

No. 670,219.

Patented Mar. 19, 1901.

E. I. BELL.
STONE SAWING MACHINE.

(Application filed Jan. 23, 1900.)

2 Sheets—Sheet 1.

(No Model.)

Fig. 2.

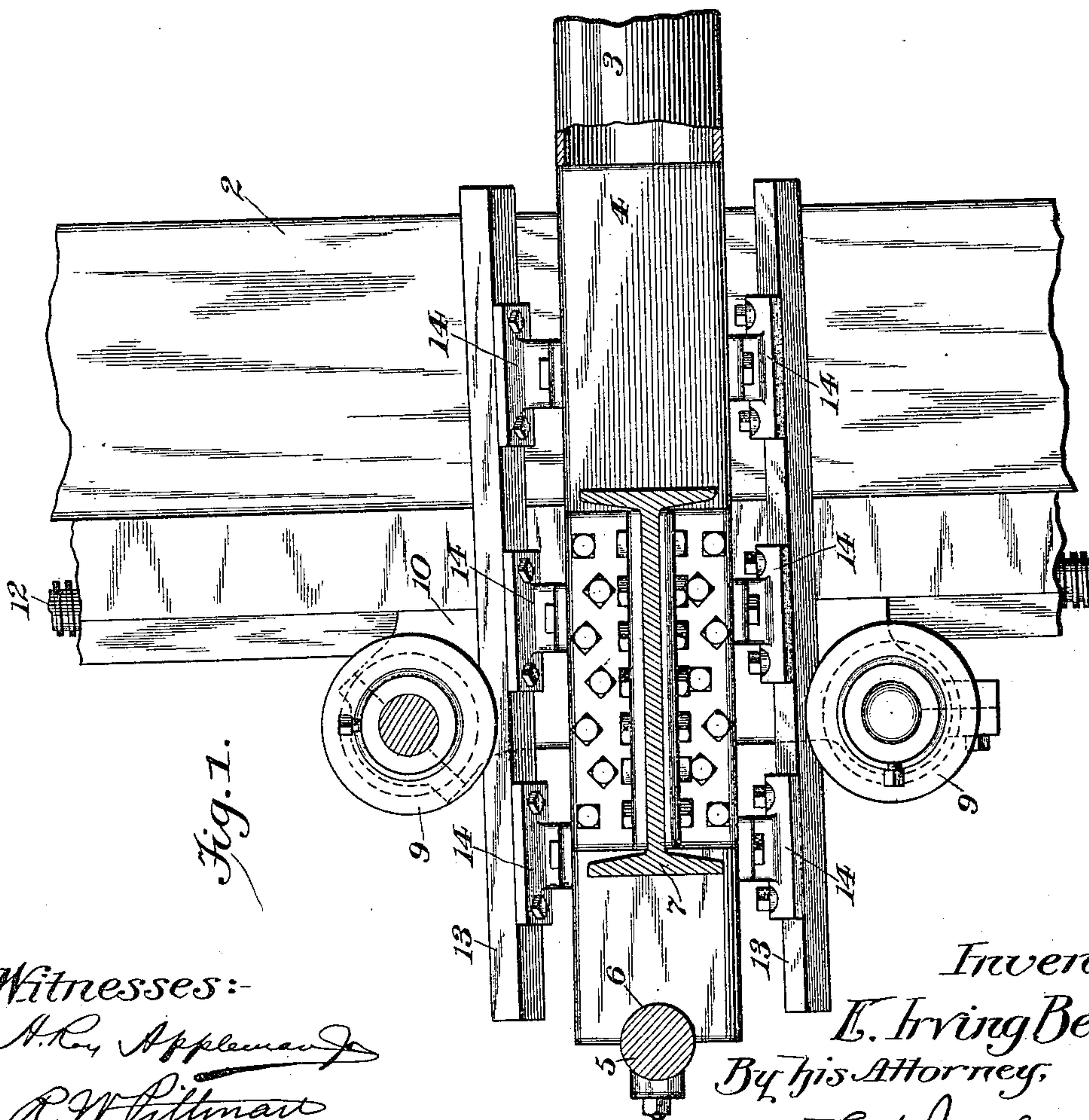
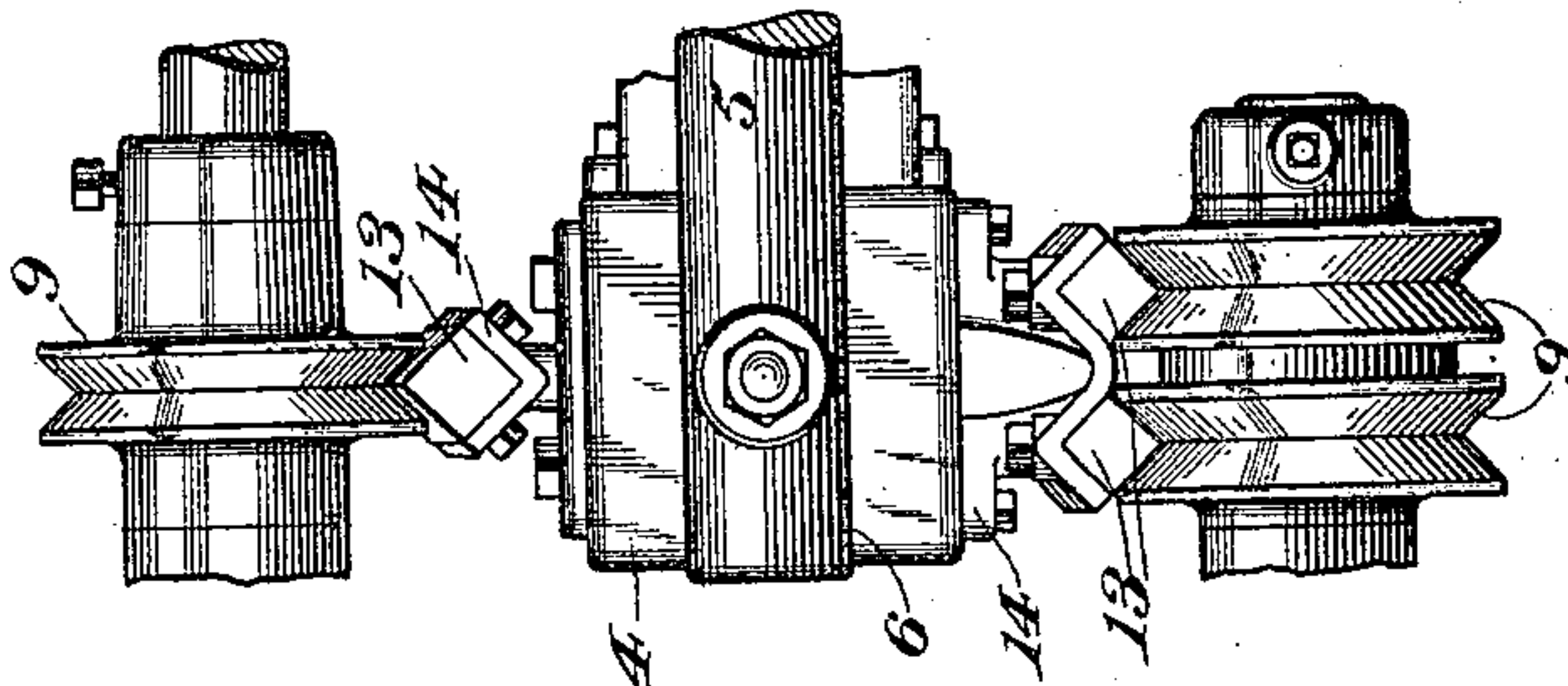


Fig. 1.

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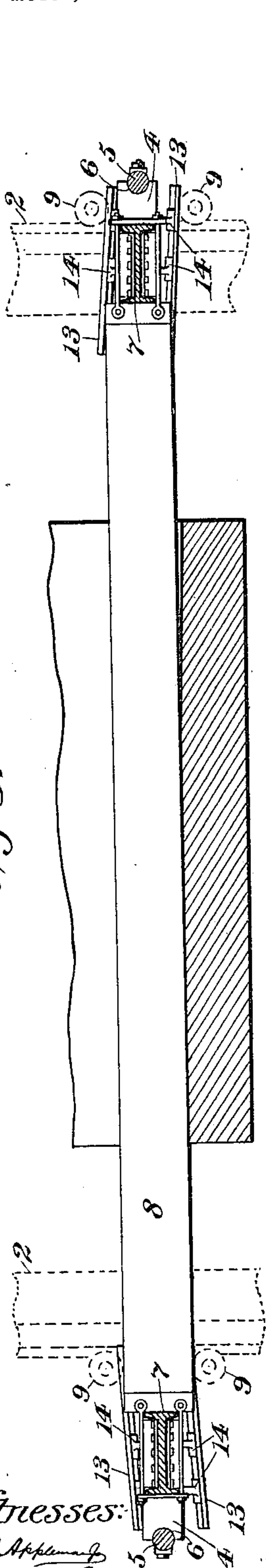
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Fig. 3.

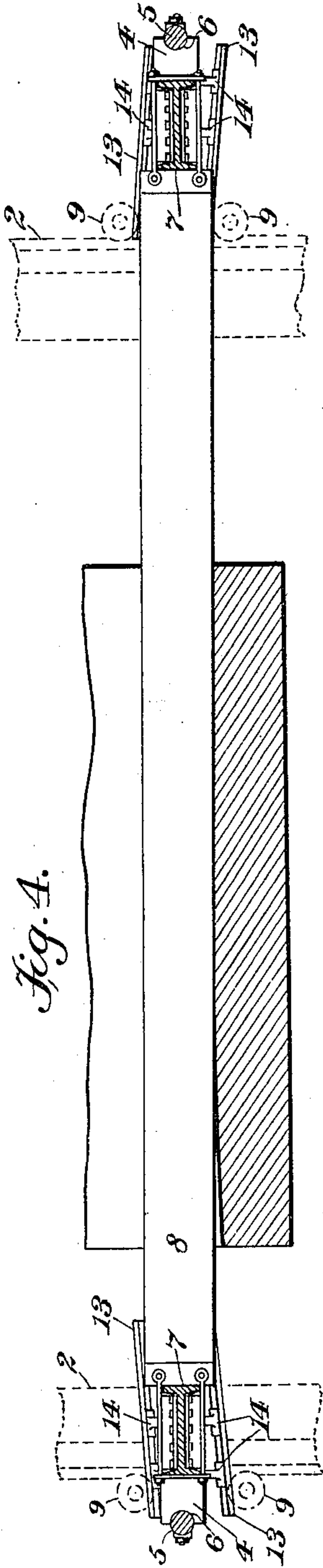


Witnesses:

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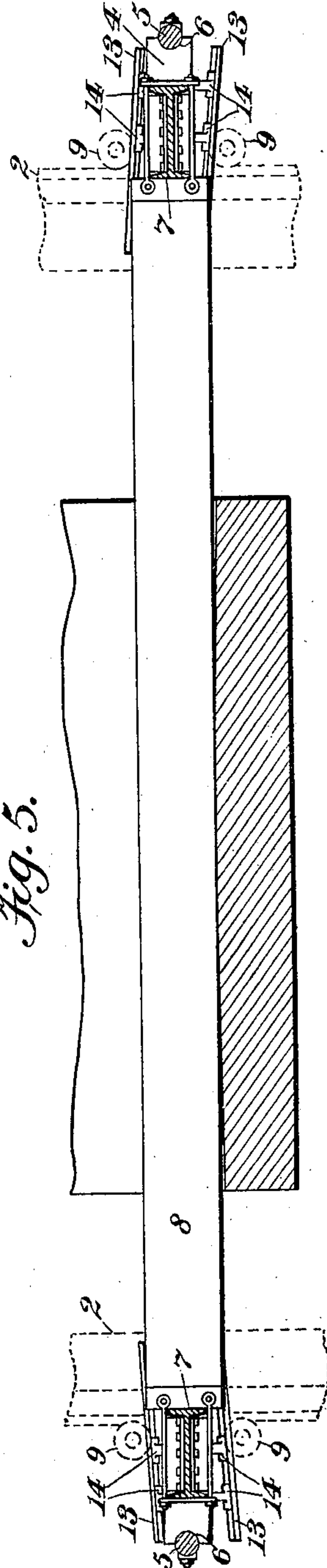
R. W. Holtman

Fig. 4.



By his Attorney

Fig. 5.



Inventor,

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UNITED STATES PATENT OFFICE.

EDWIN IRVING BELL, OF PORTLAND, CONNECTICUT, ASSIGNOR TO THE
PATENT DIAMOND GANG SAW COMPANY, OF SAME PLACE.

STONE-SAWING MACHINE.

SPECIFICATION forming part of Letters Patent No. 670,219, dated March 19, 1901.

Application filed January 23, 1900. Serial No. 2,444. (No model.)

To all whom it may concern:

Be it known that I, EDWIN IRVING BELL, a citizen of the United States, residing in Portland, in the county of Middlesex and State of Connecticut, have invented certain new and useful Improvements in Stone-Sawing Machines, of which the following is a specification.

This invention relates to stone-sawing machines, one object being to provide an improved machine of this character in which the saw or saws will have a rising-and-falling movement and which rising-and-falling movement will be secured other than by the provision of a swinging frame or instrumentality.

A further object of the invention is to provide an improved stone-sawing machine in which the feeding of the granular material by means of which the sawing is effected and the sawing operation will proceed substantially simultaneously, such feeding taking place at one part of the work, while the sawing is proceeding at another part of such work.

In the drawings accompanying and forming part of this specification, Figure 1 illustrates one part—as, for instance, one corner—of that form of stone-sawing machine shown and described in the patent of Frederick W. Shetleworth, No. 632,000, dated August 29, 1899, provided with this improvement. Fig. 2 is an end view of the supporting-rolls and tracks shown in Fig. 1 looking from left to right in said figure; and Figs. 3, 4, and 5 are views illustrating the operation of a saw and its carrier when the machine is constructed in accordance with the present invention, the work under treatment being illustrated in section.

Similar characters of reference designate like parts in all the figures of the drawings.

In the ordinary swinging-frame stone-sawing machine the blades are held in a frame which is suspended so as to have a slight rising-and-falling movement during the horizontal stroke of the saw-blades in the block of stone. When the blades rise at each end of the stroke, the granular material by which the sawing is effected works down under the lower edge of the saw-blade at such end ready for use on the return stroke of the blade. When this return stroke begins, the saw-blade

gradually lowers, owing to the action of the swinging suspension-links, thereby bringing the rolling granular particles between the lower edge of the saw-blade and the stone, and so operates to crush or wear away the stone, this being the method of sawing the blocks of material. In sawing by this method it will be observed that the working period of the stroke is limited to the middle part of the movement of the saw-blade, which by rising at each end of its stroke permits the feeding at such end. In other words, the feeding of the granular material to the saw-blades occurs at intervals between the successive sawing actions of the blades. Moreover, in the ordinary swinging-frame stone-sawing machine the sawing action is from the ends of the work toward the center. Consequently when the granular material has been fed at the ends of the work it is carried along with that portion of the saw with which they first come into engagement toward the center of the work, so that when the end of the saw has descended sufficiently to saw the stone all the granular particles have been carried toward the center and from such end of the work, so that the saw has little effect on the stone, and consequently requiring a considerable period of time to perform work which might be accomplished in much less time if the granular particles fed at the ends of the work were permitted to remain in position to coöperate with the saw when the same descended into position to engage the work.

The object of the present improvement, therefore, is to provide a stone-sawing machine in which the saw or saws will be supported for rising-and-falling movement without the use of a swinging frame and which saw, moreover, in one form thereof is so supported that it will work from the center toward the ends of the work, so that when one part of the saw is out of its sawing position and the granular material is fed at this point such material will coöperate with the saw throughout its entire sawing movement and will be rolled from the center toward the end of the block instead of vice versa, and thus will furnish a supply for the saw-blade during the entire stroke of the saw, thereby prolonging the sawing action to the limit of the

blade-stroke, so that in this way that part of the blade which last acts upon the block during a given cut comes to its final position already supplied with granular material which
 5 has been in place at a point more remote from the end of the block. These objects are accomplished in the present instance by the provision of an improved saw-supporting means, and since this supporting means can be applied to stone-sawing machines now in existence, it being shown herein in connection with that character of machine set forth in the patent above referred to, only a general description is deemed necessary of those parts not
 10 essential to the present movement, reference being made to such patent for a more detailed description of one form of machine which could be furnished with this improvement.

The saw-supporting frame or carrier may be supported by any suitable framework adapted for the purpose and usually comprises four upright posts or beams 2, one adjacent to each corner of the frame and one of which is shown herein, and which posts are secured together
 25 at their lower and upper ends by suitable cross-beams. The saw-frame may comprise a pair of side bars 3, the major portions of which may be tubular and provided with squared ends 4, which ends may be formed with or separate from such tubular portions. The side bars are connected by transverse bars 5, seated and bolted in concaved recesses 6 of the side bars.

The saw-frame is provided adjacent to each end thereof with means for supporting one or more saw-blades and which means in the present instance comprises a pair of I-beams 7, the ends of which are bolted to the side bars. To these I-beams are secured the saw-blades
 40 8, of which there may be any desired number, usually comprising a gang thereof, and which saw-blades may be assembled with the I-beams in such manner as to be adjustable thereon.

Some suitable means, designated herein as bearings, may be provided for supporting the saw-frame; but in the present instance this means comprises a plurality of sets of rolls or roll-surfaces 9, usually comprising four sets,
 50 one set located adjacent to each corner of the saw-frame, suitable means being provided for supporting each set of rolls—such, for instance, as a traveling block 10, carried by each of the upright posts, and which blocks slide upon a suitable track or way formed on the upright beam.

For adjusting each block a screw 12 may be provided, and which screws are connected by suitable gearing whereby all may be operated simultaneously to raise or lower the blocks and the saw-frame supported thereby. The supporting-rolls 9 may be of any suitable form and assembled in any desired way; but in the form shown each set comprises a plurality of rolls or roll-surfaces so organized
 65 that they constitute a three-point bearing.

For engagement with the rolls the saw-

frame is provided with tracks—such, for instance, as rails 13—and since in the present instance each set of rolls is shown comprising three each set of tracks likewise comprises a corresponding number, being of sufficient length to permit the necessary sawing movement. The tracks are shown supported on the side bars by suitable brackets 14, one of each set at the upper side and two thereof at the under side of each side bar, the tracks being so disposed that they will conform to the shape of the rolls, which are shown herein as V-shaped. It is to be understood, however, that the present object could be accomplished by the provision of rolls of a different construction and with a less number and assembled in an entirely different manner, if desired, and when a less number of rolls is provided it follows that a less number of tracks is necessary.

To secure the rising-and-falling movement of the saw-blades, the tracks are shown assembled with the saw-frame in such manner that they are located at an angle to the side bars, the tracks of each set being in parallelism with each other, while each is angularly disposed relatively to its side bar. In the form shown the tracks at each end of the saw-frame are inclined upwardly from their outer to their inner ends.

From the foregoing it will be seen that on the reciprocation of the saw-frame, by some suitable means provided for this purpose, the saw-blades will have a rising-and-falling movement, (see Figs. 3, 4, and 5,) since when the saw is reciprocated from the position shown in Fig. 3, in which one end is raised and the other performing work, to the position shown in Fig. 4 it will be seen that the angular disposition of the tracks forces that end of the saw which was previously raised into engagement with the work, while that end of the saw which was working is raised, so that during the sawing operation the blades are given a rising-and-falling movement, one end of the saw being raised while the other is lowered, and vice versa, such blades working from end to end of the stone and from the center toward the ends.

It will of course be understood that the tracks may be disposed in different angular positions, if desired—as, for instance, they may be inclined downwardly from their outer to their inner ends at each end of the frame, and that the tracks could be secured in the manner indicated to the framework while the saw-frame carried the rolls without departing from the scope of the invention.

From the foregoing it will be seen that each blade has corresponding with its reciprocatory movement a rising-and-falling movement, one part of the blade descending into the work while the other part of the blade is carried out of engagement therewith during each time the feeding of the granular materials into the cut takes place, whereby on the return stroke of the blade the action of such

blade relatively to such material is from the center of the work toward the ends, so that one end of the blade is lifted from the stone as the contacting surface of the blade moves along the stone toward the opposite end thereof, so that the saw is supplied with granular material at one part of the block while the sawing action is proceeding at another part, so that both go on substantially simultaneously, thus saving much loss of time and increasing the efficiency of the machine.

An important advantage in the organization above described is that owing to the particular manner of operating the saw the material is fed under one part of the saw-blade when the opposite part thereof is drawn into the block, so that on the succeeding stroke of the saw-blade the fresh material will be rolled outwardly toward the end of the block from the center, while the material from the previously-worked end will be rolled toward the center, and thus furnish a supply for the saw during the entire stroke of the blade, and so prolong the sawing action to the limit of the blade-stroke. In this way that part of the blade which acts last upon the block during a given cut comes to its final position already supplied with granular material and which has been in place at a point more remote from the end of the block. By this means one of the most serious defects of operating stone-saws is overcome.

In the present method no part of the blade is brought in contact with the stone without first being supplied with granular material, since the blades work outwardly from the center toward the ends instead of oppositely thereto, so that the granular material is not worked away from the ends by that part of the saw which first comes into contact with the material.

In conclusion I desire to state that various means may be used for carrying the saw or saws in place of the character of frame shown herein and that the term "frame" or "carrier" as used in the claims is to be interpreted to mean some suitable means adapted for the purpose.

Having described my invention, I claim—
1. In a stone-sawing machine, the combination of a saw-carrier supporting one or more saws; means for supporting said saw or saws for rising-and-falling movement during the engagement of the saw or saws with the work whereby the feeding of granular material to the work is permitted simultaneously with the sawing of such work, the organization being such that the working stroke of the saws will be from the center toward the ends of the work; and means for reciprocating said saws in a longitudinal direction.

2. In a stone-sawing machine, the combination of a saw-carrier supporting one or more saws; angularly-located means for supporting said saw or saws for rising-and-falling movement during the engagement of the saw or saws with the work whereby the feeding of

the granular material to the work is permitted simultaneously with the sawing of such work, the working stroke of the saw or saws being from the center toward the ends of the work; and means for reciprocating said saws in a longitudinal direction.

3. In a stone-sawing machine, the combination of a supporting-frame; a saw-frame carrying one or more saws; bearings secured to one of said frames; angularly-located means secured to the other of said frames, the organization being such that during the engagement of the saw or saws with the work one part of the saw or saws is raised while another part thereof is lowered, thereby to impart a rising-and-falling movement to said saw or saws whereby the feeding of granular material to the work is permitted simultaneously with the sawing of such work; and means for reciprocating said saws in a longitudinal direction.

4. In a stone-sawing machine, the combination of a saw-carrier; a saw supported thereby; bearings for supporting said carrier; angularly-disposed means secured to said carrier and in engagement with said bearings and effective to raise one part of said carrier while another part thereof is simultaneously lowered, thereby to impart a rising-and-falling movement to said carrier during each working stroke of the saw, whereby the feeding of granular material to the work is permitted simultaneously with the sawing of such work; and means for reciprocating said saw in a longitudinal direction.

5. In a stone-sawing machine, the combination of one or more saws; means for supporting said saw or saws and comprising devices having inclined faces; means in engagement therewith throughout the entire sawing stroke of said saw or saws whereby a rising-and-falling movement is imparted to said saw or saws and whereby the feeding of granular material to the work is permitted simultaneously with the sawing of such work; and means for reciprocating said saw or saws in a longitudinal direction.

6. In a stone-sawing machine, the combination of a saw-carrier; one or more saws carried thereby; means, having inclined faces, secured to said carrier; bearings in engagement with said inclined faces for imparting a rising-and-falling movement to the saw or saws during the engagement thereof with the work whereby the feeding of granular material to the work is permitted simultaneously with the sawing of such work; and means for reciprocating said saws in a longitudinal direction.

7. In a stone-sawing machine, the combination of a saw-carrier carrying a saw; means for supporting said carrier and comprising bearings and tracks, the latter inclined upwardly from their outer to their inner ends and in engagement with said bearings to impart a rising-and-falling movement to said saw during the engagement of the saw with

the work whereby the feeding of granular material to the work is permitted simultaneously with the sawing of such work; and means for reciprocating said saw in a longitudinal direction.

8. In a stone-sawing machine, the combination of a saw-carrier carrying a saw; tracks secured to said carrier and inclined upwardly from their outer to their inner ends; bearings in engagement with said tracks during the entire sawing stroke of said saw whereby a rising-and-falling movement is imparted to the saw and whereby the feeding of granular material to the work is permitted simultaneously with the sawing of such work; and means for reciprocating said saw in a longitudinal direction.

9. In a stone-sawing machine, the combination of one or more saws; inclined rails located in position to impart to said saw or saws a rising-and-falling movement during the engagement of the saw or saws with the work whereby the feeding of granular material to the work is permitted simultaneously with the sawing of such work; and means for reciprocating said saw or saws in a longitudinal direction.

10. In a stone-sawing machine, the combination of a saw-carrier having one or more saws secured thereto; means for supporting said saw or saws for rising-and-falling movement during the engagement of the saw or saws with the work whereby the feeding of granular material to the work is permitted simultaneously with the sawing of such work, said means comprising bearings and a plurality of sets of tracks, each track disposed at an angle to the saw or saws and coacting with said bearings; and means for reciprocating said saw or saws in a longitudinal direction.

11. In a stone-sawing machine, the combination of a saw-carrier carrying a saw; a plurality of sets of tracks having inclined faces secured to said carrier; bearings in engagement with said tracks during the engagement of the saw with the work whereby a rising-and-falling movement is imparted to the saw and whereby the feeding of granular material to the work is permitted simultaneously with

the sawing of such work; and means for reciprocating said saw or saws in a longitudinal direction.

12. In a stone-sawing machine, the combination of a saw-carrier; a saw supported thereby; means for supporting said carrier and comprising two sets of tracks, each set comprising a track above and one or more below the carrier and each having an inclined face; means in engagement with the inclined faces of said tracks throughout the entire sawing stroke of the carrier whereby a rising-and-falling movement is imparted to said saw and whereby the feeding of granular material to the work is permitted simultaneously with the sawing of such work; and means for reciprocating said saw in a longitudinal direction.

13. In a stone-sawing machine, the combination of a saw-carrier; a saw supported thereby; a plurality of sets of tracks secured to said carrier, each set having a plurality of tracks on one side of said carrier and a single track at the opposite side thereof, and each having an inclined face; bearings for supporting said tracks and coacting with the inclined faces thereof throughout the entire sawing movement of said saw to impart a rising-and-falling movement to the saw whereby the feeding of granular material to the work is permitted simultaneously with the sawing of such work; and means for reciprocating said saws in a longitudinal direction.

14. In a stone-sawing machine, the combination of a saw-frame carrying one or more saws; a track located adjacent to each corner of said frame and having its face located at an angle to said frame; bearings in engagement with said tracks whereby the saw or saws during their engagement with the work move in a curvilinear path and whereby the feeding of granular material to the work is permitted simultaneously with the sawing of such work; and means for reciprocating said saws in a longitudinal direction.

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Witnesses:

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