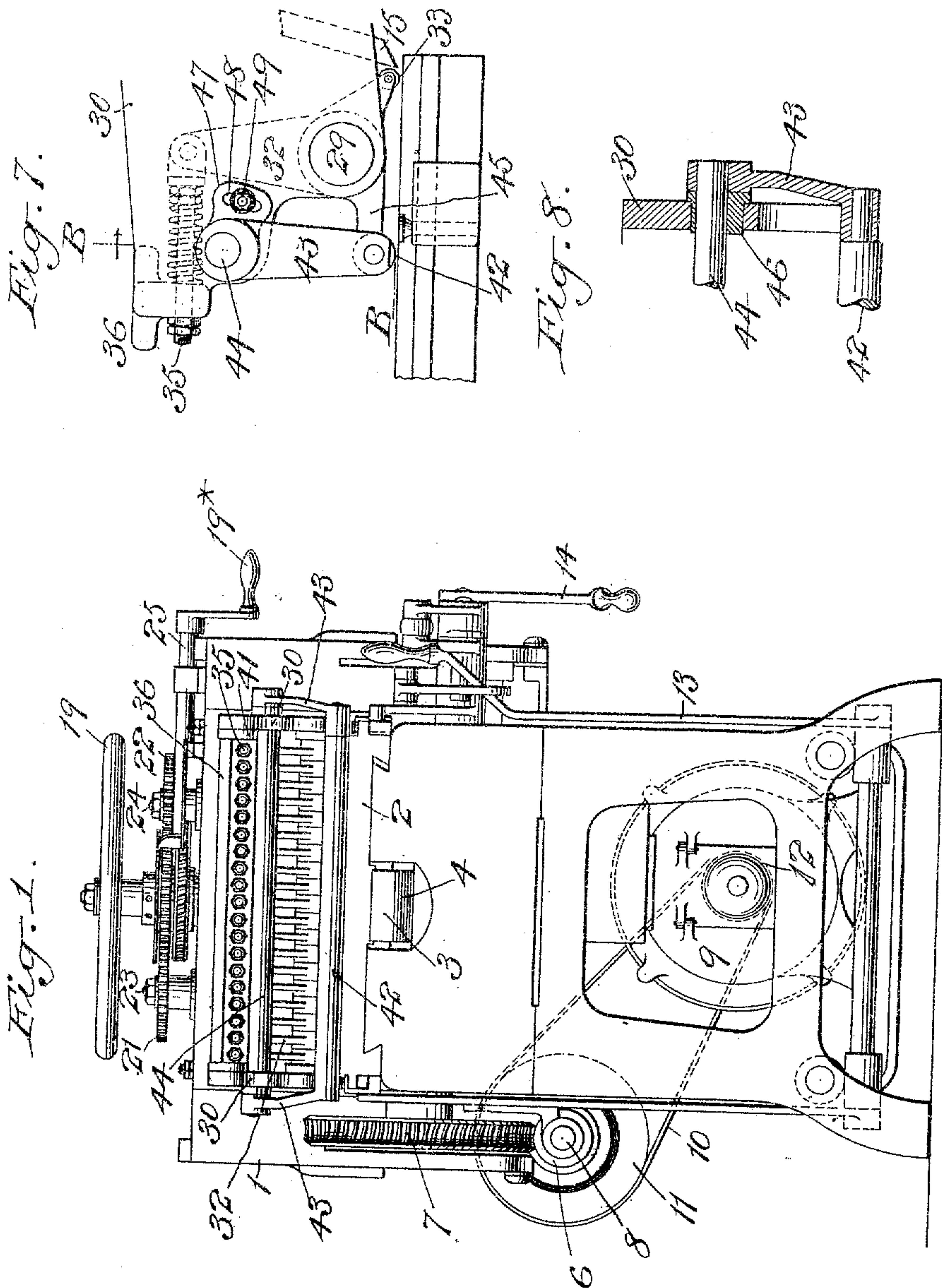


M. A. McKEE.
TREATMENT OF PRINTING PLATES.
APPLICATION FILED JULY 2, 1909.

988,583.

Patented Apr. 4, 1911.

4 SHEETS-SHEET 1.



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Brown & Leland

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4 SHEETS—SHEET 2.

Fig. 4.

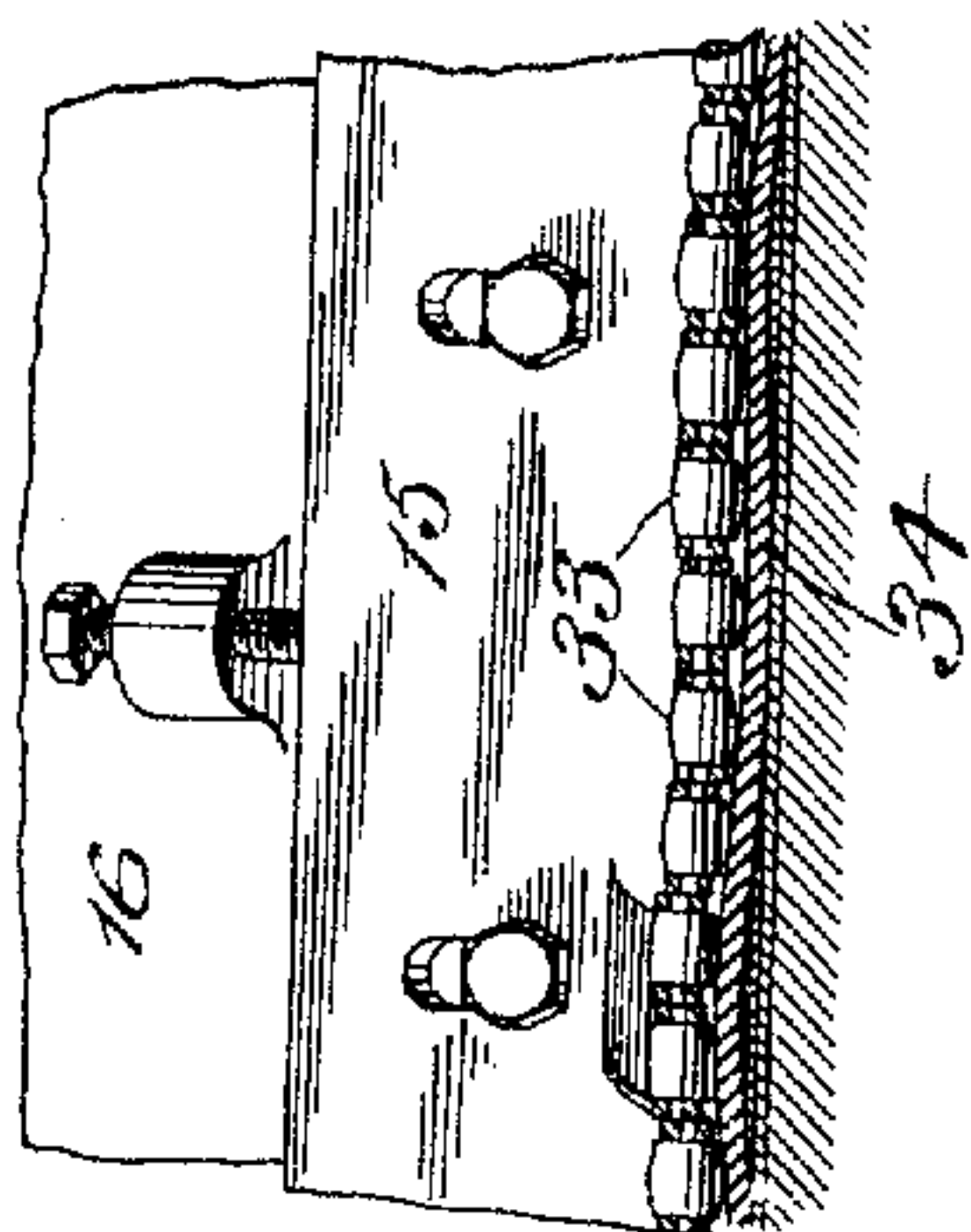


Fig. 5.

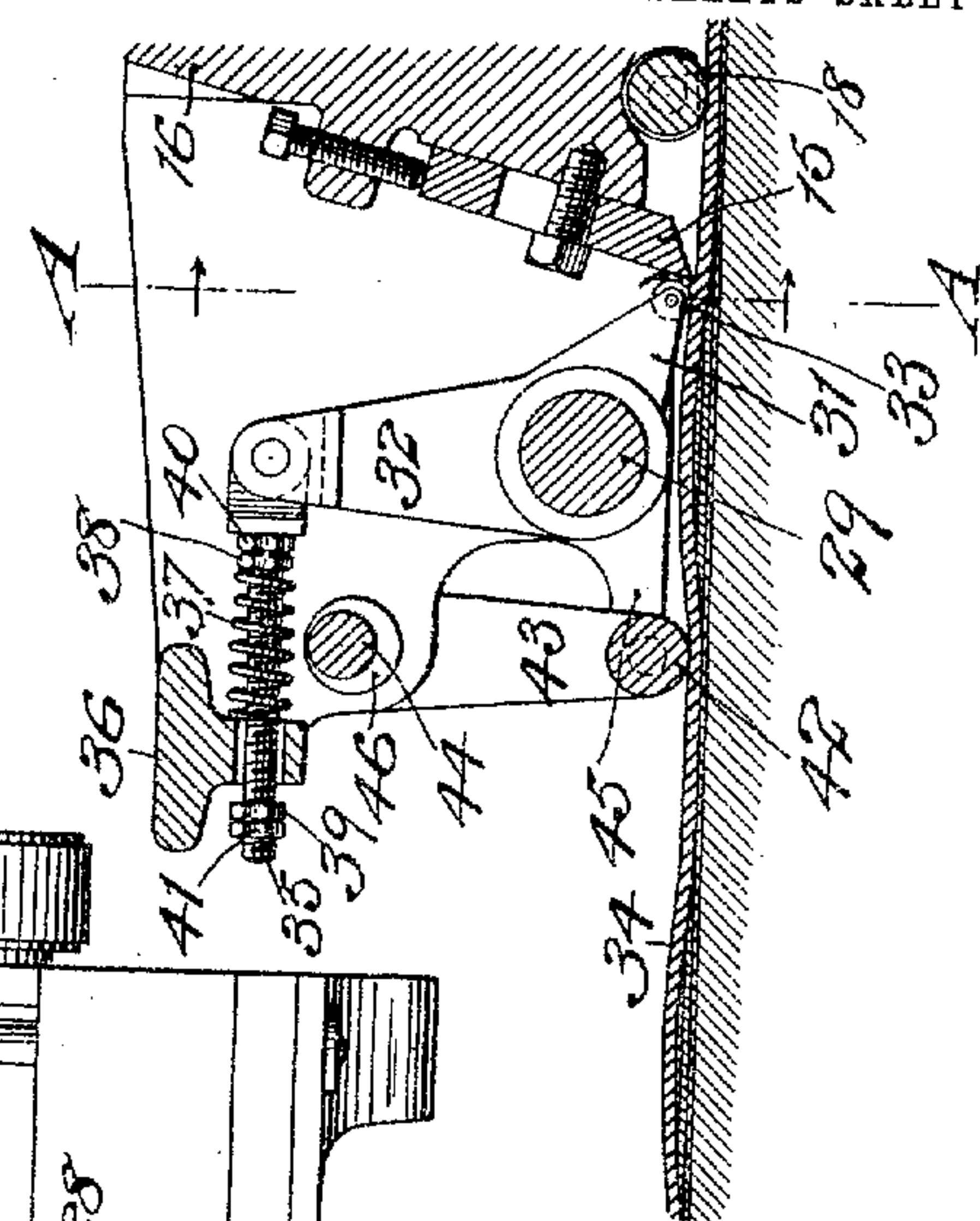
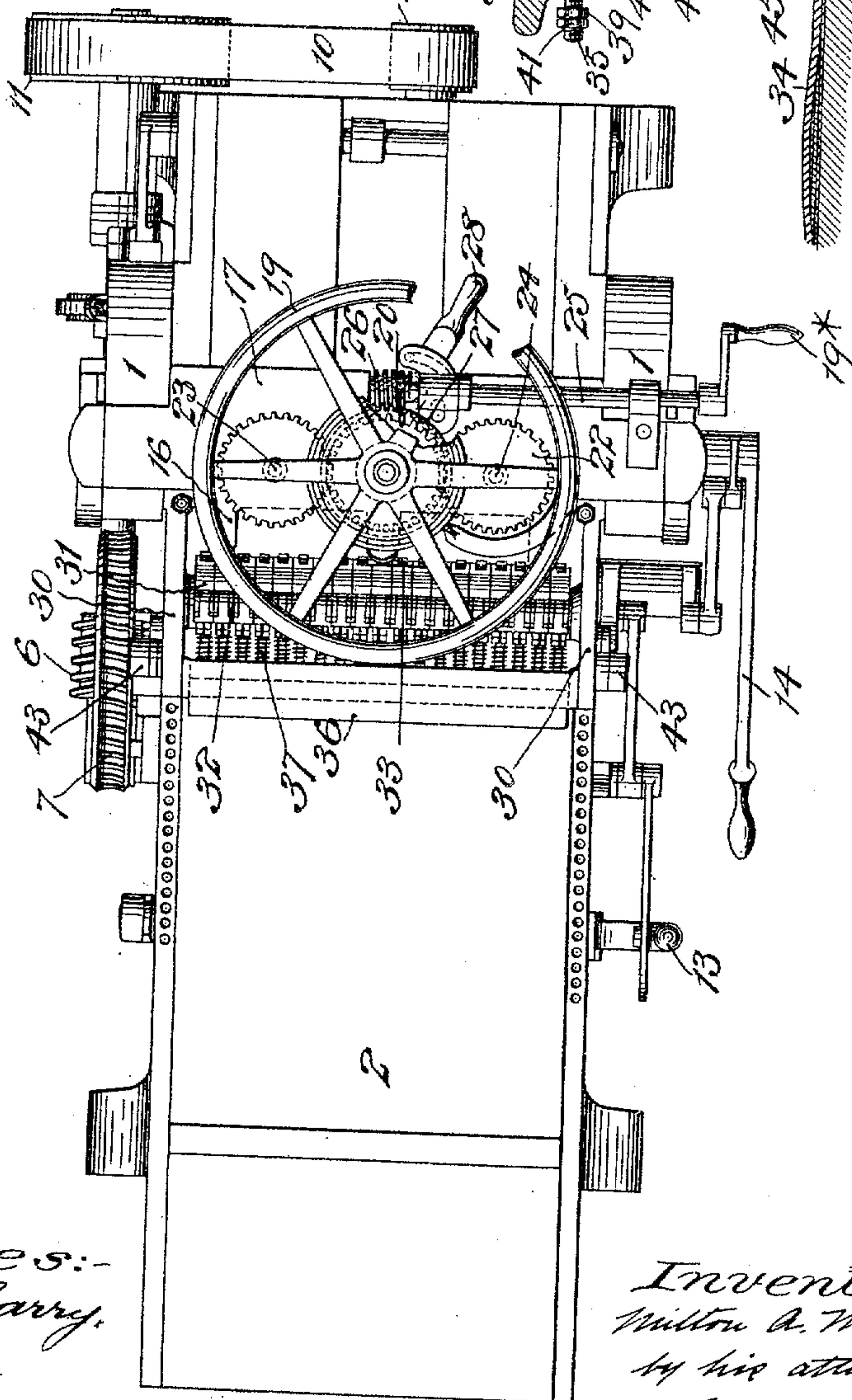


Fig. 2.



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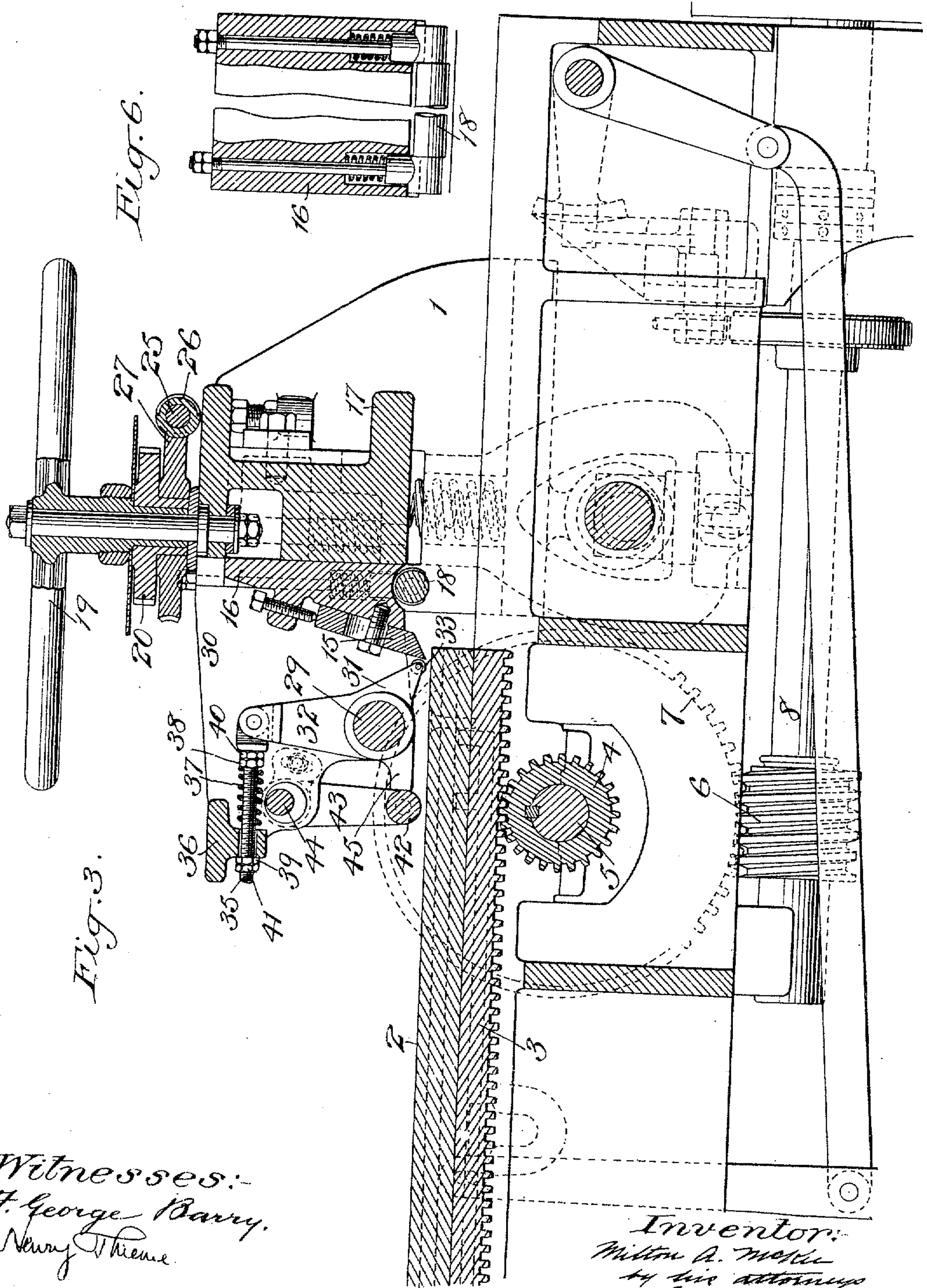
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4 SHEETS—SHEET 3.



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988,583.

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Patented Apr. 4, 1911.
4 SHEETS—SHEET 4.

Fig. 9

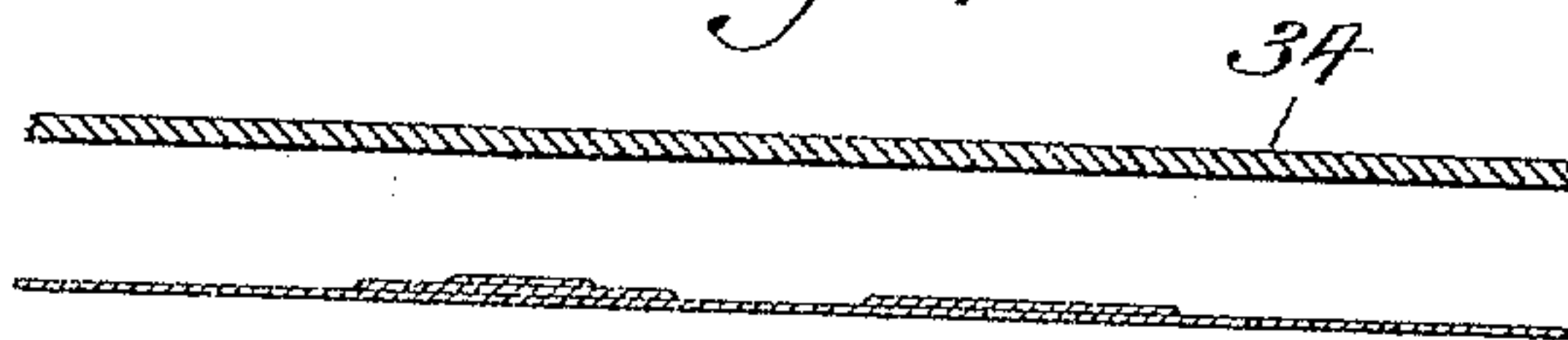


Fig. 10.

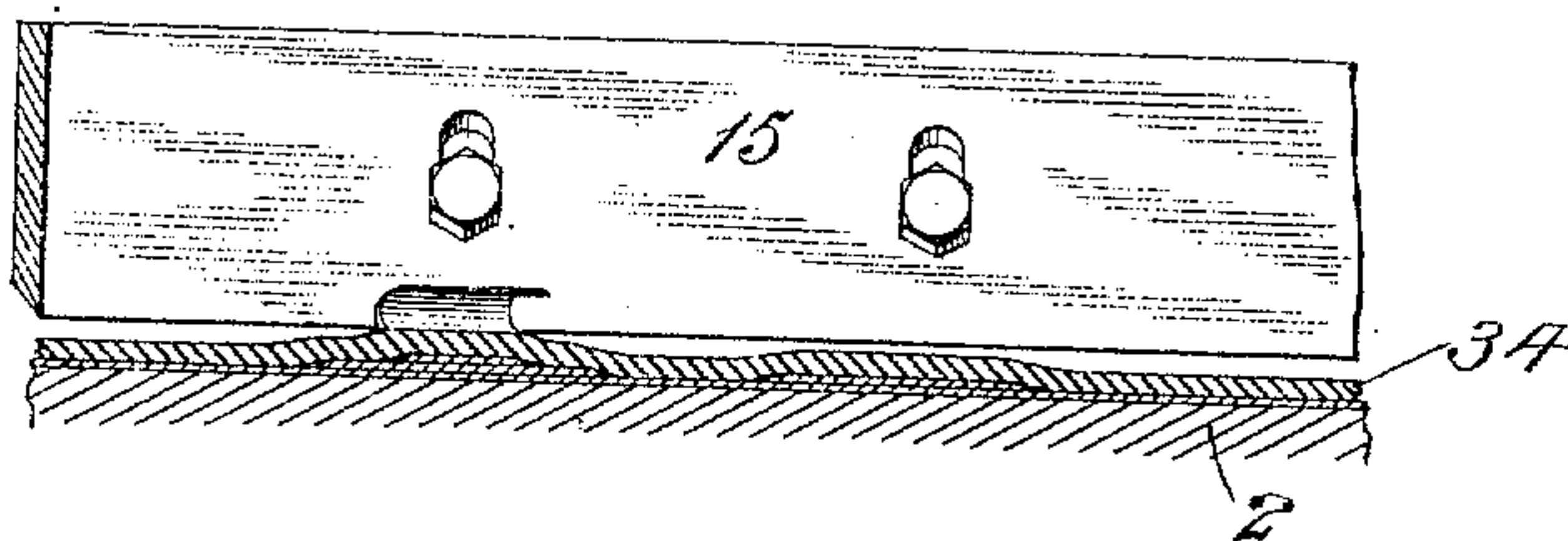


Fig. 11.



Fig. 12.

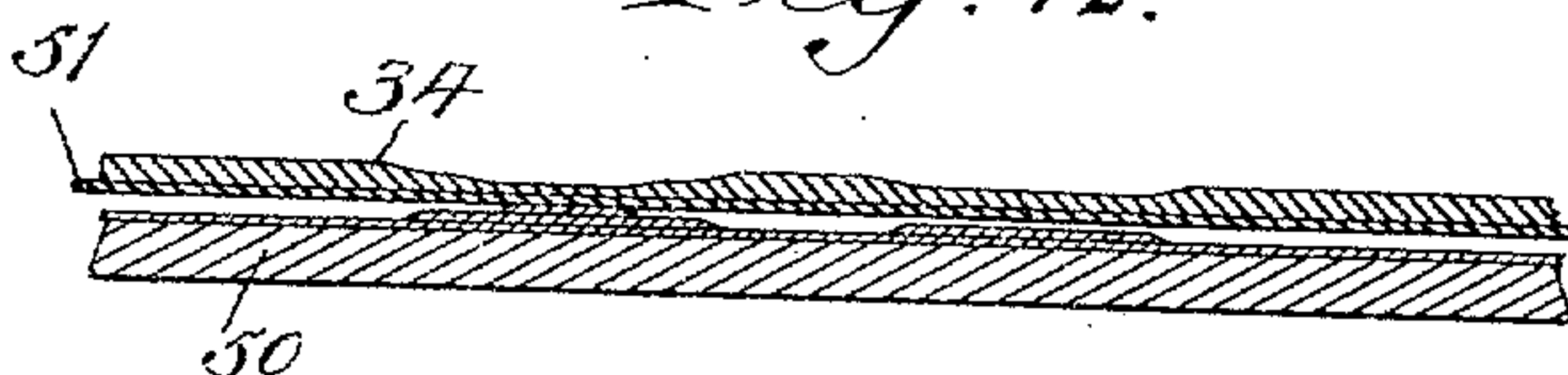


Fig. 13.

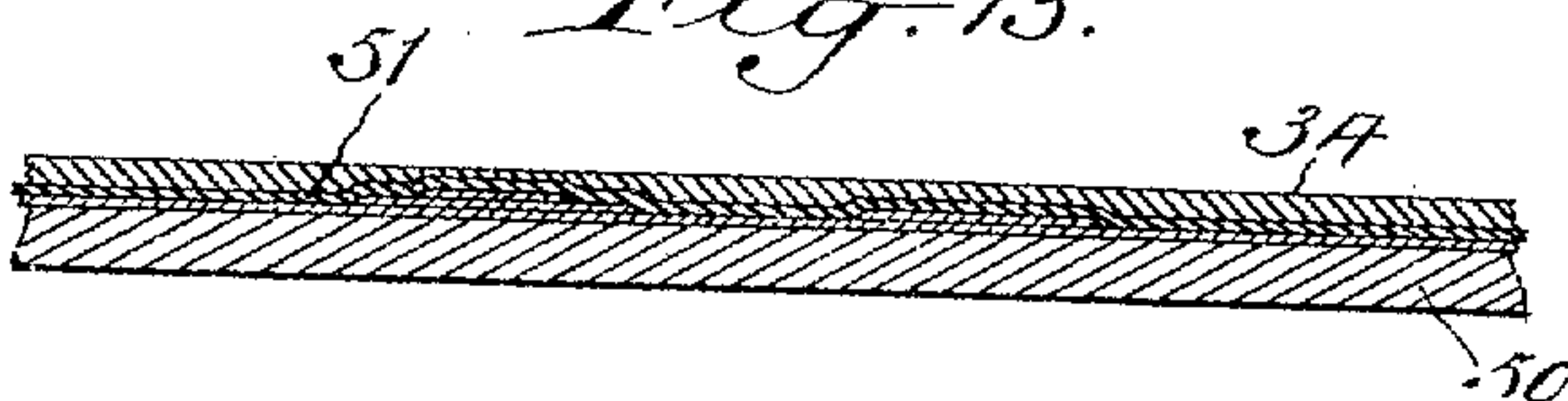


Fig. 14.



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UNITED STATES PATENT OFFICE.

MILTON ABBOTT McKEE, OF WESTERLY, RHODE ISLAND, ASSIGNOR TO C. B. COTTRELL & SONS COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

TREATMENT OF PRINTING-PLATES.

988,583.

Specification of Letters Patent.

Patented Apr. 4, 1911.

Application filed July 2, 1909. Serial No. 505,586.

To all whom it may concern:

Be it known that I, MILTON A. McKEE, a citizen of the United States, and resident of Westerly, in the county of Washington and State of Rhode Island, have invented a new and useful Treatment of Printing-Plates, of which the following is a specification.

In the treatment of printing plates it has been found that greater relief in the blacker printing parts of the plate could be obtained if a greater quantity of metal could be stored on the back of the plate opposite the part needing the greater relief. This result has been obtained by the process of preparing printing plates as described and claimed in United States Letters Patent No. 857531 dated June 18, 1907, in which the following steps are employed. A matrix is prepared so as to predetermine just what changes shall be made in the printing face of the plate to produce the desired result. The matrix is then placed face up upon the bed of a shaving machine with the printing plate face down thereupon in such position that the high and low portions of the matrix are in register with those portions of the plate which are to be made respectively low and elevated. The plate and matrix are then held firmly in position upon the bed of the shaving machine and the shaving knife is actuated either by moving the bed beneath the knife or by moving the knife along the bed, until the back of the plate is shaved to the desired thickness. When the plate is released, it will spring back to its normal position, leaving elevations and depressions along its back opposite to the depressions and elevations previously formed or produced in the matrix. The plate while still in register with the matrix, may be subjected to heat and pressure to form permanently the desired depressions and elevations in the printing face of the plate. As the back of the printing plate is engaged by the shaving knife, the knife will tend to crowd the unsupported parts of the plate away from the edge of the knife, so that the metal will be removed from the back of the plate only at those portions opposite the high portions of the matrix.

This present invention is directed to the process of treating printing plates consisting in subjecting the back of a plate to local pressure along the same in close proximity to the shaving knife as it is being subjected

to its shaving operation, the said local pressure serving to assist the knife in crowding or forcing the metal away from the edge of the knife at the unsupported portions of the plate for leaving a greater thickness or storage of metal at such unsupported portions.

Means for carrying out my process are represented in the accompanying drawings in which,

Figure 1 represents a printing plate shaving machine suitable for carrying out one step of my process. Fig. 2 is a top plan view of the machine. Fig. 3 is an enlarged detail longitudinal vertical section through the machine, Fig. 4 is an enlarged detail section taken in the plane of the line A—A of Fig. 5, Fig. 5 is an enlarged detail vertical longitudinal section at the shaving knife and spring-pressed fingers, illustrating the action of the knife and fingers with respect to the back of the printing plate, Fig. 6 is an enlarged transverse detail section of the inner spring-pressed plate holding roller, Fig. 7 is an enlarged detail view, showing in side elevation the device for adjusting the plate cramping roller, Fig. 8 is an enlarged section taken in the plane of the line B—B of Fig. 7, Fig. 9 is a transverse section through a matrix, face upward, with a printing plate ready to be placed upon it face downward, Fig. 10 is a transverse sectional view through the matrix and superposed plate upon the bed of the shaving machine, illustrating the shaving action of the knife of said machine, Fig. 11 is a transverse section of the plate face downward after the shaving operation, Fig. 12 is a transverse sectional view through the press board, the matrix, the soft paper sheet and the printing plate as placed together to be subjected to pressure and heat, Fig. 13 is a sectional view of the same parts shown in Fig. 12, after they have been subjected to heat and pressure, and Fig. 14 is a section of the finished printing plate.

In all the views the thickness of the paper employed in the process and the scarcely visible greater or less prominence of the parts of the surface of the plates are somewhat exaggerated to render them distinguishable to the eye.

The main frame of the shaving machine is denoted by 1 and its reciprocating bed by 2. The bed rack is denoted by 3 and is driven backward and forward by a reversing

pinion 4 mounted on a shaft 5 driven by a worm and gear connection 6, 7, from a drive shaft 8, which shaft in turn is driven from any suitable source of power, such, for instance, as a reversing motor 9, by a belt and pulley connection 10, 11, 12. The movement of the bed may be reversed automatically and may also be reversed manually by the starting and reversing lever 13. The movement of the bed may also be controlled by the starting lever 13. The knife controlling lever is denoted by 14. These levers are suitably connected to the parts which they control and as they form no part of the present invention, their operation will not be specifically described herein.

The shaving knife is denoted by 15, and it is adjustably mounted on a member 16 which in turn is adjustably mounted upon the frame 17 adjustable in the main frame 1. The spring-pressed plate engaging roller 18 is mounted in the vertically adjustable knife carrying member 16. The vertical adjustments of the shaving knife 15 are controlled by a hand wheel 19 having a geared connection 20, 21, 22, with the vertical adjusting screws 23, 24. A micrometer adjustment of the knife carrying member 16 may be provided by a hand shaft 25 provided with a worm and gear connection 26, 27, with the shank of the handle 19*. This shaft 25 and its worm may be moved into and out of operative position by a hand lever 28.

The means which I have shown for exerting pressure upon the plate locally along the same, in close proximity to the knife, is constructed, arranged and operated as follows: A plurality of spring-pressed fingers are mounted upon a cross shaft 29 carried by brackets 30 forming a fixed part of the knife carrying member 16. Each of these fingers comprises a downwardly and inwardly extended arm 31 and an upwardly extended arm 32. The arm 31 is provided with a barreled roller 33 arranged to roll along the back of the printing plate 34 in close proximity to the shaving knife 15. A screw bolt 35 extends forwardly from the uprising arm 32 of each spring-pressed finger, which bolt passes through a cross piece 36 of the brackets 30. A spring 37 is interposed between the cross piece 36 and an adjusting nut 38 on the said screw bolt. An adjusting nut 39 on the screw bolt 35, in front of the cross piece 36, serves to limit the inward movement of the arm 32 of the spring-pressed finger and thereby the downward movement of the arm 31. The tension of the spring 37 may be adjusted by the nut 38. These nuts 38, 39, may be provided with lock nuts 40, 41, for locking the nuts 38, 39, in their adjusted position. A cramping roller 42 is carried by arms 43 supported upon a cross shaft 44 mounted eccentrically in bushings 46 rotatably mounted in the

brackets 30. Stops 45 on the brackets 30 limit the inward movement of the roller 42. This roller 42 serves to hold the printing plate and its interposed matrix firmly down upon the bed 2 of the machine as the plate 70 is passed beneath the shaving knife 15.

Means are provided for adjusting the cramping roller 42 toward and away from the bed 2, which means consists in the present instance, of flanges 47 on the eccentric bushing 46, which flanges have elongated slots 48 through which clamping bolts 49 extend for securing the flanges rigidly to the brackets 30 at any desired position within the limits of their rotative movements.

The press board shown in Figs. 12 and 13 is denoted by 50, and the blotting paper which is interposed between the matrix and the plate is denoted by 51.

In carrying out the process after the formation of the matrix in accordance with the tones of the subject, it is laid upon the bed 2 of the shaving machine with the built-up portions uppermost and the printing plate to be affected thereby is then laid face down on said matrix and in proper register therewith. The back of the plate may then be subjected to the action of the shaving knife 15, for the purpose of producing in or on the back of the plate, a series or set of depressions and elevations the reverse of those formed in the matrix by the built-up and cut-out portions of the latter, in order that the said depressions and elevations thus formed in the back of the plate may be subsequently produced or formed in the face of the plate by a succeeding step in the treatment as will hereinafter appear. The plurality of independent spring-pressed fingers located adjacent to the knife will exert their pressure upon the back of the plate as it passes beneath the knife, thus serving to exert pressure locally along the plate and assist the knife in crowding the unsupported parts of the plate away from the edge of the knife for permitting portions of the plate opposite the raised portions of the matrix to be removed in one or more shavings by the knife. The shaving operation is continued until a full shaving is made covering the entire area of the back of the plate, or until the plate has been shaved to the thickness desired. The printing plate has a certain amount of resiliency and hence when the various portions of the plate are deflected or pressed down during the shaving operation, such deflections are but temporary and as soon as the pressure is removed, such deflected portions spring back to their normal position. Therefore, it will be seen that when all of the several shaving operations are concluded, the face of the plate will be straight and even, while the back of the plate will be uneven or irregular and consist of depressions and elevations

the reverse of those in the matrix, and it will be understood that such depressions and elevations in the back of the plate are those formed by the cutting process and as predetermined and controlled by the making up or construction of the matrix. After the shaving operation just described and while the matrix is still in register with the plate, the latter is subjected to the action of heat and pressure and the projections on the back of the plate are forced forward and similar projections forced into the hollows or depressions in the matrix at the face of the plate, and at the same time, the back of the plate is pressed true or even, as represented in Fig. 13. After this operation, the plate and matrix are removed from the heating and pressing machine and placed in another press where there is no heat and which is preferably kept cool, and by means of pressure, the face of the plate is positively and finally set to conform to the outlines of the matrix and when removed from the last mentioned press, the plate will have the appearance represented in Fig. 14, wherein it will be observed that the back of the plate is true or even while its face which constitutes the printing surface of the plate, is irregular or high and low at different places so as to have a varying pressure on the paper in the printing operation and thus yield varying strengths of impressions or heavy and light impressions on the surface of the paper and at the places predetermined by the making of the matrix from a proof or copy of the matter or subject which the plate to be treated bears.

By the use of the expression "exerting pressure locally upon the back of the plate," I wish to be understood as contemplating the independent application of pressure at different points upon the back of the plate.

In so far as certain features of my improvements in the art of treating or manipulating the plates are concerned, it will be understood that I do not wish to be limited to each and all of the steps of the complete process to which I prefer to subject the plate, for some of such steps may be used without others or in connection with still other steps or modes of treatment to produce certain of the results produced by me and to avoid either in all or in part, the work of underlaying or overlaying. I desire to cover herein not only the process as an entirety but also the steps or sub-processes thereof.

What I claim is:

1. In the process of treating printing plates, applying a matrix to the face of the plate, said matrix having high and low portions corresponding respectively to the depressions and elevations which are to appear in the face of the printing plate, subjecting the back of the plate to the action of a shaving knife and exerting pressure locally upon

the back of the plate, in close proximity to the shaving knife, for assisting the knife in forcing the unsupported parts of the plate away from its edge during the shaving action.

2. In the process of treating printing plates, applying a matrix to the face of the plate, said matrix having high and low portions corresponding respectively to the depressions and elevations which are to appear in the face of the printing plate, subjecting the back of the plate to the action of a shaving knife and exerting pressure locally upon the back of the plate, in close proximity to the shaving knife, by a plurality of independent pressure devices, for assisting the knife in forcing the unsupported parts of the plate away from its edge during the shaving action.

3. In the process of treating printing plates, applying a matrix to the face of the plate, said matrix having high and low portions corresponding respectively to the depressions and elevations which are to appear in the face of the printing plate, subjecting the back of the plate to the action of a shaving knife, exerting pressure locally upon the back of the plate, in close proximity to the shaving knife, for assisting the knife in forcing the unsupported parts of the plate away from its edge during the shaving action, and finally subjecting the plate and matrix to heat and pressure to form permanently the desired depressions and elevations in the face of the plate.

4. In the process of treating printing plates, applying a matrix to the face of the plate, said matrix having high and low portions corresponding respectively to the depressions and elevations which are to appear in the face of the printing plate, subjecting the back of the plate to the action of a shaving knife and exerting pressure locally upon the back of the plate, in close proximity to the shaving knife, by a plurality of independent pressure devices, for assisting the knife in forcing the unsupported parts of the plate away from its edge during the shaving action and finally subjecting the plate and matrix to heat and pressure to form permanently the desired depressions and elevations in the face of the plate.

5. In the process of treating printing plates, mechanically producing in the printing face of a plate depressions and elevations at predetermined places where the printing is to be respectively light and heavy, comprising subjecting the back of the plate to the action of a shaving knife and exerting pressure locally along the back of the plate, in close proximity to the shaving knife.

6. In the process of treating printing plates, mechanically producing in the printing face of a plate depressions and elevations

tions at predetermined places where the printing is to be respectively light and heavy, comprising subjecting the back of the plate to the action of a shaving knife and
5 exerting pressure locally along the back of the plate, in close proximity to the shaving knife, by means of a plurality of independent pressure devices.

In testimony, that I claim the foregoing as my invention, I have signed my name in 10 presence of two witnesses, this 23rd day of June 1909.

MILTON ABBOTT McKEE.

Witnesses:

H. D. JAMESON,
A. NUTTING.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."
