

1,023,306.

2 SHEETS—SHEET 1.

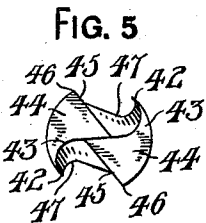
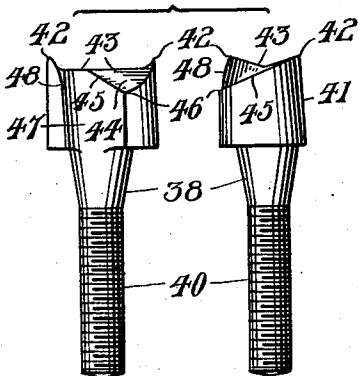


FIG. 6

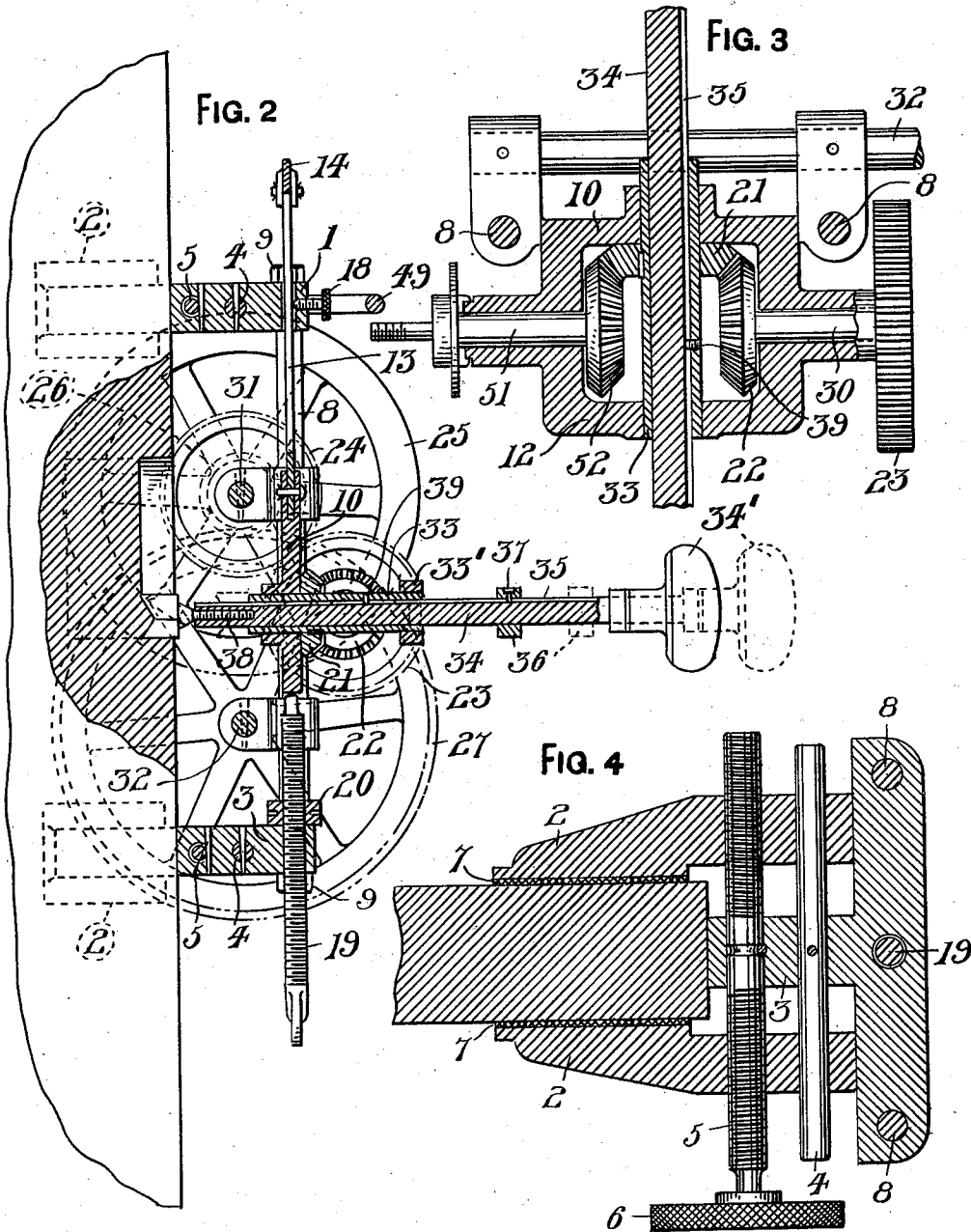
**WITNESSES**

WITNESSES
J. C. Hoffman,
A. W. Heine.

INVENTOR

Gustav Gerlach,
By H.W. Stevenson,
Attorney

1,023,306.



WITNESSES
J. W. Hoffman,
A. W. Heinle.

INVENTOR
Gustav Gerlach
By *H. W. Stevenson*
Attorney

UNITED STATES PATENT OFFICE.

GUSTAV GERLACH, OF CARRICK, PENNSYLVANIA.

MORTISING-MACHINE.

1,023,306.

Specification of Letters Patent.

Patented Apr. 16, 1912.

Application filed March 19, 1910. Serial No. 550,459.

To all whom it may concern:

Be it known that I, GUSTAV GERLACH, citizen of the United States, residing at Carrick, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Mortising-Machines, of which the following is a specification.

My invention pertains to certain new, useful, and advantageous improvements in mortising machines or apparatus for drilling longitudinal slots or grooves, being a device utilized principally by the carpenter trade, but applicable also for other uses, and involves certain principles not known or used in devices of a similar nature.

The fundamental idea and object involved in my invention is the provision of an apparatus for mortising purposes that, when placed in position on the door, or other object on which the work is to be done, can be quickly and securely adjusted, and the work of forming the groove or aperture be performed with despatch and accuracy.

Another object of my invention is the novel means involved for variable adjustments to correspond with any length or depth of opening desired, so that a multiplicity of uniform sized apertures can be made without altering the adjustment feature.

Still another object is a peculiarly formed and specially designed auger or bit, that will enter any species of wood, either hard or soft, and when performing its function will disintegrate and reduce the material being worked on into comparatively fine particles. This said bit could also be adapted for metal drilling by proper tempering.

My invention combines speed in operation and accuracy in the results obtained, dispensing with the need of a chisel and hammer or other tool for completing the work.

Having the above objects in view, as well as others that will appear as this description proceeds, my invention finally consists of the novel construction and arrangement of parts shown in the drawings, and hereinafter described in detail.

Referring to said drawings: Figure 1 is a front elevation of my apparatus in operative position on the mortising edge of a door; Fig. 2, Sheet 2, is a vertical section taken through the center of the machine; Fig. 3 is an enlarged sectional view taken on the line III—III of Fig. 1; Fig. 4 is a

transverse section through the lower securing jaw taken on the line IV—IV of Fig. 1; Fig. 5 is a top plan view of the working end portion of the boring tool; and Fig. 6 shows two elevated views of said boring tool.

In the drawings numerals of reference designate like parts throughout the several views shown, and referring to said drawings 1—1 are suitable castings, preferably of a T formation, which constitute the upper and lower securing members for the device, and carry the attachment jaw members. This feature of my device involves the two adjustable jaws 2—2, arranged at each side of the shank portion 3 of said castings, also the stationary guide 4 secured through said shank, a screw member 5, provided with right and left hand threads, for simultaneous advancement or receding of said jaws, and a handle portion 6. The inner contacting faces of these jaw members are preferably provided with a suitable lining 7 of felt or other non-scratching material, for a well known purpose. No novelty is claimed for this particular form of securing means above described, but is simply illustrative of a reliable and simple fastening feature.

Connecting the upper and lower castings 1—1 are a plurality of stationary vertically disposed guide rods 8, which seat through apertures formed in the outer ends of said castings, and are secured by nuts 9, or other suitable means. Mounted on these guide rods 8, and arranged for free movement thereon, is a housing 10, preferably of the form shown, and involving the extension apertured lugs 11, through which the said guide rods pass, and central positioned yoke 12. Pivotaly secured to the upper section of said housing is a link 13, which is connected to a lever member 14, fulcrumed at 15 on a standard 16, mounted on the casting 1. Said link 13 is provided with an aperture or groove 17 in one of its faces, which, in conjunction with a set screw 18, adjustably seated through the member 1, serves as a means for retaining the housing in suspended position.

An adjustment screw member 19, vertically disposed through the lower casting 1, involving a jam nut 20, serves to limit the downward movement of the housing 10. Carried by the said housing is the power means for operating the mortising tool, and preferably involves the centrally disposed

bevel gears 21 and 22, seated in the yoke 12; meshing gears 23 and 24, of equal diameter; fly wheel 25; small gear 26; meshing large gear 27; and operating crank lever 28, having a handle 29. From actual practice and usage I have found that the best results in the mortising process and cutting action of the bit will be obtained by providing an approximate ratio between the meshing gears 26 and 27 of one to five, and conforming the other two pairs of meshing gears of equal ratio, one with the other. A shaft 30 carries the gears 22 and 23; another shaft 31 supports the gear 24, fly wheel 25, and wheel 26; and still another shaft 32 carries the gear 27, and offers a securing means for the crank 28.

The centrally disposed bevel gear 21 is mounted over and secured to a collar 33, which is operatively seated through the housing 10, and is adapted to receive the removable bit stem 34. This latter member is provided with a longitudinal groove 35 throughout its entire length, likewise with an adjustable collar 36, which is secured in any desired position on said stem by means of the set screw 37, or other suitable means. The inner end of said stem is provided with an interiorly threaded portion for the reception of the screw shank of the removable operating bit 38. Said stem is adapted for longitudinal play within the collar 33, the limit of said movement being regulated by the distance between the collar 36 and abutting outer end of the member 33, and in order that said stem will rotate to operate the cutting tool 38, I provide a fixed pin 39, which enters through said member 33 and seats in the groove 35.

For all practical purposes, and in order to satisfactorily carry out the objects of my invention, I have found by actual experiments that the peculiar form of mortising tool or bit shown in detail, Figs. 5 and 6, is the most reliable, and will do the work required of it under all ordinary conditions. This said bit involves the securing threaded portion or shank 40, and outer working end 41, provided with sharp pointed cutting sections 42 equidistant apart from the axial center of said tool. These cutting points 42 are connected by a reversed curved edge 43, which declines from each point 42 toward the axial center, thus leaving said points elevated a pre-determined distance above the axial center of the tool, as shown in Fig. 6. The outer end of said tool is also provided with oppositely disposed tapering face portions 44, which are formed into a more or less tri-angular section, having for their boundaries the said curved line 43, parallel straight acute angled lines 45, and curved periphery; the lowest point in said faces being at 46. I also provide the oppositely disposed hollowed out portions 47, which

assist in forming the cutting edges 48; the latter being a continuation of the cutting points 42. The tri-angular face portions 44 afford a means for utilizing a flat file to keep the main cutting points 42 in working condition, while the recessed portions 47 facilitate use of a rat-tail or round file, also to assist in sharpening said points, and in keeping a cutting edge at 48. The two extreme outer points 42 will first engage and bite into the material being worked on, and when the said tool is revolved at a rapid rate said cutting points will disintegrate and reduce the material into comparatively fine particles, while the sharp edge 48 will follow up and materially assist in this boring operation, thus said tool will rapidly eat its way into the wood or other material to perform its intended function.

In actual operation and usage of my apparatus the device is first placed over the edge of the door or other object to be mortised or grooved, and firmly secured in position by means of the clamping jaw members 2, a suitable handle 49 being attached to the upper casting 1 for convenience in handling. The bit 38 has been previously secured in the stem 34, and when the device is placed in operative position the cutting points 42 of said bit will closely engage against the material to be worked on, and ready for instant service when power is applied. The width of the mortise or groove will be fully determined by the size of bit used, thus necessitating a special tool for each width of groove desired. In order to gage the depth of the mortise the adjustable collar 36 is positioned and secured on the stem 34 a pre-determined distance from the limiting shoulder 33' that will act as a stop when the desired depth is reached, thus preventing the bit from entering into the material being worked on than just the required depth wanted. In order to gage and set the device for the exact length of mortise or groove required the operator has previously marked the exact size and space for cutting and has positioned the device accordingly. The housing is then raised by means of the lever 14 and connecting link 13, and held in suspended position by means of the set screw 18, which, as before stated, engages in the recess 17, when the top edge of the bit will be flush with the extreme upper and marked line of the space to be removed. The housing is then released, and permitted to drop until the lower edge of the bit is flush with the bottom line previously marked, then the limiting screw 19 is turned in until it engages against the said housing, when the jam nut 20 is brought into locking contact with the casting 1. The full limit of movement permitted said housing is thus confined between the upper member 1 and the inner end of the said screw stem 19. The appa-

ratus is now set for a pre-determined sized mortise or groove as the case may be, and a multiplicity of such recesses can be made with my device without altering any of the previously described adjusting features. Power being applied with one hand by means of the mechanism shown, consisting of the crank lever and meshing gears, the bit is caused to rotate rapidly, and with the other hand the operator alternately raises and lowers the housing by means of the lever 14, and in so doing changes the cutting position of the bit so that it will engage and bite into the material the full length of the space previously determined. During this process the operator keeps the brace 34' firmly held against his body, so that as the bit continues to cut out the required space, by exerting a forward pressure on said brace, in the same manner now commonly employed with the use of the well known brace and bit, the tool will be gradually forced into the material, until the limit of depth is reached when the collar 36 engages against the shoulder 33'. A clean cut symmetrical mortise or groove will result, and the labor be accomplished in a short space of time, which will make it possible, by using an apparatus of my design, to greatly expedite this nature of work.

In the event of it being desired my apparatus can be equipped with tool sharpening device, operatively mounted and carried by the housing 10, and consisting of the emery or buffing wheel 50, exteriorly

and removably mounted on a shaft 51, the inner end of which carries a bevel gear 52, similar to and meshing with the gear 21. The operation of this accessory will be readily apparent without further description when taken in conjunction with the power mechanism heretofore outlined.

What I claim as new, is:—

In a mortising machine, a support carrying clamping jaws and having guide rods, a housing mounted for reciprocation on said rods, a lever pivotally mounted on the support and connected with said housing for reciprocating the latter, a cutter-carrying shaft rotatably-mounted in the housing to be reciprocated therewith, said shaft extending at right angles to the line of reciprocation of the housing and movable in the housing longitudinally under pressure while rotating and being reciprocated, means for limiting the longitudinal movement of said shaft in one direction, a drive gear carried by the support, gearing connecting said drive gear with the cutter-carrying shaft, and an adjustable stop carried by the support to be engaged by the housing to limit the movement of the housing in one direction.

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

GUSTAV GERLACH.

Witnesses:

BEATRICE FITZGERALD,
J. P. APPLEMAN.