F. H. DANIELS.

PROCESS OF TREATING ROLLED METAL FLATS AND THE LIKE.

APPLICATION FILED OCT. 29, 1909.

956,302. **Patented Apr. 26, 1910.**

4 SHEETS—SHEET 1.

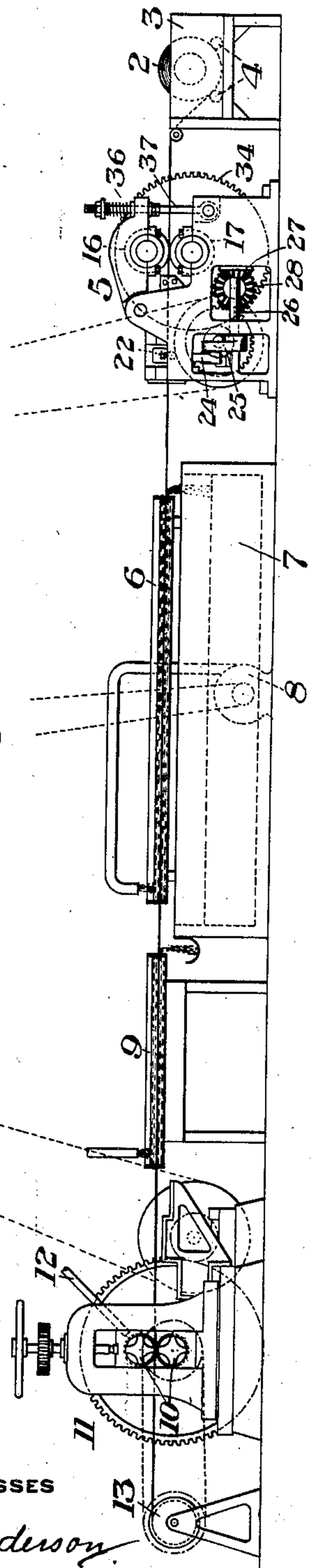

Fig. 1.

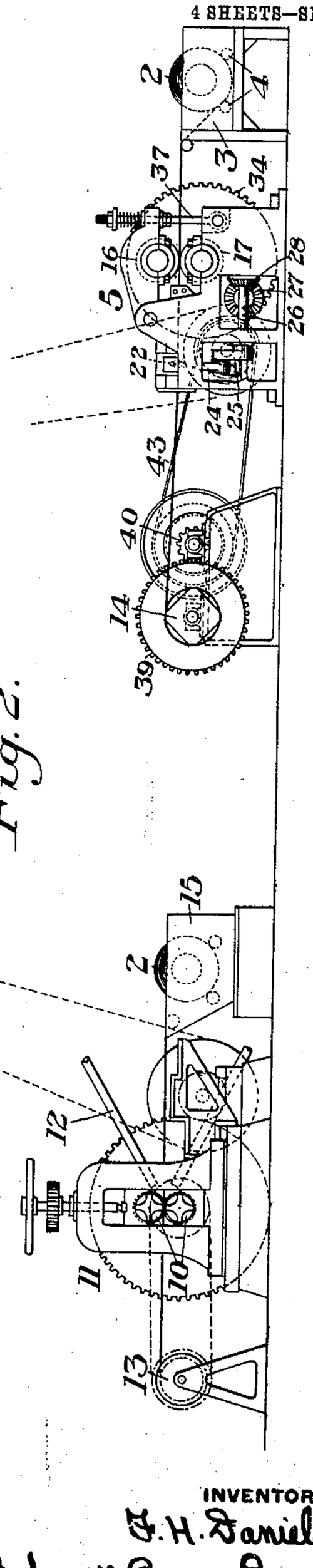

Fig. 2.

WITNESSES

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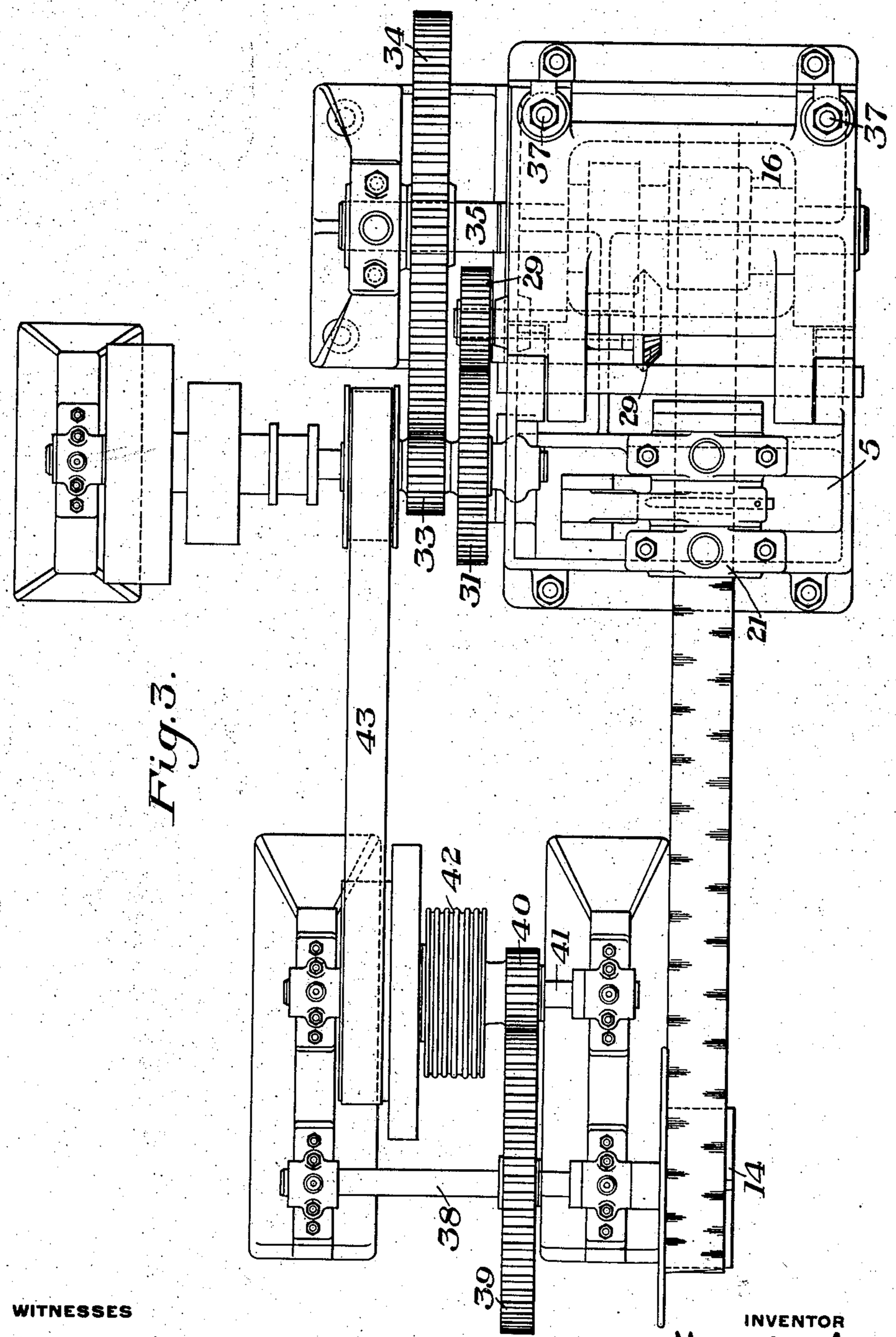
Fig. 3.



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4 SHEETS—SHEET 3.

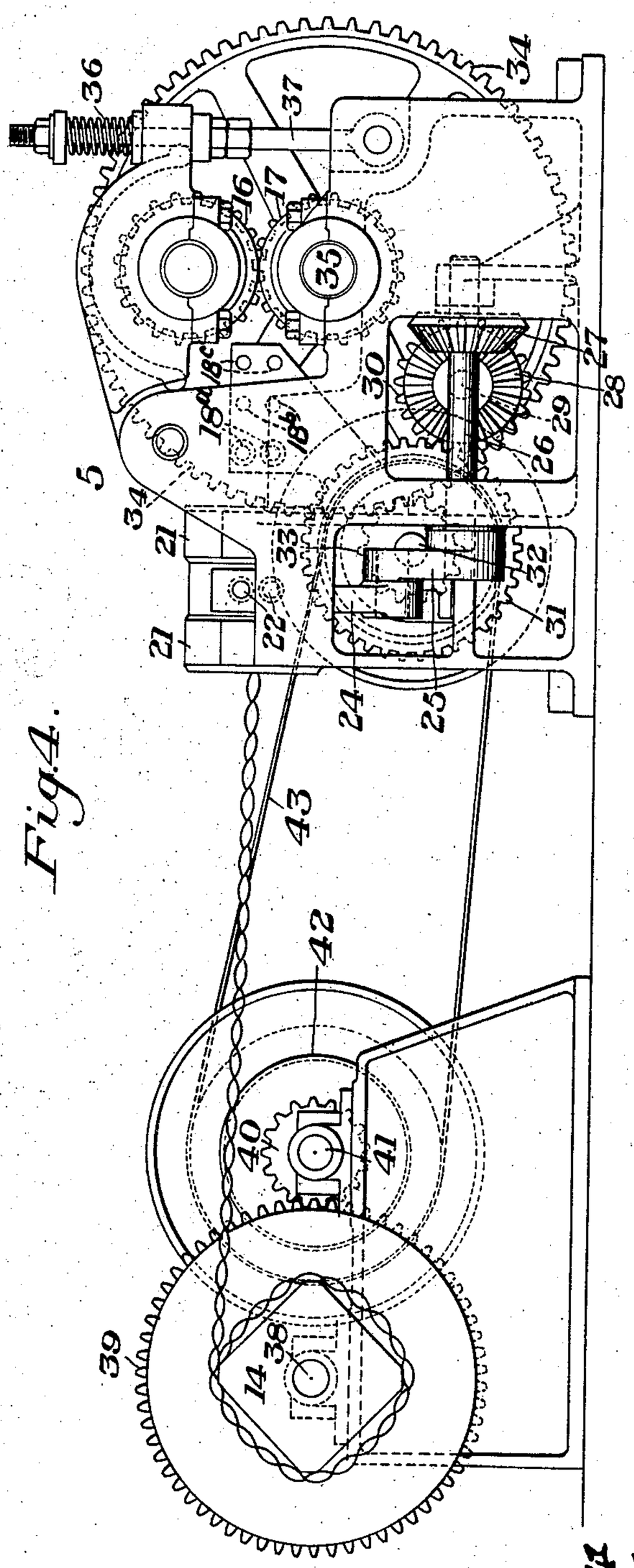

Fig. 4.

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4 SHEETS—SHEET 4.

Fig. 5.

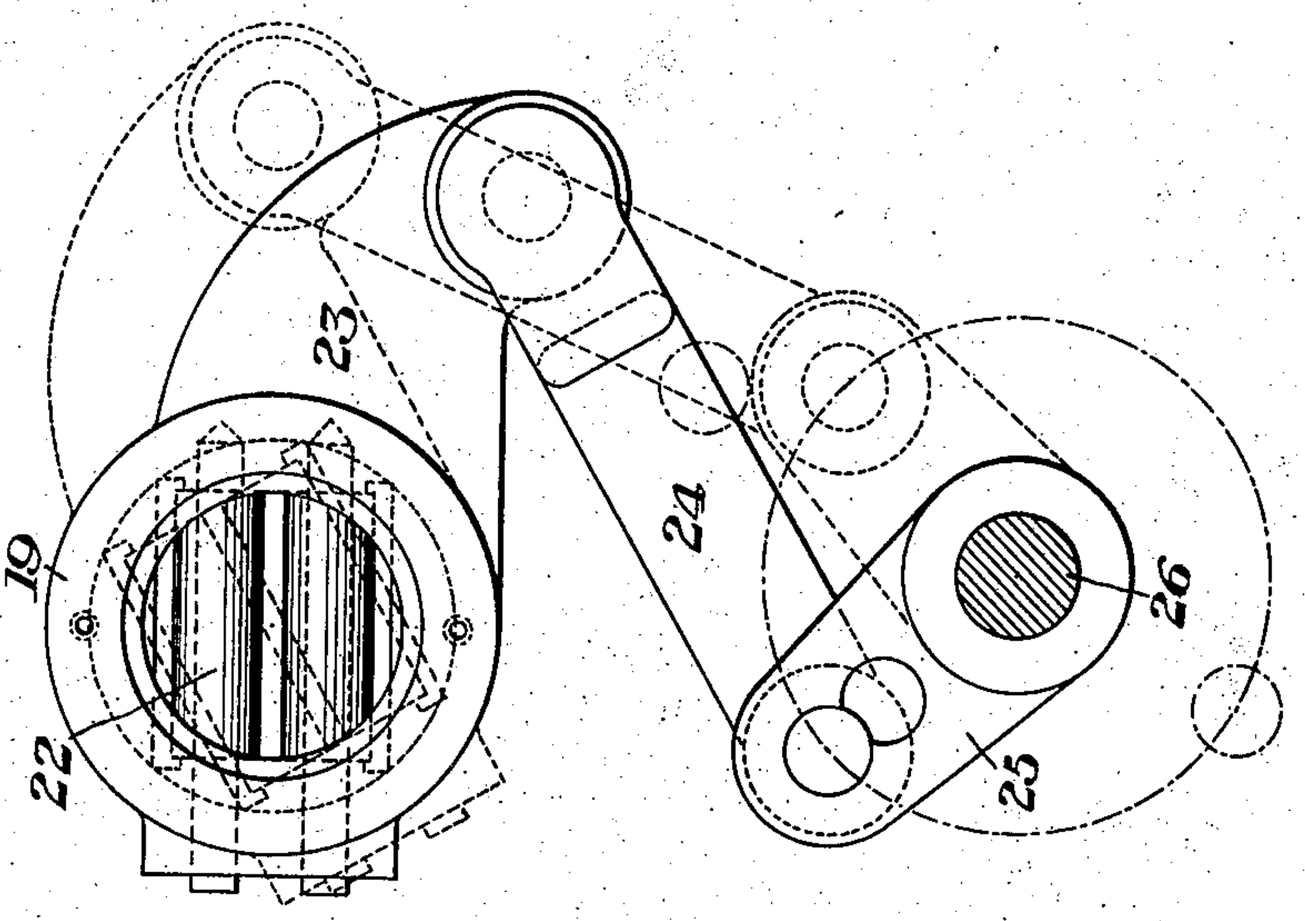
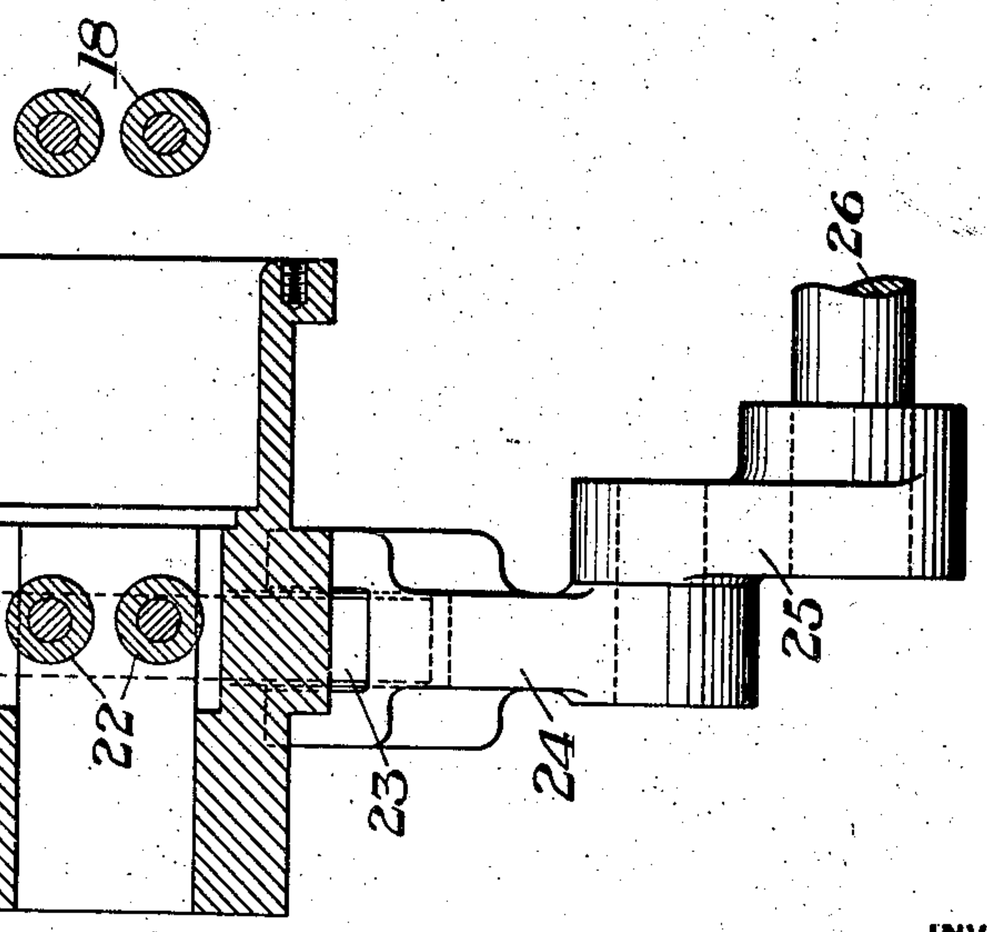


Fig. 6.



WITNESSES

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UNITED STATES PATENT OFFICE.

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PROCESS OF TREATING ROLLED METAL FLATS AND THE LIKE.

956,302. Specification of Letters Patent. Patented Apr. 26, 1910.

Application filed October 29, 1909. Serial No. 525,239.

To all whom it may concern:

Be it known that I, FRED H. DANIELS, of Worcester, county of Worcester, State of Massachusetts, have invented a new and useful Improvement in Processes of Treating Rolled Metal Flats and the Like, 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 side view partly diagrammatic illustrating one form of apparatus for carrying out my invention; Fig. 2 is a similar view illustrating a modification of the invention; Figs. 3 and 4 are, respectively, plan and side views of one form of corrugating machine which may be employed; Figs. 5 and 6 are detail views of portions of the corrugating machine.

My invention has relation to the process of treating rolled metal strips and other similar shapes for the purpose of removing scale therefrom, and to provide for a more efficient action of the pickle bath, whereby the flat may be thoroughly cleaned with a minimum amount of acid.

In accordance with my invention, the coils of flats as they come from a rolling mill are placed in a suitable machine, in which they are unreeled and in which the flats are corrugated in passing. The flats are then subjected to the action of a pickling bath, either with or without reeling or coiling, and after leaving such bath are passed through a rolling mill, in which they are reduced in thickness and smooth surfaced, the roll also acting to remove the corrugations. The flats are then rewound.

Referring first to Fig. 1, the numeral 2 designates a coil of flats as it comes from the rolling mill and which is placed in a vertical position on a suitable stand or support 3, provided with antifriction rollers 4, upon which the coil rests. The flat is unwound from this coil and passed through the corrugating machine 5. From the corrugating devices of this machine, the flat passes forwardly and directly into a pickling trough 6, which is preferably supported over an acid tank 7. The acid solution used in trough 6 is circulated therein by being drawn by a suitable pump 8 from the tank upwardly into the trough from which it runs back into the tank. The flat passes out of the trough 6 through a washing tank 9 and thence to and through the rolls 10 of a cold-rolling machine 11. Water is preferably supplied to the rolls of this machine, as by the pipe 12, for the purpose of removing any acid or any foreign matter which may not have been removed in the washing tank 9. Any acid which might remain on the flats would injure the rolls 10, as well as the flat itself. After passing through these rolls, the flat is coiled on a suitable reel 13, and is then ready for the usual finishing operations.

In the modification illustrated in Fig. 2, the flat after passing through the corrugating machine 5, is reeled or wound into a loose coil on a suitable reel 14. This coil is then lifted over and placed in an acid bath in a suitable tank 15, in which it may be agitated in any suitable manner. The flat is then flushed thoroughly on both sides and is run through the cold-rolling machine 11 in the same manner as in Fig. 1.

In both forms of the invention, the flat coming from the rolling mill is corrugated for the purpose of loosening and breaking off all scale so as to present a smooth surface which can be more easily reached by the acid in cleaning. When the flat is recoiled before being submitted to the acid bath, the corrugations also act to form a loose bundle, thus giving the acid more complete access to all parts of the surface. Any suitable corrugating device may be used for this purpose. In Figs. 3, 4, 5 and 6, I have illustrated a machine for this purpose which forms the subject matter of my pending application, Serial No. 500,894, filed June 8, 1909, of which the present application is in part a division. This machine comprises the pressure feed rolls 16 and 17 which engage the end of the flat as it is unwound from the coil 2 and feed it forwardly between a pair of rollers 18 which may be placed in any one of the three positions indicated by 18^a, 18^b and 18^c, and thence through the corrugating and scaling device shown in detail in Figs. 5 and 6. This device consists of a hollow frame or sleeve 19, having journal portions 20, which are carried in suitable bearings 21. In the central portion of the frame or sleeve between the bearings are mounted two rollers, preferably steel rollers 22. Secured to the central portion of the frame or sleeve is a rocker arm 23, having a pivoted connecting rod 24, attached at its other end to a crank 25, secured to a rotary shaft 26. The shaft 26 is pro-

vided with a bevel wheel 27, which meshes with a corresponding wheel 28 on a countershaft 29. This shaft has a pinion 30, which meshes with a toothed wheel 31, on the driven shaft 32. The shaft 32 is also provided with a pinion 33, which intermeshes with a toothed wheel 34, on the shaft 35 of the lower feed or pressure roll 17. The two rolls 16 and 17 are geared together as shown in Fig. 4, and the upper one is yieldingly pressed against the lower one by a spring 36, acting upon a pivotal rod 37, secured to the frame and also acting upon the rocking top bearing of the upper roll. From the corrugating and scaling device, the corrugated piece feeds forwardly to the rewinding reel or block 14, before referred to, and which is mounted on a shaft 38 having a toothed wheel 39, intermeshing with a pinion 40, on the shaft 41. This shaft 41 has a suitable friction clutch 42, and is driven by a belt 43, from the main driving shaft of the corrugating machine. The winding block 14 is preferably of polygonal shape, so as to provide openings between the layers of the coil to give free access to all parts of the coil in cleaning.

In operation, the rolls 18 may be set in any one of the three sets of bearings 18^a, 18^b and 18^c illustrated in Fig. 4, for the purpose of varying the depth of the corrugations. These can also be varied by varying the throw of the rocker 23. As the metal passes through the frame or sleeve 19, the rocking of the rollers will cause it to alternately corrugate opposite edges of the flats, as indicated in Fig. 3.

The machine described forms a simple and effective machine for the purpose, but it will be understood that any other suitable corrugating device may be employed.

If desired, the flat coming from the rolling mill, instead of being first formed into a coil 2, may be led directly through the corrugating machine and thence to the acid bath, and various other modifications may be made in the details of the process.

The action of the corrugating device, whereby opposite edge portions of the flat are alternately crimped or corrugated serves to effectively loosen and remove the scale therefrom, so that the acid of the pickling bath is brought into direct contact with the surface to be cleaned and the flats are cleaned with a minimum amount of acid.

I claim:

1. The method of treating metal flats, etc., which comprises the following steps, first, corrugating the flat to loosen and remove the scale therefrom, second, subjecting the corrugated flat to the action of an acid bath, and third, cold-rolling the same.

2. The herein described method of treating metal flats and the like, which comprises the following steps, first, corrugating the flats to loosen and remove scale therefrom, second, forming the corrugated flat into a loose bundle or coil, third, subjecting the coil to an acid bath, and fourth, cold-rolling the flat.

3. The herein described method of treating metal flats and the like, which comprises the following steps, first, corrugating the flats to loosen and remove scale therefrom, second, forming the corrugated flat into a loose bundle or coil, third, subjecting the coil to an acid bath, and fourth, cold-rolling the flat and removing the corrugations and reforming the flat into a coil.

4. The method of treating metal flats and the like, which comprises the following steps, first, taking a coil formed of flat material, second, uncoiling the flat and passing it through a corrugating device, whereby its opposite edge portions are alternately crimped, third, subjecting the crimped flat to an acid bath, and fourth, cold-rolling the flat and removing the crimps therefrom.

5. In the art of treating flats, the steps which consist in bending opposite edge portions of the flat alternately in opposite directions, and then subjecting the same to an acid bath.

6. In the art of treating metal plates, and the like, the steps which consist in alternately crimping or bending opposite edge portions of the flat, forming the same into a loose coil, then subjecting the coil to the action of an acid bath, and then removing the crimps or bends.

7. The method of treating metal flats, which comprises the following steps, first, corrugating the flat to loosen and remove scale therefrom, second, subjecting the corrugated flat to the action of an acid bath, third, washing the flat, and fourth, cold-rolling the same.

8. The method of treating metal flats, which comprises the following steps, first, corrugating the flat to loosen and remove scale therefrom, second, forming the corrugated flat into a loose coil or bundle, third, subjecting the coil or bundle to the action of an acid bath, and fourth, rolling the flat.

In testimony whereof, I have hereunto set my hand.

FRED H. DANIELS.

Witnesses:

A. F. Backlin,

Wm. A. Bacon.