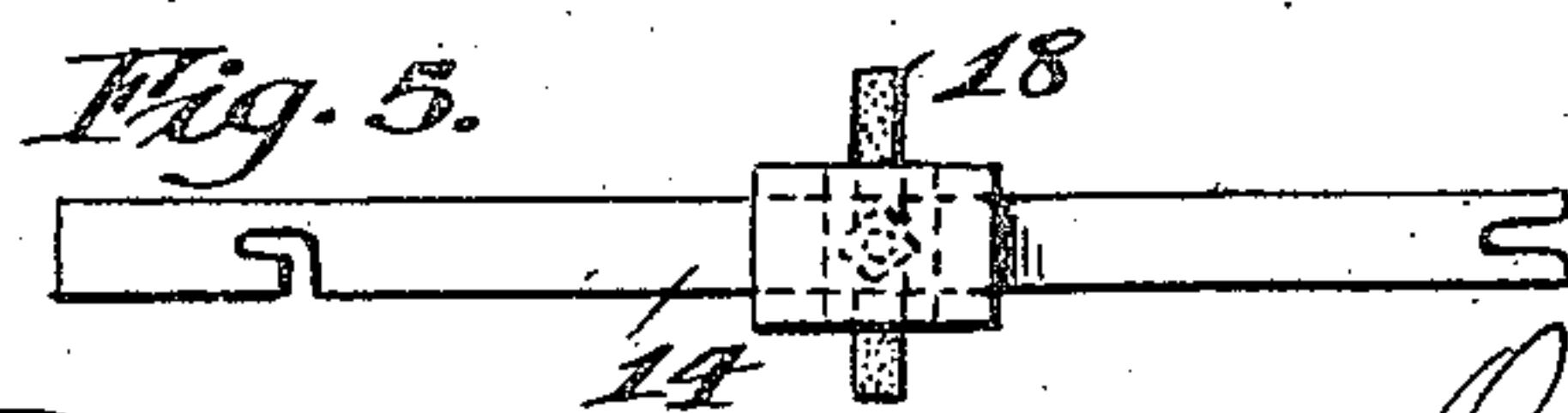
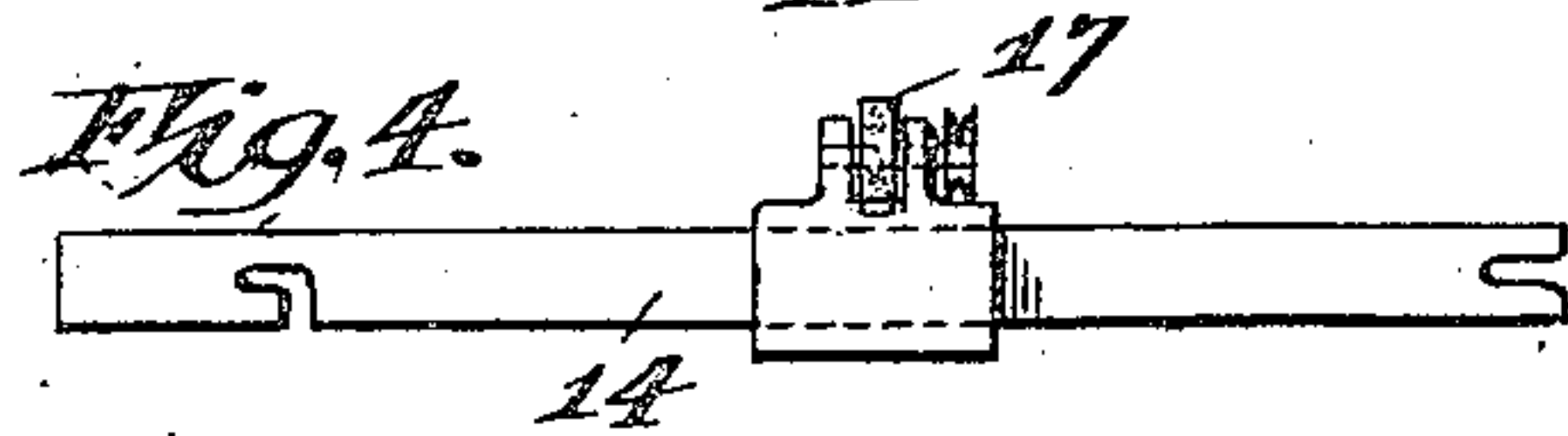
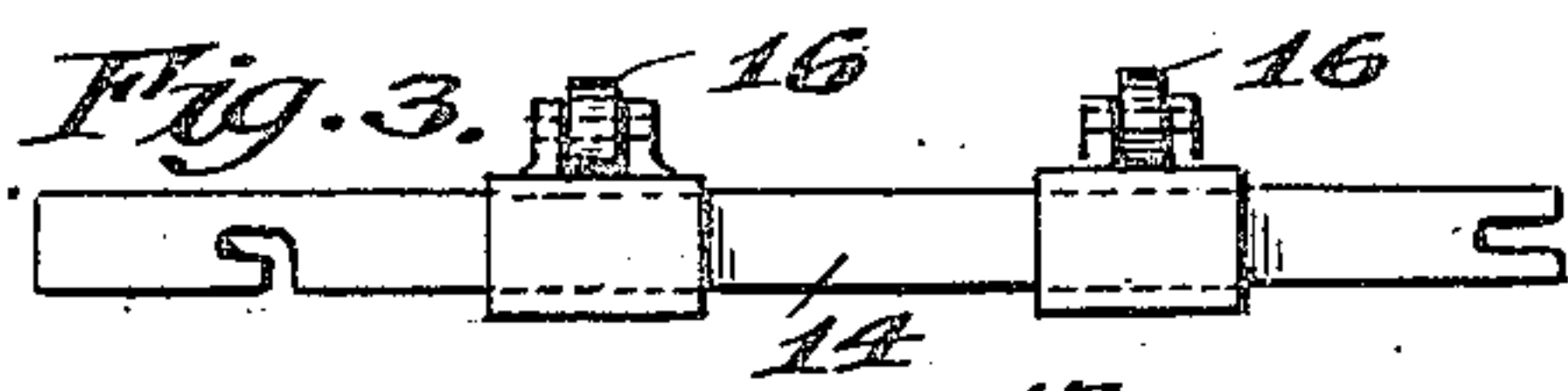
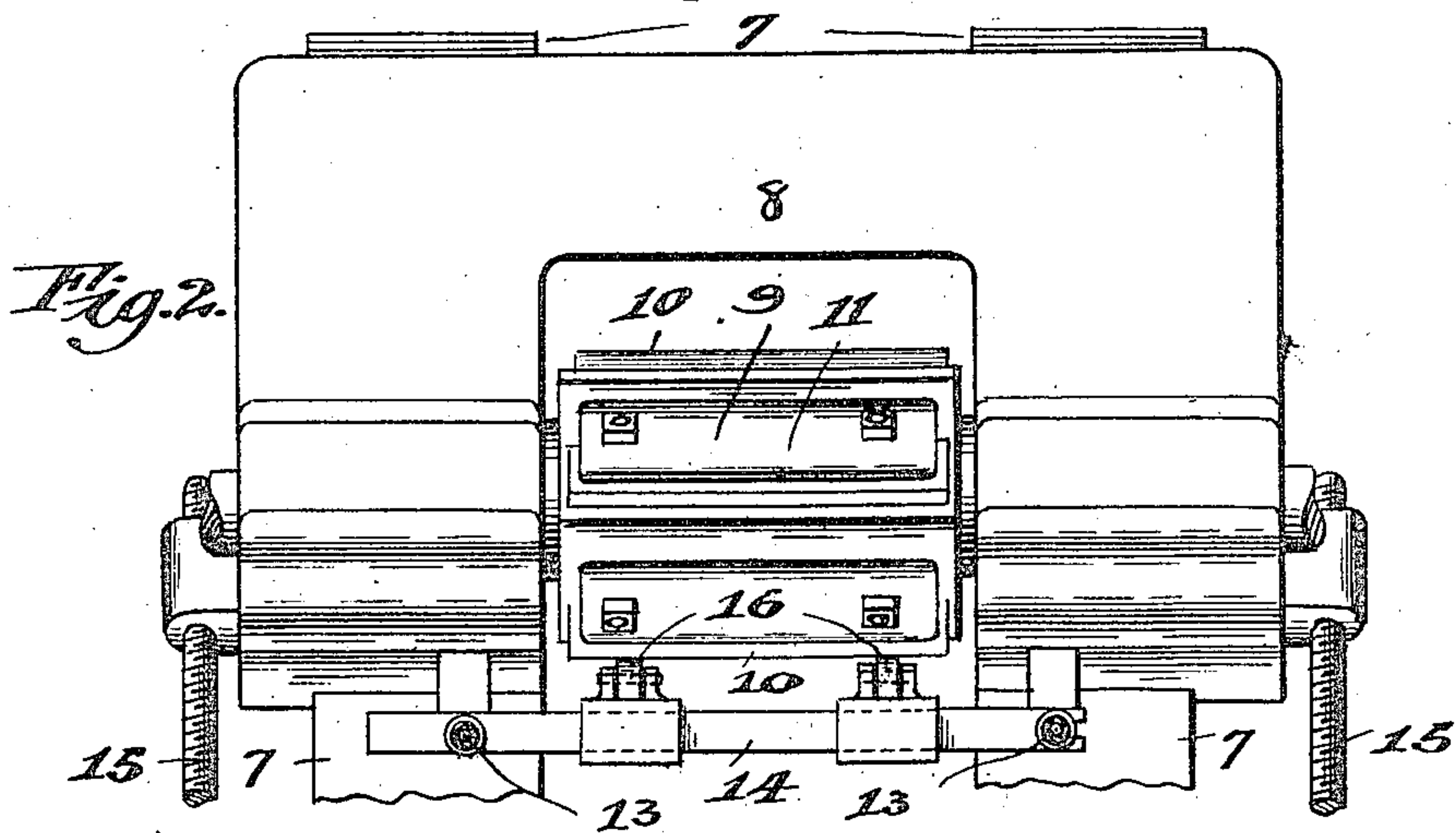
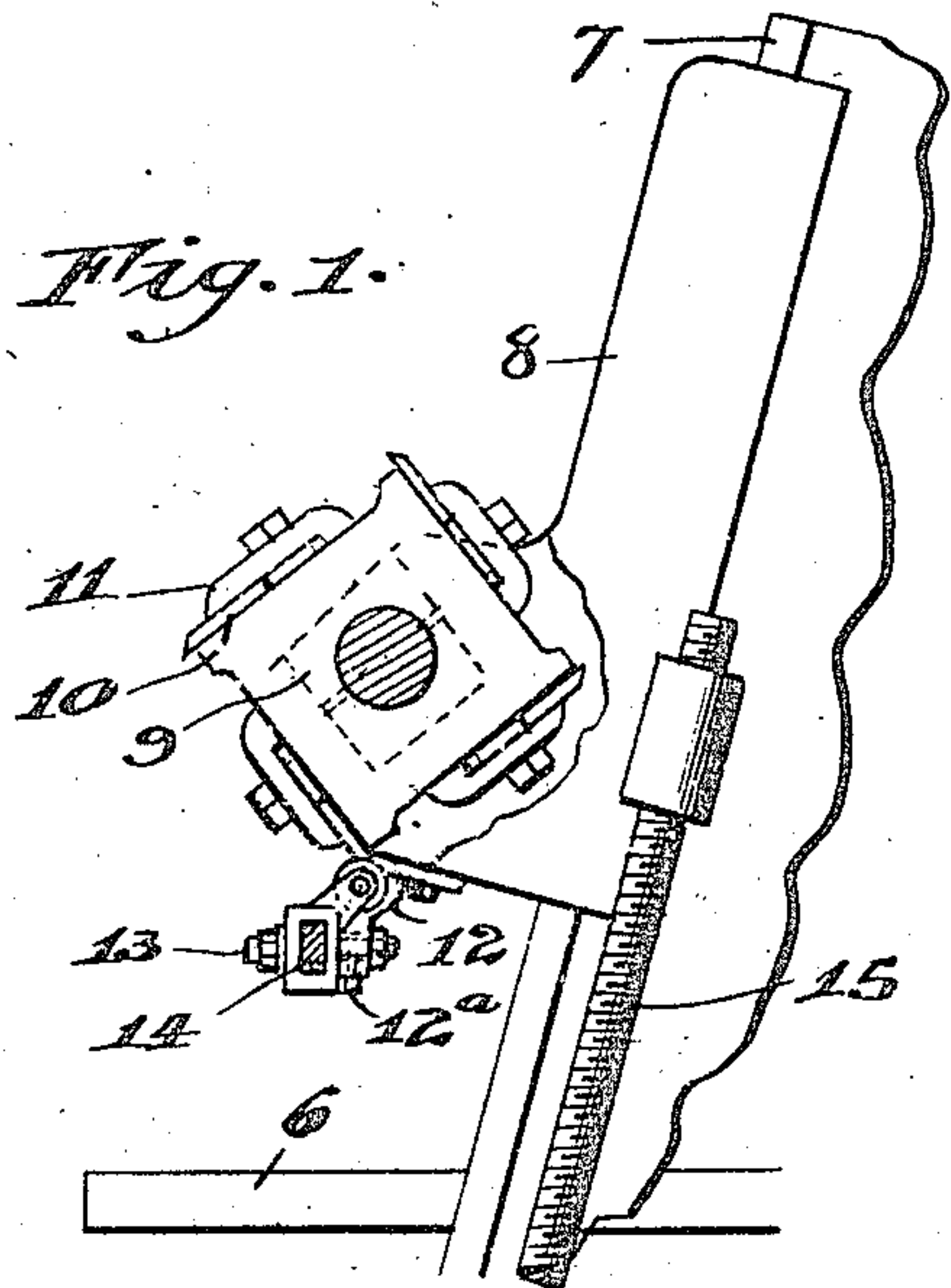


O. B. OSBORN.  
 ADJUSTING AND GRINDING PLANER KNIVES.  
 APPLICATION FILED SEPT. 18, 1908.

993,398.

Patented May 30, 1911.



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# UNITED STATES PATENT OFFICE.

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## ADJUSTING AND GRINDING PLANER-KNIVES.

993,398.

Specification of Letters Patent.

Patented May 30, 1911.

Application filed September 18, 1908. Serial No. 453,595.

*To all whom it may concern:*

Be it known that I, OZRA BURR OSBORN, of the city of Beloit, county of Rock, and State of Wisconsin, have invented certain  
5 new and useful Improvements in Adjusting and Grinding Planer-Knives, of which the following is a specification.

Planer knives are adjustably mounted upon a cutter head carried in boxes mounted  
10 on slides of the planer frame. These knives are thin blades of steel, beveled to a cutting edge, and are usually four in number, being mounted to project when in working position beyond the four corners of the rectan-  
15 gular head.

To the production of good work it is essential that the cutting edge of the knife should maintain a uniform distance from the face of the planer bed, so as to act upon  
20 the lumber uniformly and reduce it to a uniform thickness. To secure this adjustment requires very great care and such nicety of manipulation that it is impossible to obtain even an approximately correct adjust-  
25 ment without the aid of a special device usually called a knife gage. These gages are constructed in a variety of ways, the most efficient form of construction employing rollers mounted upon a support capable of be-  
30 ing swung around the cutter head or stationarily mounted to contact the several knives as the cutter head is slowly rotated past the gage rollers. With this form of gage reasonable accuracy in the adjustment  
35 of the knives can be secured in the initial setting. The setting of the knives and the passing of them over the gage rollers dulls the knife edges somewhat and it is necessary after the knives have been set that they shall  
40 be ground before they are used and of course they become dulled in use and have to be re-ground, which can be done without removing them from the cutter head. To perform this operation various kinds of grinders  
45 have been proposed, the most efficient one comprising a rotating emery wheel mounted to travel upon its support and reciprocating thereon parallel to the cutting edge of the knife. It is found that after the knives  
50 have been adjusted and ground (the adjust-

ing being performed while the cutter head is rotated by hand, and the grinding while the cutter head is held stationary), that when the machine is in practical use and the cutter head rotating at a high speed, say  
55 several thousand revolutions per minute, a variation from the original adjusted position of the cutting edges of the knives will develop. These variations develop in vari-  
ous high speed machines, such as cream sep-  
60 arators, steam turbines and the like, and in a planing machine produce very undesirable results because unless the knives be adjusted to an absolutely uniform distance from the planer bed they will cut different  
65 depths, thus producing in the finished stock waves or ridges instead of a perfectly smooth or even surface. It is not important to consider to what this variation is due, but I assume it is due to the fact that the  
70 cutter head, under a high speed of rotation, and by reason of imperfect balance, finds a new center of rotation, thus frequently resulting in causing the knives to cut to un-  
equal depths and possibly also resulting in  
75 one knife cutting at unequal depths at different points. This objection it has been heretofore sought to overcome by running the cutting edges of the knives at high speed over a block of emery thus truing the edges  
80 of the knives with the planer bed. This operation is usually performed by mounting the support for the emery block either upon the frame of the machine or upon the boxes carrying the cutter head and giving the  
85 block a traverse. With all of these appliances above described it has been found impossible heretofore to secure even substantial accuracy and uniformity in the action of the knives upon the lumber and this is  
90 due mainly to the fact that heretofore the adjusting and grinding mechanisms have been positioned with reference to the cutter head, and as the head is frequently out of parallelism with the planer bed or platen  
95 irregularities are introduced by the very operations which have for their purpose to correct them.

Assuming that the knives have been ad-  
justed by the most efficient form of gage 100



known and have been ground or sharpened by the best form of grinding mechanism, it is obvious that unless the adjusting mechanism and the grinding mechanism operate absolutely on the same line, the grinding introduces inequalities which it is impossible to correct by the so-called jointing operation with the emery block, because it is impracticable to take off anything substantial by this operation without destroying the necessary clearance provided in the grinding of the knives.

The object of my invention is to provide a means and method for adjusting, grinding and jointing planer knives with absolute uniformity, and the basis of my improvement is the conception that these various operations must be performed by mechanisms which are positioned with reference to the planer bed or platen and that the gage, grinding wheel and jointer must act from the same point of support.

As a means to this end, my invention contemplates the mounting of the gage or adjusting mechanism, the emery wheel or grinding mechanism, and the emery block or jointing mechanism, upon a support or supports capable of being accurately placed at a given distance from the planer bed or platen and the operation of these several devices at such fixed and uniform distances from the bed or platen so that irrespective of any wear in the bearings of the cutter head or its variation from the original position, the knives may always be perfectly lined up with the bed or platen, resulting in their uniform action upon the surface of the material and a reduction of the material to an absolutely uniform thickness.

Specifically, my invention is preferably carried out by means of studs or supports mounted upon the boxes or bearings of the cutter head and affording a convenient means for determining their correct position with reference to the bed or platen, and the mounting upon said studs so fixed and positioned, of a bar or other support carrying the gage rolls, emery wheel and emery block. The same bar may be used as a support for these various devices, or each of them may be provided with its own bar or support, the essential thing being that these various devices shall be so mounted that they shall all act at the same distance from the bed or platen of the machine. It is obvious, therefore, that the principle of my invention may be embodied in various ways, but I have indicated diagrammatically in the accompanying drawings means for carrying out my invention, in which—

Figure 1 is an elevation showing the planer head in end view, with the support bar and one of its studs. Fig. 2 is a front view of the same, showing both of the studs and the bar in front elevation. Figs. 3, 4,

and 5 show the support bar with the various mechanisms cooperating therewith, viz: the gage wheels being shown in Fig. 3; the emery wheel in Fig. 4; and the emery block or jointing mechanism in Fig. 5.

In the drawings 6 represents the bed of the machine; 7 the cheek piece or slide; 8 the cutter head yoke carrying the boxes for the cutter head shaft; 9 the cutter head; 10 the knives thereof, and 11 the knife holders. From the lower side of the cutter head yoke depend the lugs 12 in which are mounted studs 13 and on which studs is mounted the support bar 14 for carrying the various mechanisms acting on the knives.

By means of the screws 15 the yoke is adjusted for various thicknesses of lumber and by means of a set screw 12<sup>a</sup> the studs may be adjusted to the proper position with reference to the platen and this position being once fixed it is obvious that the several devices mounted on said studs will always operate at uniform distances from the same surface.

In Fig. 3 I have indicated at 16 gage rolls mounted on the bar 14, said gage rolls serving to position the knives as they are turned with the edges of the knives against the faces of these rolls. In Fig. 4 I have indicated at 17 the emery wheel whereby the edges of the knives may be ground, and in Fig. 5 I have indicated at 18 the emery block whereby the edges of the knives may all be jointed; this latter operation being performed while the cutter head is being rotated at full speed. The details of these several mechanisms and their combination except to the extent hereinafter indicated in the claims, are not of my invention and there may be substituted for these structural details any equivalent or suitable mechanisms.

It will be apparent that when the studs are brought to the proper position at uniform distances from the surface of the bed or platen, and the gage rolls are mounted on a bar or support carried by said studs, the knives will all be adjusted to a uniform distance from the surface of the bed or platen. Similarly the emery wheel being mounted on said previously positioned studs, the knives will be ground to the same line; and when the jointing operation takes place it will also true up the knives along the same line. Therefore the knives in the actual operation of the machine will cut uniformly and avoid the inequalities of surface in the lumber which accompany the usual operation of planing machines.

I claim:

1. The herein described method of adjusting and grinding planer knives which consists first in turning the knives slowly over stationary gage devices positioned at uniform distances from the bed or platen, then grind-



ing said knives by means of a grinding mechanism operating along the line to which the knives have been adjusted, and finally jointing said knives to the same line while rapidly rotating, substantially as described.

2. The herein described means for adjusting and grinding planer head knives comprising supports capable of being adjusted to equal distances from the bed of the planer, and means interchangeably mounted upon said supports for adjusting, grinding and jointing said knives, substantially as described.

3. The method of treating the knives of planer cylinders for the production of lumber of uniform thickness, which consists in positioning and loosely holding the knives on the cylinder with their cutting edges farther from the axis of the cylinder than their desired final positions, rotating said cylinder and knives, pushing said knives inwardly during such rotation and at that portion of the rotation in which they meet the work to the desired adjusted position with their cutting edges parallel to the surface of the planer-platen, stopping the rotation of said cylinder and knives, grinding the edge of each knife while in the same position that its adjustment occurred in parallelism with the platen, then rotating said cylinder and knives, and during such rotation jointing the edges of one or more of said knives while in that portion of their rotation in which they meet the work, substantially as described.

4. The method of treating the knives of planer cylinders for the production of lumber of uniform thickness, which consists in positioning and loosely holding the knives on the cylinder with their cutting edges farther from the axis of the cylinder than their desired final positions, rotating said cylinder and knives, pushing the latter inwardly during such rotation to adjusted positions parallel to the surface of the planer-platen, stopping the rotation of said cylinder and knives, and grinding the edges of the latter while in planing position and in parallelism with the platen, substantially as described.

5. The method of treating the knives of planer cylinders for the production of lumber of uniform thickness, which consists in positioning and loosely holding the knives on the cylinder with their cutting edges farther from the axis of the cylinder than their desired final positions, rotating said cylinder and knives, pushing the latter inwardly during such rotation and while in planing position to adjusted positions parallel to the surface of the planer-platen, rotating said cylinder and knives at full speed, and during such rotation jointing the edges of one or more of the knives while in planing position parallel to the platen, substantially as described.

6. The method of treating the knives of planer cylinders for the production of lumber of uniform thickness, which consists in positioning and loosely holding the knives on the cylinder with their cutting edges farther from the axis of the cylinder than their desired final positions, rotating said cylinder and knives, pushing the latter inwardly during such rotation while the knives are in planing position to adjusted positions with their edges parallel to the surface of the planer-platen by rollers mounted on the planer-frame, stopping the rotation of the cylinder and knives, grinding the edges of the knives while in planing position parallel to the platen by a grinder supported from the same points of suspension as said rollers, rotating the cylinder with its adjusted sharpened knives, and during such rotation jointing the edges of one or more of said knives when in planing position in parallelism with the platen by a jointer supported from the same points of suspension as the rollers and grinder, substantially as described.

7. The method of treating the knives of planer cylinders for the production of lumber of uniform thickness, which consists in positioning and loosely holding the knives on the cylinder with their cutting edges farther from the axis of the cylinder than their desired final positions, rotating said cylinder and knives, pushing the latter inwardly during such rotation and while in planing position to adjusted positions with their edges parallel to the surface of the planer-platen by rollers mounted on the planer-frame, stopping the rotation of the cylinder, and grinding the edges of the knives while in planing position parallel to the platen by a grinder supported from the same points of suspension as said rollers, substantially as described.

8. The method of treating the knives of planer cylinders for the production of lumber of uniform thickness, which consists in positioning and loosely holding the knives on the cylinder with their cutting edges farther from the axis of the cylinder than their desired final positions, rotating said cylinder and knives, pushing the latter inwardly during such rotation and while the knives are in planing position to adjusted positions with their edges parallel to the surface of the planer-platen by rollers mounted on the planer-frame, rotating the cylinder with its adjusted knives at full speed, and during such rotation jointing the edges of one or more of the knives while in planing position in parallelism with the platen by a jointer supported from the same points of suspension as the rollers and grinder, substantially as described.

9. The method of treating the knives of planer cylinders for the production of lum-



ber of uniform thickness, which consists in grinding the edges of the knives while in planing position parallel to the surface of the planer-platen by a grinder supported on  
5 the planer-frame, rotating the cylinder with its sharpened knives, and during such rotation jointing the edges of the knives in par-

allelism with the platen by a jointer supported from the same points of suspension as the grinder, substantially as described.

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