

C. L. GROHMANN.
HEAD CLAMPING MECHANISM.
APPLICATION FILED DEC. 7, 1908.

983,225.

Patented Jan. 31, 1911.

2 SHEETS—SHEET 1.

Fig. 1.

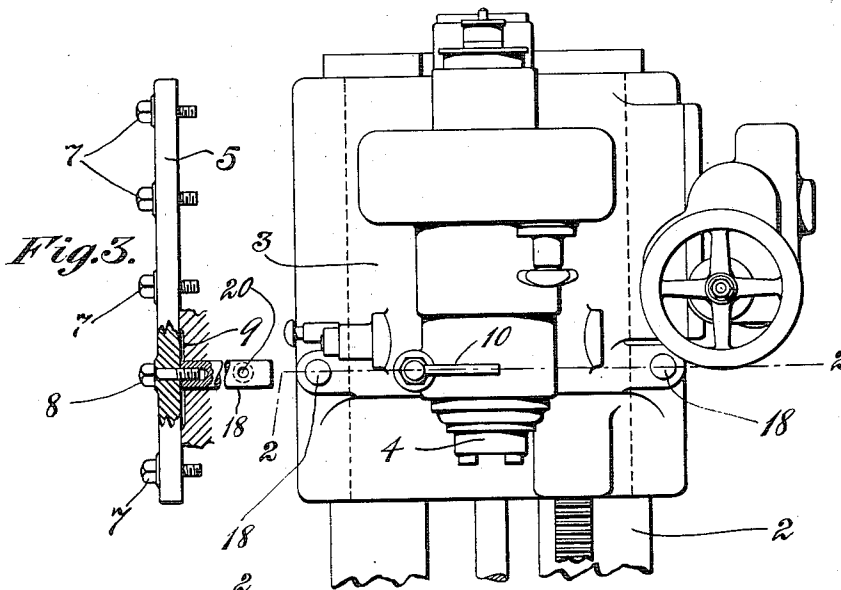


Fig. 3.

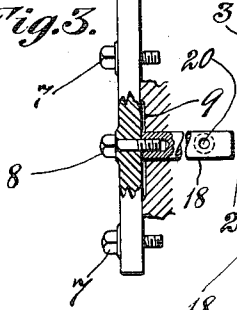
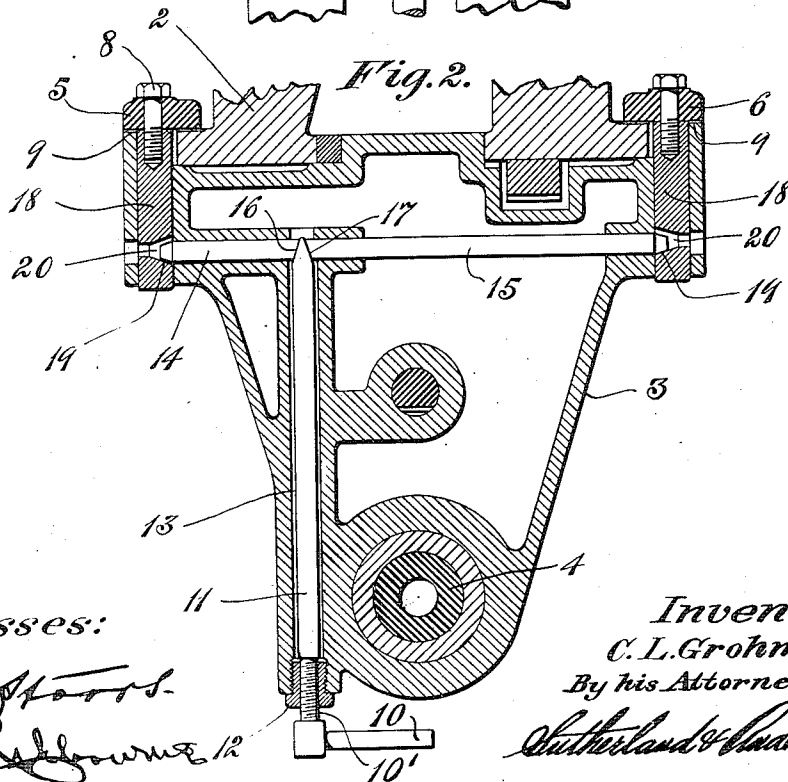


Fig. 2.



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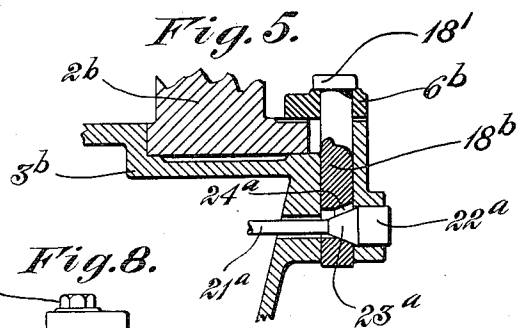
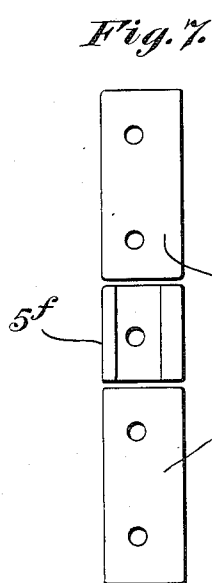
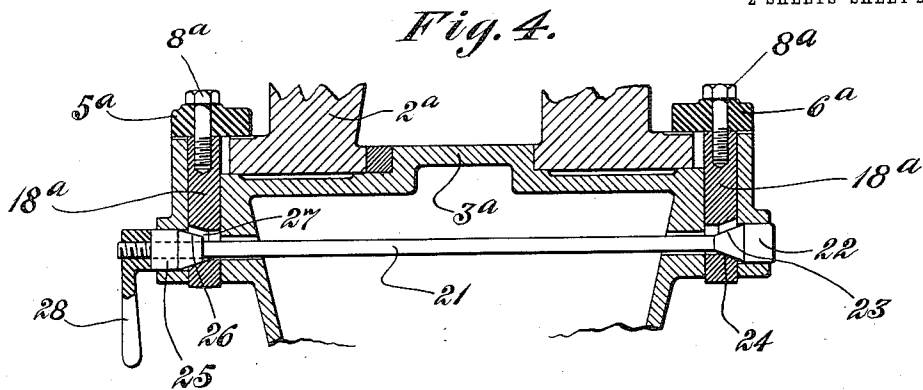
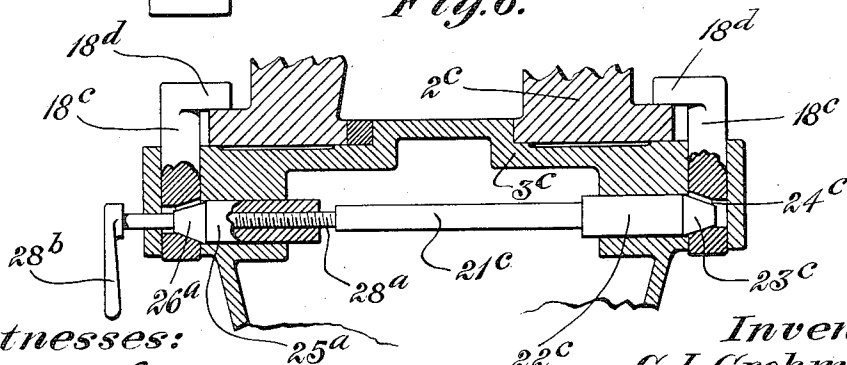


Fig. 6.



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UNITED STATES PATENT OFFICE.

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HEAD-CLAMPING MECHANISM.

983,225.

Specification of Letters Patent.

Patented Jan. 31, 1911.

Application filed December 7, 1908. Serial No. 466,273.

To all whom it may concern:

Be it known that I, CARL L. GROHMANN, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Head-Clamping Mechanism, of which the following is a specification.

This invention relates to head clamping mechanism and one of the primary purposes of the invention is to provide simple mechanism of the kind set forth for solidly and substantially holding a head or analogous part in an adjusted position and for also causing positively the simultaneous setting of a plurality of clamps from an actuator common to said clamps.

In the drawings accompanying and forming part of the present specification I illustrate in detail several forms of embodiments of the invention which to enable those skilled in the art to practice said invention will be fully set forth in the following description while the novelty of the invention will be included in the claims succeeding said description.

Referring to said drawings, Figure 1 is a front elevation of head clamping mechanism comprising my invention. Fig. 2 is a horizontal section on the line 2—2 of Fig. 1. Fig. 3 is a detail view of a clamp and certain adjunctive devices together with a portion of the head. Figs. 4, 5 and 6 are views corresponding substantially to Fig. 2 and each illustrates a modification although in said Fig. 5 only one side of the head and the devices thereat are shown. Fig. 7 is a side elevation of a still further modification, and, Fig. 8 is a face view of the same.

Like characters refer to like parts throughout the several figures.

There are in certain types of the machines to which allusion has been made, a column or similar support and a head or equivalent member movable thereon. It is assumed that the part 2 is such a column and that the part 3 is such a head. The head need not travel vertically in which event it would not be, strictly speaking, sustained by a column. Said head 3 serves as a suitable carrier for a tool (not shown). The tool-spindle is illustrated, being denoted in a general way by 4. The head though might constitute a carrier for the work.

The head 3 is supported by suitable ways or guides upon the column or support which are quite common in the machines to which I have referred and for this reason and for the further one that the same form no part of the present invention it is needless to describe them in detail.

The clamping mechanism preferably though not necessarily includes two clamping devices which may be made in several different ways but which advantageously consist of gibs. The gibs or clamping devices illustrated are denoted by 5 and 6 respectively and advantageously they have at all times a sliding contact or engagement with the column or support 2, their inner or active surfaces bearing against what is represented as the rear side or surface of said column. The head therefore when the gibs or clamping devices are in their inoperative positions can be readily raised and lowered. The gibs are connected to the head preferably in some positive but removable manner and several screws all of which are denoted by 7 satisfactorily answer such purpose. There may be any desired number of these screws. In addition to the attaching screws 7 there is a screw as 8 which does not serve such function but which performs a different office as will hereinafter more particularly appear. The clamping devices or gibs 5 and 6 overhang or overlap the support or column 2 and it will be evident that when they are strained or drawn into firm engagement with the said column the head will be held against movement in opposite directions. Preferably those portions of the sides of the head 3 opposite the screws 8 are rabbeted or cut away as at 9 which permits a flexing or bending of the clamping devices or gibs when pressure is applied thereto, to clamp the head. These rabbets or cut-away portions are exaggerated in the drawings; in practice they are hardly perceptible and it is possible that there are cases where their presence will not be necessary.

As will hereinafter appear I provide in connection with a pair of clamping devices of whatever character they may be, an actuator common to them both and means for transferring the effect of said actuator, which is usually manually-operable, to said clamping devices in unison the result being that the head can be quickly clamped in an

adjusted position. Preferably the means which simultaneously operates said clamping devices applies to them equal or uniform pressures so that the head will be held in such a steady, stable manner that there is no possibility of chattering—due to wobbling of the head. The said gibs or clamping devices are also substantially coextensive with or practically equal in length the height of the head so that when said clamping devices are in their releasing position they aid in accurately guiding the said head up and down.

The actuator for the two gibs or clamping devices may take several forms; that shown is denoted by 10 and consists of an arm or crank coöperative in some suitable manner preferably with a rod or shaft as 11 extending depthwise or from front to rear of the head. As will hereinafter appear this rod or shaft constitutes part of the means for transferring the effect of such actuator simultaneously to the two clamping devices or gibs 5 and 6. It will be seen that the actuator is shown as located at the front of the head so as to be easily and readily accessible to the attendant of the machine equipped with said head. When therefore it is necessary for such attendant either to clamp or release the head it is not necessary for him to walk back of the head or reach therearound to accomplish the results in question. It is quite common to provide separately-operated clamping devices for a machine head and it frequently happens that the attendant will only set one of said clamping devices from forgetfulness or other causes; in such an event vibration of the head naturally follows and the consequence is an inferior grade of product. I eliminate such a possibility by the present mechanism.

The rod or shaft 11 has an endwise or reciprocatory movement although the same is very slight and this action is accomplished by the actuator 10 which acts against the tail of said rod. The actuator 10 is shown as having a shank 10' threaded into a nut as 12 fixed, for example by threading in the outer end of the bore 13 in which said rod or shaft 11 is located. It therefore follows that when the actuator 10 is turned to the right its shank 10' is fed inward so as to impart an advancing movement or inward thrust to said rod 11. On the opposite motion of the actuator the rod can be backed to its original position. I prefer to employ said rod 11 for operating rod means and a cam action for this purpose is quite satisfactory. Said rod means is shown as consisting of two rods or bars as 14 and 15 extending transversely of the head 3. I use the expression "rod means" in a broad sense to include one or more rods. Said rods 14 and 15 when operated by the rod 11 set simultaneously the two clamping members or gibs 5 and 6. The rod serves as a suitable

wear-compensating element and owing to its presence acts as a means for applying definite pressures to the respective clamping devices whether said pressures be equal as is so in the present case, or otherwise. Said rod 11 acts as a spreader or expander for oppositely thrusting or separating the two rods 14 and 15 and it is in the nature of a float; in that it is bodily movable for as will be clear it can in addition to its endwise or longitudinal movement also have a lateral motion the latter being due to the fact that it is smaller in size than the bore or passage 13. This lateral movement of said rod is what may be utilized to compensate for wear in any of the parts by reason of which I can also set the clamping devices with the predetermined or definite pressures and can also set said clamping devices absolutely in unison or simultaneously.

The rod 11 is shown as having at its inner end or head two cam or wedge-faces 16 and 17 respectively which are shown as converging inwardly and which act against angular faces on the butts of said rods 14 and 15. When therefore the rod 11 is advanced by the actuator 10 it will simultaneously thrust said rods 14 and 15 outwardly and oppositely and owing to the fact that said rod 11 is floatable in its mounting I insure absolutely the simultaneous setting of the two clamping devices 5 and 6 notwithstanding the fact that there may be wear in any of the parts. The rod 11 amply compensates for such wear wherever it may be between the actuator and the said clamping devices.

It will be clear that the bolts or screws 8 are free of the head or carrier 3; that is they have no direct connection therewith in the sense that the gib attaching screws or bolts 7 have. Said screws 8 are represented as tapped into plugs as 18 endwise movable in bores or openings extending depthwise of the head 3 and which open into the rabbets 9. It is therefore evident that these plugs constitute a simple means for bending or flexing the gibs or clamping devices 5 and 6 at points opposite said rabbets by virtue of which said gibs can be drawn into clamping relation with said column or support 2. The rods 14 and 15 serve as a convenient and simple means for setting the two clamping devices through the intervention of said plugs during which action the latter are drawn forward. The head ends of said rods 14 and 15 are shown as being of cone form as at 19 and are adapted to enter similarly-shaped counterbores or seats as 20 in the outer ends of said plugs said cone heads acting as will be evident as cams. While the shape of said counterbores is the same as that of said cone heads the former are much larger than the latter by reason of which the plugs can be advanced to set the gibs or clamping devices without possibility of

binding or straining any of the parts which would possibly not be the case were there a snug or comparatively tight fit between the said cone heads and their receiving seats or counterbores.

It will be assumed that the parts are set in their unclamped positions as shown in the several figures of the drawings and that it is desired to hold the head 3 in an adjusted position. To accomplish this the actuator 10 is swung down or turned to the right. When the actuator 10 is thus operated its shank 10' imparts an inward or forward thrust to the rod 11 and the latter in turn spreads the rods 14 and 15 the cam or cone heads of the latter drawing forward the two plugs 18 and setting the two clamping devices or gibs 5 and 6. It will be seen that said clamping devices 5 and 6 have at all times a sliding fit with the column 2 and that they are substantially coextensive with said head. These relations, however, are in no wise essential. At this point it will be evident that the foregoing description applies to Figs. 1 to 3 inclusive. Hereinafter I describe certain modifications wherein the clamping devices are not in the form, strictly speaking of gibs and wherein said clamping devices cover but a very small portion of the column. It is possible that they might when set simply have a knife-edge bearing against the column or any other similar part the extent of their bearing not being a matter of great importance.

I will first describe the construction shown in Fig. 4. In this view the column is denoted by 2^a and the head by 3^a and these two parts are precisely like the similar members hereinbefore described. The gibs are designated by 5^a and 6^a and they are connected to plugs 18^a by screws 8^a which all are like the previously described parts. Extending between said plugs 18^a is a rod 21 represented as provided at one end with a stationary collar 22 provided with a tapered active portion 23 to freely fit an opening or seat 24 of substantially similar formation. I have shown as loosely mounted on said rod a second collar 25 also having a tapered portion 26 to freely fit a similarly shaped opening 27. It should be stated that the opening 24 is in the plug 18^a shown on the right in said Fig. 4 while the opening 27 is in the other plug. I have shown as threaded to the end of the rod 21 adjacent the slidable or loose collar 25, a handle 28 located exteriorly to said collar and adapted to engage said collar 25. It will be clear that when the handle or arm 28 is turned the collar 25 will be thrust toward the right in Fig. 4 while the collar 22 will be pulled toward the left in said figure in view of the similar pull on said rod. In other words the two collars are caused to approach each other the consequence being that the plugs

18^a are drawn forward to simultaneously set the two clamps or gibs 5^a and 6^a.

Referring now to Fig. 5, 2^b and 3^b denote the column and head respectively. 6^b shows the gib which is perforated to receive the plug 18^b provided with a head 18' for engaging the outer surface of the said gib or clamping member 6^b. A rod 21^a is provided with a head 22^a having a tapered portion 23^a to fit the substantially similarly shaped seat 24^a in said plug 18^b. This collar 22^a is fixed to the rod 21^a and operates precisely like the collar 22. When therefore the collar 22^a is moved to the left in Fig. 5 the plug 18^b is drawn forward and the head 18' presses the clamp or gib 6^b firmly against the column 2^b. There is at the other side of the column and head a plug 18^b operable by devices such as those shown at the left in said Fig. 4 whereby said two plugs 18^b can be set absolutely together and not one in advance of the other.

In Fig. 6 I show a construction wherein the clamps for holding the head in an adjusted position are not in the form of gibs strictly speaking but are simply the heads 18^a of plugs as 18^c which are the counterparts otherwise of the plugs hereinbefore specifically described. The plug 18^c on the right in Fig. 6 is shown as having an opening 24^c of tapered form to receive the similarly shaped portion 23^c of the head or collar 22^c of the rod 21^c against the free or outer end of which the tip of the screw 28^a is shown as bearing, said screw being threaded through a collar or nut 25^a provided with a tapered portion 26^a at its outer end to fit the similarly shaped opening 26^a in the plug 18^c on the left in said Fig. 6. The screw or threaded stem 28^a extends entirely through the collar or nut 25^a and is represented as provided with a handle 28^b. It follows therefore that when this handle is turned in the proper direction the collars 22^c and 25^a are moved outwardly and oppositely so that the tapered portions 23^c and 26^a by acting against the plugs 18^c can simultaneously set the heads 18^a of said plugs into clamping engagement with the column 2^c so as to hold the head 3^c in adjusted relation thereon.

In Figs. 7 and 8 I show a construction wherein a divided gib 5^e may be employed. This gib unlike the gibs previously described does not clamp the head. It is shown in two sections which are respectively connected to said head in some rigid manner, for example by means of screws as hereinbefore set forth. Between the sections of said gib 5^e is a clamp or jaw 5^f which is adapted to engage the column although such latter part is not illustrated in either of said two last mentioned figures. This clamp or jaw 5^f is perforated to receive the screw 8^f which is tapped into a plug as 18^f which may be constructed and oper-

ate precisely like the plugs hereinbefore described. When the plugs 18^r are drawn forward the clamps or jaws 5^r are set into clamping relation but the gib sections at
5 opposite sides of said clamps are not operated although they may have a sliding connection with the column as previously stated.

In the several forms of the invention I
10 provide a movable head and its support, a pair of clamps for clamping said head in an adjusted position, an actuator common to both clamps, and means for transferring the effect of said actuator to both clamps
15 and for positively preventing the setting of one clamp in advance of the other by virtue of which it is possible to always set said clamps absolutely in unison which is a very advantageous feature in that there
20 is no possibility of the head being subjected to vibration on its support the two being as solidly related as though they were integral. It is not a matter of consequence as to how these several parts are constructed
25 and related although mechanism of the type or character described between the actuator and the two clamps possesses utility in that there is a reaction of each clamp upon the other through said connections whereby I
30 assure their being set up together.

What I claim is:

1. The combination of a column, a head slidable on said column and having bores extending from front to rear thereof, plugs
endwise slidable in said bores and having
35 clamping devices for engaging said column and devices for operating said plugs to set said clamping devices, the plugs having tapered counterbores to receive said operating devices. 40

2. The combination of a column, a head
slidable vertically of said column and having bores extending from front to rear thereof, plugs slidable in said bores, provided with clamping devices for engaging
45 said column and also having tapered counterbores, rods extending crosswise of the head, provided with tapered outer ends to engage in said counterbores, a third rod provided with an angular head to engage be-
50 tween the ends of said first mentioned rods, and movable in all directions, and a hand operable screw tapped into said head and adapted to advance said third rod.

In testimony whereof I affix my signature
55 in presence of two witnesses.

CARL L. GROHMANN.

Witnesses:

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H. W. KILBOURNE.