Sept. 29, 1936. A. F. BENNETT 2,055,783

MACHINE TOOL STRUCTURE

Filed June 22, 1934

Fig. 1.

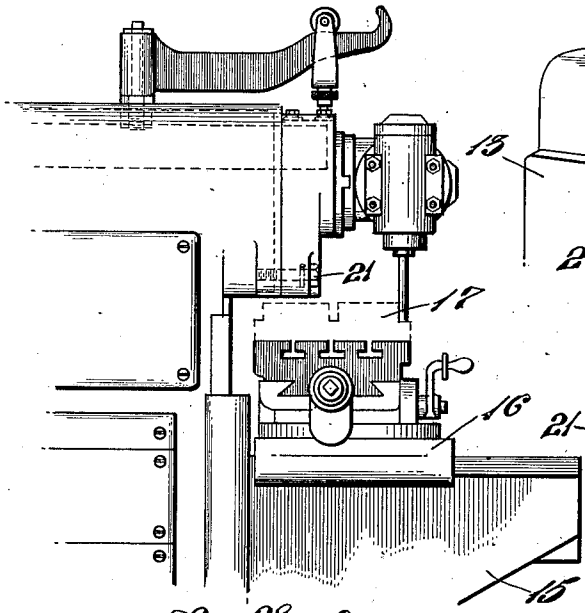


Fig. 2.

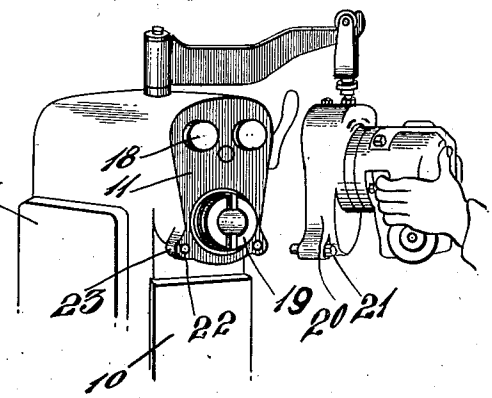


Fig. 8.

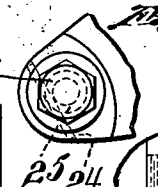
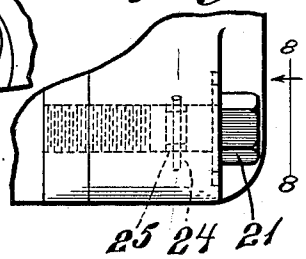


Fig. 7.



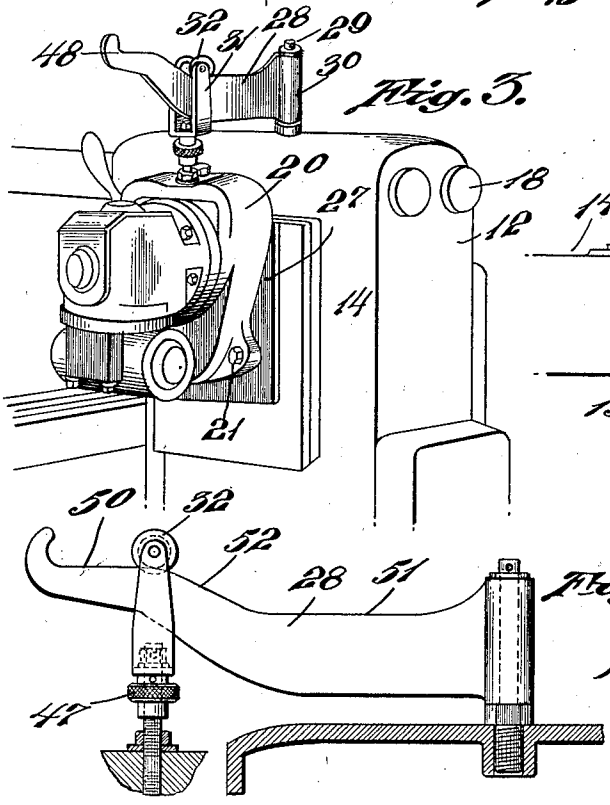
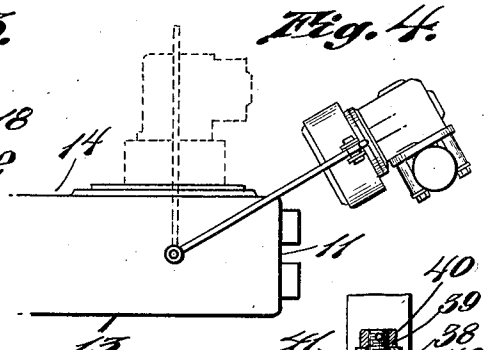


Fig. 5.

Fig. 4.



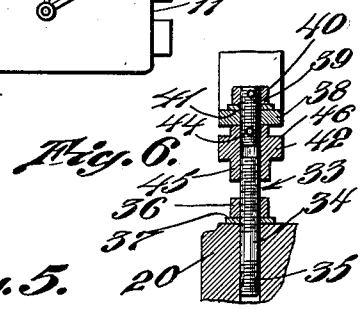


Fig. 6.

Fig. 5.

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MACHINE TOOL STRUCTURE

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Application June 22, 1934, Serial No. 731,942

12 Claims. (Cl. 90—11)

This invention relates to a machine tool structure, more particularly to an attachment which is fitted onto this structure; and has for one of its objects the convenient storing of this attachment when not in use.

Another object of the invention is the conveniently moving of the attachment from its stored position to its operative position.

Another object of the invention is a construction by which the operator may move the attachment from its inoperative storage position to its operative position without being required to manually support the weight of the attachment.

Another object of the invention is to mount the attachment in storage position at a different level than when the attachment is mounted in operative position, and also to provide a convenient arrangement for moving the attachment from one level to another as well as moving it from one location over the base to another.

Another object of the invention is the provision of a storage location for the attachment, which will not necessitate the moving of an overarm or any other part between the time of removing the attachment from operative position and the securing of it in its storage or inoperative position.

Another object of the invention is the provision of an integral stop for the carriage from which the attachment is suspended on the swinging crane.

Another object of the invention is to provide an adjustment by which slight variations in attachments may be compensated for in the mounting of the attachment on its crane on the standard.

A further object of the invention is the provision of a crane having two different levels with an easy incline from one level to the other with a carriage from which the attachment is supported movable from one level to the other.

A still further object of the invention is the provision of attaching bolts which are permanently carried by the attachment so that they are always in position for securing the lower part of the attachment to an abutting surface and cannot be accidentally removed and lost.

With these and other objects in view, the invention consists of certain novel features of construction, as will be more fully described, and particularly pointed out in the appended claims.

In the accompanying drawing:

Fig. 1 is a side elevation of the upper portion of a machine tool, showing the attachment as mounted in position on the face thereof.

Fig. 2 is a perspective view showing the face and upper portion of the machine tool structure with the attachment on the crane swinging about the corner thereof, and approaching a position for movement inwardly into engagement with the face of the machine.

Fig. 3 is a perspective view of the upper portion of the machine, illustrating the attachment as mounted in storage position on the side thereof.

Fig. 4 is a top plan view illustrating the relative location of the attachment in storage and operative positions and the attachment in a position to swing about the corner of the machine.

Fig. 5 is a side elevation of the crane illustrating a fragmental portion of the attachment as suspended therefrom.

Fig. 6 is a sectional view showing the adjusting mechanism in detail;

Fig. 7 is a side elevation of a fragmental portion of the attachment, showing the cap screw locating means;

Fig. 8 is a sectional view of Fig. 7.

In the use of an attachment for machine tool structures, such as milling machines and the like, it is usual when the attachment is removed from working position to transport it to the tool room at some distance from the machine, which requires considerable time and the exertion of a great deal of energy of the operator in transportation; and in order that the attachment may be more conveniently handled, I have provided an abutting surface on that side of the machine not ordinarily used and at a location fixed with reference to the working position, for the mounting and storage for the attachment when not operating; and in order to move the attachment from its operative to its inoperative position on the machine, I have provided a crane mounted on the machine, upon which there is mounted a carriage which supports the attachment and by which while suspended, it may be swung from one position to another thru 90°. I have also found that it is much more convenient to provide the storage position of the attachment on a lower level than the operating position thereof, whereby the attaching plate does not have to be built up on the side of the machine, which is curved in contour, and I provide my crane with two different levels and arrange the crane so that when the carriage which supports the attachment is on the upper level, it is in position to be bolted onto the face or operating position, on the machine and when on the lower level and closer to its pivotal axis of the crane, it will be in a posi-

tion to be bolted in its storage or inoperative position on the machine; and I have connected these two levels by an easy incline, whereby the carriage may be readily moved from one level to the other, without it being necessary for the operator to lift the attachment and thus bear and support the weight thereof; and I have also provided a limit by turning up the end of the crane so that the carriage cannot be detached from the crane and also an adjustment for moving the attachment with reference to the carriage; and the following is a detailed description of the present embodiment of this invention by which these advantageous results may be accomplished:—

With reference to the drawing, the standard of the machine tool is here shown as generally rectangular in shape, the front of which is designated 10 with a face 11, while the back is indicated at 12, and sides at 13 and 14. A knee 15 is movable vertically on the front of the standard, and a carriage 16 suitably supports the work 17 illustrated in dotted lines in Fig. 1. There projects thru the face 11 overarms 18 for the spindle 19, the overarms 18 being shown as retracted in Fig. 2 but projecting beyond the face 11 a distance sufficient to extend into recesses in the attachment 20 for receiving and locating the attachment in position, the attachment being also provided with a connection for the rotatable spindle 19 so that the mechanism in the attachment is driven by the spindle 19.

The attachment 20 is mounted in operative position on the face 11 on the front of the standard by means of cap screws 21, which extend into threaded openings 22 in the lugs 23 extending outwardly on the sides of the face 11. These cap screws 21 are permanently altho rotatively, mounted in the attachment being secured therein by a pin 24 lodging in an annular groove 25 in the cap screw 21. By this arrangement, the cap screws cannot be accidentally withdrawn from the attachment and lost but are always in a position for the use for which they are intended.

When it is desired to operate the machine tool with an arbor for the cutter in the spindle 19, it is necessary that the attachment be removed. Such an attachment is heavy and is frequently kept in a storeroom some distance from the machine, which necessitates the operator carrying the attachment to the storeroom; and in order to lessen the labors of the operator and conserve his time, I have provided a space on the side 14 of the machine as a storage position for the attachment. The side 14 of the machine is provided with a plate 27 which is tapped with a pair of openings to receive the cap screws 21 which are permanently mounted in the attachment 20.

In order to swing the attachment from operative to inoperative position upon the plate 27, I have provided a crane 28 which is pivotally mounted on the post 29 on the top of the machine so that its hub 30 may swing freely about this post 29 as a pivotal point. Upon the crane there is mounted a carriage 31 having a wheel 32 to engage with the upper edge of the crane, which forms a track for the wheel, this carriage being bifurcated and provided with an adjustment designated generally 33, which suspends the attachment from the carriage.

This adjustment consists of an upstanding threaded member 34 screwed into the attachment 20 at its end 35 and locked therein by a nut 36 engaging a washer 37 which engages the top of the attachment. Thru the bottom 38 of the bifurcated portion of the carriage, a threaded member 39 is rotatably mounted and upon which there is a nut 40 positioned which engages a washer 41 resting upon the portion 38. This nut 40 is secured to the member 39. There is also a socket part 42 screwed onto the lower end of the member 39 and fixed thereto by a pin 44. This socket 42 is threaded at its lower end 45 to threadingly engage the member 34 so that as it is turned thereon the attachment can be raised or lowered. The turning of the socket 42 is accomplished by an enlarged portion 46 thereof knurled on its outer surface, as illustrated at 47, see Fig. 5.

The outer end of the crane is turned upwardly as at 48, to provide a stop to limit the outward movement of the carriage 31 and when the carriage is at its outer position against this stop, the length of the crane is such that the attachment may be swung clear of the corner of the machine, as illustrated in Fig. 4. The storage position of the attachment when clamped to the plate 27, is at a level lower than the operating position of the attachment when clamped to the face 11, and I have chosen this arrangement of the lower position so that it will be unnecessary to cause the plate 27 to extend up where it will break the line of the curve connecting the side 14 and the top of the machine, which will not only detract from the appearance of the machine but will also require additional casting material. I also choose the location of the plate 27 in a plane at substantially 90° from the face 11 as at this point it will be unnecessary to move or disturb any parts of the machine, or make any adjustment, it being merely necessary to detach the attachment and swing it to this storage position and there clamp it by the cap screws 21. I have chosen the mounting plate at a location so that an easy incline may connect the two different levels on the crane.

The upper level on the crane is designated 50 from which the carriage is supported when the attachment is in its operative position, while I have illustrated a lower level 51 upon which the carriage is located when the attachment is to be in inoperative position. These two levels are connected by an incline 52 so that the wheels 32 of the carriage may be easily slid from one level to the other without it being necessary for the operator to lift the attachment by a too abrupt level from one position to the other.

Operation

In operation, it is merely necessary for the operator to unscrew the bolts 21 which mount the attachment on the face of the machine, roll the attachment out to the end of the crane where the carriage will abut the hook 43 and then swing the crane thru substantially 90° so that the attachment will be opposite its inoperative mounted position, or the plate 27 and then move it inwardly to the lower level 51 where it will be secured to the plate 27 by the cap screws 21 which as previously pointed out are in permanent position in the attachment and may be utilized conveniently for securing it in position. This saves the operator traveling to the tool room; saves him lifting the weight of the attachment, and thus conserves his energy as well as his time. If it is necessary or desirable to substitute one attachment for another, this may be easily done by disconnecting the attachment 20 by rotating the nut 42 by the knurling 47, or if it is desired that adjustment of the height of the attachment be

made, this same nut 42 can be utilized for this purpose.

The foregoing description is directed solely towards the construction illustrated, but I desire it to be understood that I reserve the privilege of resorting to all the mechanical changes to which the device is susceptible, the invention being defined and limited only by the terms of the appended claims.

I claim:

1. In a machine tool structure having an upright rigid stand, an abutment thereon thru which a rotatable spindle extends, an attachment mounted on said abutment for cooperation with said spindle, said stand having a second abutment removed from the first abutment for mounting the attachment in inoperative position, whereby both positions of the attachment are fixed with reference to each other.

2. In a machine tool structure having an upright stand, an abutment thereon thru which a rotatable spindle extends, an attachment mounted on said abutment for cooperation with said spindle, said stand having a second abutment removed from the first abutment for mounting the attachment in inoperative position, said abutments being disposed in generally right angular planes relative to one another.

3. In a machine tool structure, an upright rigid stand having an abutment thereon thru which a rotatable spindle extends, an attachment mounted on said abutment for cooperation with said spindle, said stand having a second abutment removed from the first abutment for mounting the attachment in inoperative position, said second abutment being at a different elevation than the first abutment.

4. In a machine tool structure having an upright rigid stand, an abutment thru which a rotatable spindle extends, an attachment mounted on said abutment for cooperation with said spindle, a second abutment removed from the first abutment thereon for mounting the attachment in inoperative position, and means movably mounted on said stand for supporting and swinging said attachment from a position on one abutment to a position in engagement against the other abutment.

5. In a machine tool structure, an upright rigid stand having an abutment thru which a rotatable spindle extends, an attachment mounted on said surface for cooperation with said spindle, and said stand having a second abutment removed from the first abutment thereon for mounting the attachment in inoperative position, whereby both positions of the attachment are fixed with reference to each other, said second abutment being at a different elevation than the first abutment, and means movably mounted on said stand for supporting and swinging said attachment from one abutment into position to engage the other abutment.

6. In a machine tool structure having an upright rigid stand, an abutment thru which the spindle extends, an attachment mounted on said abutment for cooperation with said spindle, a second abutment removed from the first abutment for mounting the attachment in inoperative position, and a crane movably mounted on said stand for supporting said attachment and swinging it into position to engage either of said abutments.

7. In a machine tool structure having an upright stand, an abutment thereon thru which a rotatable spindle extends, an attachment mounted on said abutment for cooperation with said spindle, a second abutment removed from the first abutment and at a different horizontal level for mounting the attachment in inoperative position, and a crane pivotally mounted on said stand for supporting said attachment and swinging it into position to engage either of said abutments, said crane having portions in different horizontal planes with a carriage movable along it from one end to the other, said crane portions cooperating with means for positioning said attachment at desired locations.

8. In a machine tool structure having an upright rigid stand, an abutment thru which a rotatable spindle extends, an attachment mounted on said abutment for cooperation with said spindle, a second abutment removed from the first abutment for mounting the attachment in inoperative position, said abutments being in generally right angular planes, and a crane movably mounted on said stand for supporting said attachment and swinging it into position to engage either of said abutments.

9. In a machine tool structure having an upright stand, and a pair of spaced abutments for the mounting of an attachment, a crane with a carriage thereon for moving the attachment from one abutment to the other, said crane having integral means at one end thereof for the limiting of movement of the carriage therealong.

10. In a machine tool structure having an upright stand, and a pair of spaced abutments thereon for the mounting of an attachment, a crane with a carriage thereon for moving the attachment from one abutment to the other, said crane having a hook at one end for limiting the movement of the carriage.

11. In a machine tool structure having an upright stand, an abutment on said stand thru which a rotatable spindle extends, an attachment mounted on said abutment for cooperation with said spindle, said stand having a second abutment removed from the first abutment for mounting the attachment in inoperative position, and means carried by the attachment and cooperating with means in each of said abutments for securing the attachment against either of said abutments.

12. In a machine tool structure having an upright stand, an abutment surface on said stand thru which a rotatable spindle extends, an attachment mounted on said abutment for cooperation with said surface for mounting the attachment in inoperative position, said stand having a second abutment removed from the first abutment for mounting the attachment in inoperative position, bolts rotatably secured in the attachment and cooperating with means in each of said abutments for securing the attachment on either of said abutments.

ARTHUR F. BENNETT.