F. H. DANIELS, F. L. COGILL & J. A. FRAY.

SHEARING MACHINE.

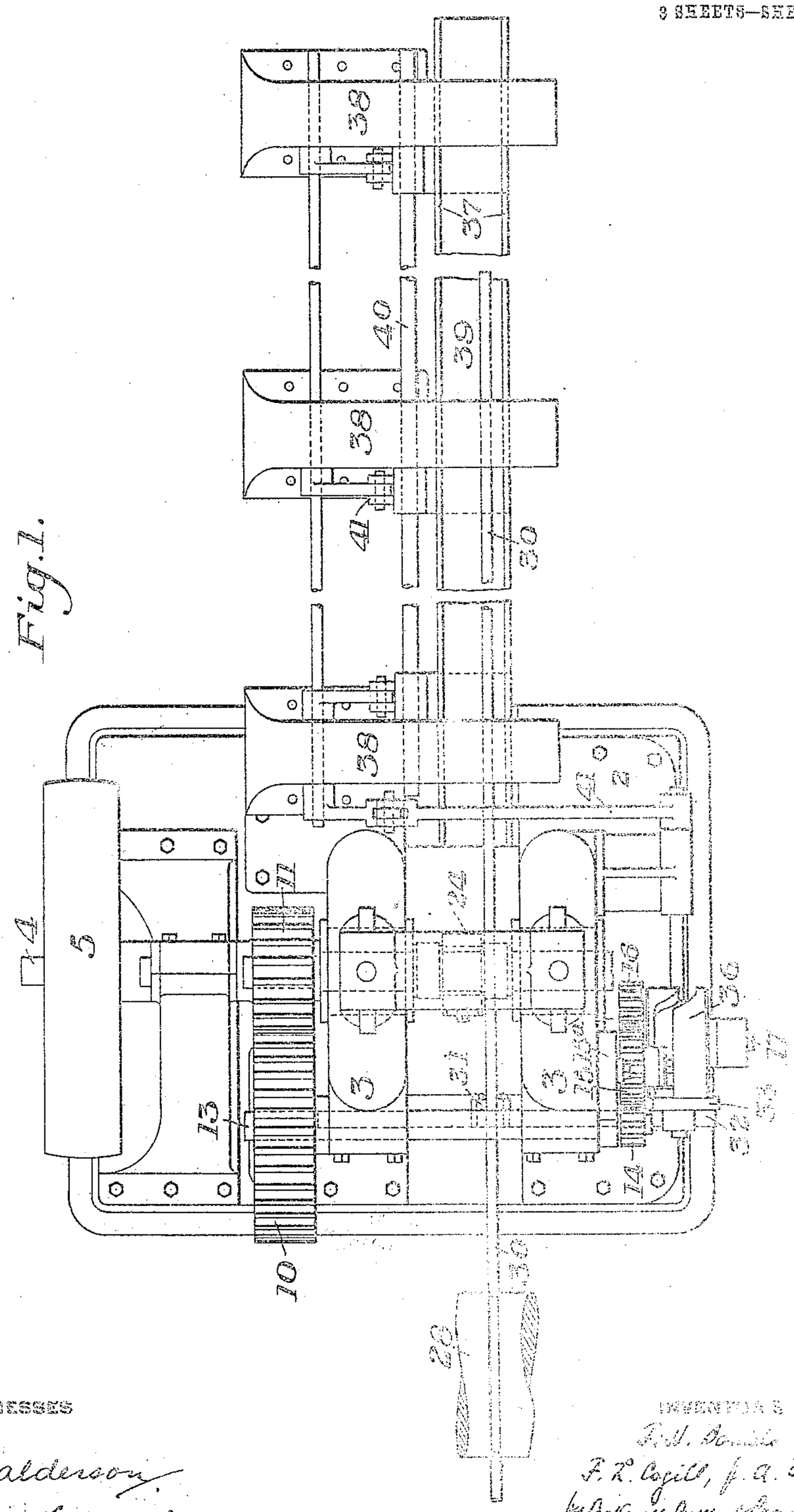
APPLICATION FILED JUNE 5, 1908.

915,020.

Patented Mar. 9, 1909.

3 SHEETS—SHEET 1.

Fig. 1.



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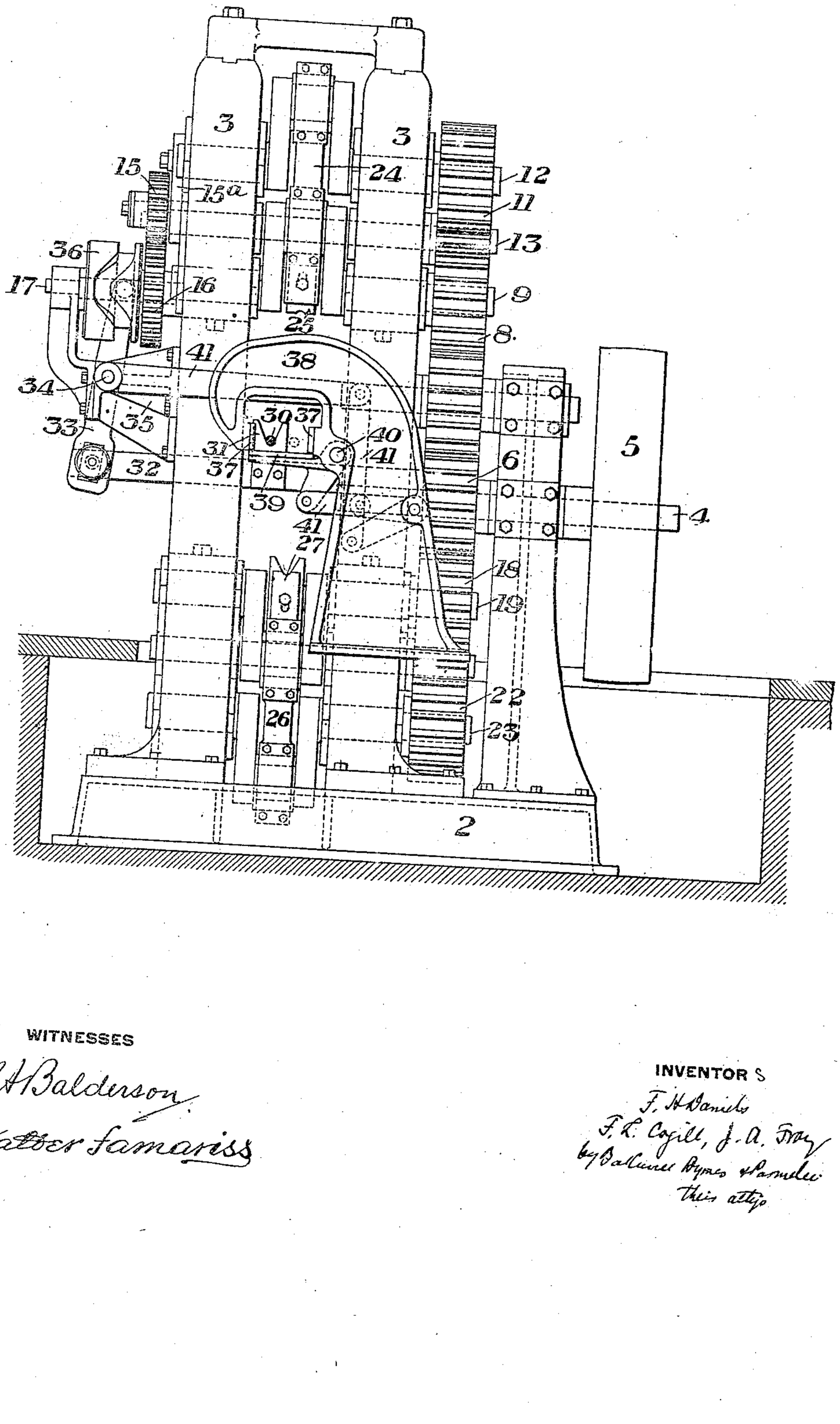
3 SHEETS—SHEET 2.

Fig. 2.



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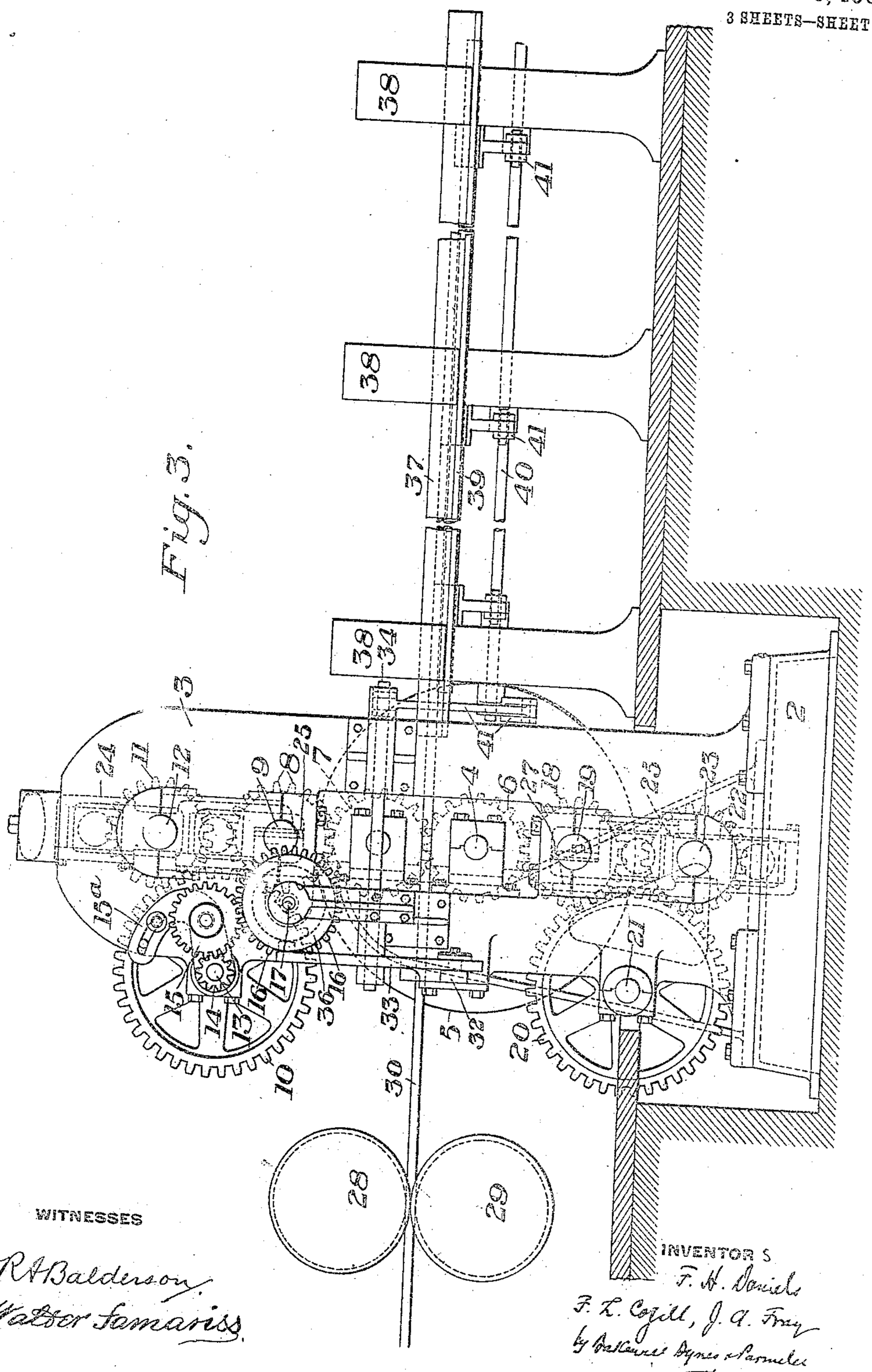
3 SHEETS—SHEET 3.

Fig. 3.



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UNITED STATES PATENT OFFICE

FRED H. DANIELS, OF WORCESTER, MASSACHUSETTS, AND FRANK L. COGILL AND JAMES A. FRAY, OF BRIDGEPORT, CONNECTICUT; SAID COGILL AND FRAY ASSIGNORS TO THE AMERICAN STEEL & WIRE COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF NEW JERSEY.

SHEARING-MACHINE.

No. 915,020. Specification of Letters Patent. Patented March 9, 1909.

Application filed June 5, 1908. Serial No. 436,821.

To all whom it may concern:

Be it known that we, FRED H. DANIELS, of Worcester, Worcester county, Massachusetts, FRANK L. COGILL, of Bridgeport, Fairfield county, Connecticut, and JAMES A. FRAY, of Bridgeport, Fairfield county, Connecticut, have invented a new and useful Improvement in Shearing-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which:

Figure 1 is a plan view of a shearing machine embodying our invention; Fig. 2 is an end view of the same, and Fig. 3 is a side view.

Our invention has relation to metal shearing machines, and is designed to provide a simple and efficient machine of this character which is adapted to shear rods, squares, or other shapes of metal stock into definite lengths, and to provide means whereby any desired length may be sheared at each operation by a simple change of gear arrangement.

The precise nature of our invention will be best understood by reference to the accompanying drawings, in which we have shown one form thereof, and which will now be described, it being premised, however, that various changes may be made in the details of construction and arrangement by those skilled in the art without departing from the spirit and scope of our invention as set forth in the appended claims.

In these drawings, the numeral 2 designates the base of the machine upon which rests and to which are secured the end housings 3.

4 designates the driving shaft, which may be driven by a band wheel 5 or by any other suitable means. The shaft 4 carries a gear pinion 6, which meshes with an intermediate pinion 7, which in turn drives a pinion 8 on a crank shaft 9. The pinion 8 gears into a spur wheel 10, which in turn drives a pinion 11 on a crank shaft 12 above and parallel with the crank shaft 9. The gear wheel 10 is carried on a shaft 13, which at the opposite end of the machine carries a pinion 14 meshing with a gear wheel 15, which in turn meshes with a toothed wheel 16 on a shaft 17. The pinion 6 also meshes with a pinion 18 on a lower crank shaft 19. The pinion 18 drives a gear wheel 20 on a shaft 21, and the gear wheel 20 drives a pinion 22 on a crank shaft 23 below and parallel with the shaft 19. The various crank shafts are journaled in the housings 3, and each shaft has formed therein centrally between the housings a double crank arm. The crank arms of the two upper shafts 9 and 12 are connected by a connecting rod 24, which carries at its lower end a shear blade 25. The crank arms of the two lower crank shafts 19 and 23 are connected by a connecting rod 26, which carries at its upper end a shear blade 27.

28 and 29 designate a pair of feed wheels or rolls for the metal stock indicated at 30, which may be a rod, square or any other suitable shape. The wheels 28 and 29 are of a size and are driven at a speed so as to give the stock 30 a definite rate of feed, and the respective pairs of crank shafts are driven at such a speed as will cause the crank pins to have a corresponding speed. That is to say, supposing the stock to be fed at a speed of 800 feet per minute and the crank pins of the crank shafts to describe a circumference of five feet in length, the crank shafts will be given 160 revolutions per minute. The purpose of this arrangement is to cause the shear blades 25 and 27 to move forwardly in making a shear at the same speed as that at which the stock is being fed through the machine. If the stock were allowed to travel directly under the shear blades there would, therefore, be cut a length of five feet for each revolution of the crank shaft. In order to allow the shearing of any desired length, we provide the guide 31, which is normally to one side of the center line of the shear blades, and through which the stock is guided as it is fed by the wheels 28 and 29. This guide is carried by a transversely movable bar or support 32, which is actuated by a lever 33, pivoted at 34 to a bracket 35 secured to one of the housings 3 and having its upper end in engagement with a face cam 36 on the shafts 17 before referred to.

The gear wheel 16 is a change gear wheel which can be readily removed from the shaft 17 and a wheel of different diameter substituted therefor. To permit this to be done, the pinion 15 is mounted upon an adjustable swinging bracket 15ª, as best shown in Fig. 3, so that the driving connection between the shaft 13 and the gear wheel 16, no matter

what the diameter of the latter may be, may be maintained. By means of this change gear wheel, the cam wheel 36 may be made to have one revolution during any desired number of revolutions of the crank shafts. Thus, supposing the gear wheel 16 to be of the proper diameter to cause the cam to make one revolution for each five revolutions of the crank shafts, the stock will be cut into thirty-foot lengths, it being understood that the action of this cam on the lever 35 is such as to hold the guide 31 out of line with the shear blades during five revolutions of the crank shafts and then to move said guide into line with the shear blades for the sixth revolution of the crank shafts.

The severed lengths of stock are preferably arranged to be caught in a trough whose lateral walls are formed by the plates 37, which are secured to a series of overhanging arms or brackets 38. The bottom of this trough is formed by a tilting plate 39, which is secured to a rocker shaft 40, and which is connected by a series of links and levers 41 with the lever 33. The arrangement of these links and levers is such that after each length of stock is deposited in the trough, the bottom plate 39 will be tilted so as to allow the stock to drop as soon as it is cut off. The arrangement of the links 41 is such, as will be be seen from Fig. 2, as to form a toggle joint to hold the tilting bottom plate of the trough in its closed position until released by the action of the cam wheel 36.

The machine may be used to advantage in connection with rolling mills, such as mills for rolling blooms, rods, bars and other shapes, the shear being located in line with the rolls which finished the commodity to be cut to length. These rolls may, however, be either finishing rolls or a roll at some intermediate stage in the process of rolling, and 28 and 29 in the drawings may be taken as indicating such rolls. The partly rolled shape can be delivered to the shears and cut to lengths and then fed to another train of rolls and finished. The shear can also be used for shearing finished material either hot or cold.

The advantages of our invention result from the facility with which the machine can be changed to cut the stock into any desired length, the simple change of one of the driving gears for the cam wheel being all that is required. The machine is simple and positive in its operation. It will be understood that any suitable arrangement of driving gears for the two pairs of crank shafts may be employed; also that the precise arrangement of the gears for driving the cam wheel may be changed; that any suitable arrangement of the laterally movable guide may be employed, and that various other changes in details of construction and arrangement may be made.

What we claim is:—

1. A shearing machine having a movable shearing blade, feeding means for feeding the stock, including a guide which is normally out of line with the path of movement of the movable shear blade, and means for periodically moving said guide into the path of movement of the shear blade; substantially as described.

2. A shearing machine having two pairs of rotating crank shafts, gearing for driving the same at a definite rate of speed, connecting rods connecting the cranks of each pair of shafts and each carrying a shear blade, means for feeding the stock to the machine at the same rate of speed as the speed of rotation of the crank pins of said shafts, a movable guide for the stock normally out of line with the shear blade, and means for periodically moving said guide into the path of movement of the shear blades; substantially as described.

3. A metal shearing machine having a movable shear blade, a laterally movable feed guide normally out of the line of movement of said shear blade, means for moving said guide into the path of movement of the shear blade, and gearing for actuating said means in time relation to the movement of the shear blade, said gearing having a change member; substantially as described.

4. In a metal shearing machine, a movable shear blade, a stock guide normally out of line with the path of movement of the shear blade, a movable support for said guide, cam controlled means for moving said support, and gearing for actuating the cam controlled means, said gearing having a change member; substantially as described.

5. A metal shearing machine having a pair of reciprocating shear blades, each of which is carried by two cranks rotating about different centers, means for rotating the cranks in unison, and means for feeding the stock into the machine at the same rate of movement as the lineal movement of the shear blades on the cranks; substantially as described.

6. In a metal shearing machine, a pair of reciprocating shear blades, a pair of connected crank shafts for carrying and actuating each blade, gearing for driving all the crank shafts at the same rate of speed, stock feeding means, including a laterally movable guide normally out of line with the path of movement of the shear blades, and cam controlled means for moving said guide periodically in time relation to the movement of the shear blades; substantially as described.

7. In a metal shearing machine, a pair of reciprocating shear blades, a pair of connected crank shafts for carrying and actuating each blade, gearing for driving all the crank shafts at the same rate of speed, stock

feeding means, including a laterally movable guide normally out of line with the path of movement of the shear blades, and cam controlled means for moving said guide periodically in time relation to the movements of the shear blades, together with means for varying the time of movement of said guide; substantially as described.

8. A metal shearing machine having a stock guide normally out of line with the shear blades, cam controlled means for periodically moving said guide into and out of line with the shear blades, and a change gearing for actuating the cam controlled means; substantially as described.

9. A metal shearing machine having a guide for the stock normally out of line with the shear blades, a movable support for said guide, means for periodically moving the support to move the guide into line with the shear blades, a receiving trough for the sheared lengths, said trough having a movable discharging member, and means for actuating said discharging member in time relation to the movements of the guide supports, substantially as described.

10. In shearing mechanism, the combination with feed or delivery rolls, of a reciprocating shear blade, a movable guide for the material being fed or delivered, and means for periodically moving said guide into and out of line with the path of movement of the shear blade; substantially as described.

In testimony whereof we have hereunto set our hands.

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FRANK L. COGILL.
JAMES A. FRAY.

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