to and horizontally in line with the model wheel and cutter-wheel first mentioned, and also carried by said carriage, but together movable across its line of travel; means for moving said carriage horizontally and revolving said cutters; and a spring-controlled frame, carrying revoluble stocks for the model and 20 work, respectively, movable at right angles to the movement of said carriage.

2. In a machine for turning irregular forms, the combination with a suitable supporting frame, of a cutter-wheel with its carriage, adapted to move horizontally across the supporting frame; a model wheel in fixed position on the carriage in the plane of the cutter-wheel; another cutter-wheel and model wheel also on the carriage, also 35 in one plane, and in fixed relation to each other corresponding to that between those first mentioned, located, respectively, adjacent to and horizontally in line with the model-wheel and cutter-wheel first mentioned, but together movable across its line of travel; means for moving said carriage horizontally and revolving said cutters; and a spring controlled frame, carrying revoluble stocks for the model and work, respectively, movable at right angles to the movement of said carriage. 45

3. In a machine for turning irregular forms, the combination with a suitable supporting frame, of a cutter-wheel with its carriage, adapted to move horizontally across the supporting frame; a model wheel on the carriage in fixed relation to the cutter-wheel; another cutter-wheel and model wheel in fixed relation to each other corresponding to that between those first mentioned, located, respectively, adjacent to and horizontally in line with the model wheel and cutter-wheel first mentioned; a support for the cutter-wheel and model wheel last mentioned, movable on the carriage at right angles to its line of movement; means for moving said carriage horizontally and revolving said cutters; and a spring controlled frame, carrying revoluble stocks for the model and work, respectively, also movable 65

at right angles to the movement of said carriage.

4. In a machine for turning irregular forms, the combination with a suitable supporting frame, of a cutter-wheel with its carriage, adapted to move horizontally across the supporting frame; a model wheel on the carriage in fixed relation to the cutter wheel; a spring controlled frame, carrying revoluble stocks for the model and work, respectively, movable at right angles to the movement of said carriage, and normally holding the model and work against the model wheel and cutter wheel, respectively; another cutter wheel and model wheel in fixed relation to each other corresponding to that between those first mentioned, on a support that is movable transversely to the line of travel of said carriage; means for yieldingly holding the movable model wheel and cutter wheel in contact with the model and work, respectively; and means for moving said carriage horizontally, and revolving said cutters. 70 75 80 85

5. In a machine for turning irregular forms, the combination with a suitable supporting frame, of a cutter-wheel with its carriage, adapted to move horizontally across the supporting frame; a model wheel on the carriage in fixed relation to the cutter wheel; a spring controlled frame, carrying revoluble stocks for the model and work, respectively, movable at right angles to the movement of said carriage, and normally holding the model and work against the model wheel and cutter wheel, respectively; a plate movable in guides transversely across the carriage; another pair of cutter and model wheels, carried by said plate in fixed relation to each other that corresponds to that between the pair first mentioned; a spring adapted to hold said last mentioned plate in contact with the model and work, respectively; and means for moving said carriage horizontally, and revolving said cutters. 90 95 100 105 110

6. In a machine for turning irregular forms, the combination with a suitable supporting frame, of a cutter-wheel with its carriage, adapted to move horizontally across the supporting frame; a model wheel on the carriage in fixed relation to the cutter wheel; another cutter wheel and model wheel in fixed relation to each other corresponding to that between those first mentioned, located, respectively, adjacent to and horizontally in line with the model wheel and cutter-wheel first mentioned, and also carried by said carriage, but together movable across its line of travel; means for moving said carriage horizontally and revolving said cutters; a spring-controlled frame, carrying revoluble stocks for the model and work, respectively, movable at right angles to the movement of said carriage. 115 120 125 130

riage; and means for adjusting said pairs of model wheels and cutter wheels horizontally with reference to each other.

7. In a machine for turning irregular
5 forms, the combination with a suitable supporting frame, of a carriage movable horizontally thereon, consisting of two sections, horizontally adjustable with reference to each other; two pairs of cutter and model
10 wheels, one pair being movably supported in fixed relation to each other on one section of said carriage, and the other pair being supported in fixed relation to each other cor-

responding to that of the first pair but upon a support that is movable transversely to 15 the line of travel of said carriage; means for moving said carriage horizontally and revolving said cutters; and a spring controlled frame, carrying revolving stocks for the model and work, respectively, movable 20 at right angles to the movement of said carriage.

HENRY F. LOEWER.

Witnesses:

D. GURNEE,
L. THON.