No. 730,140. PATENTED JUNE 2, 1903.

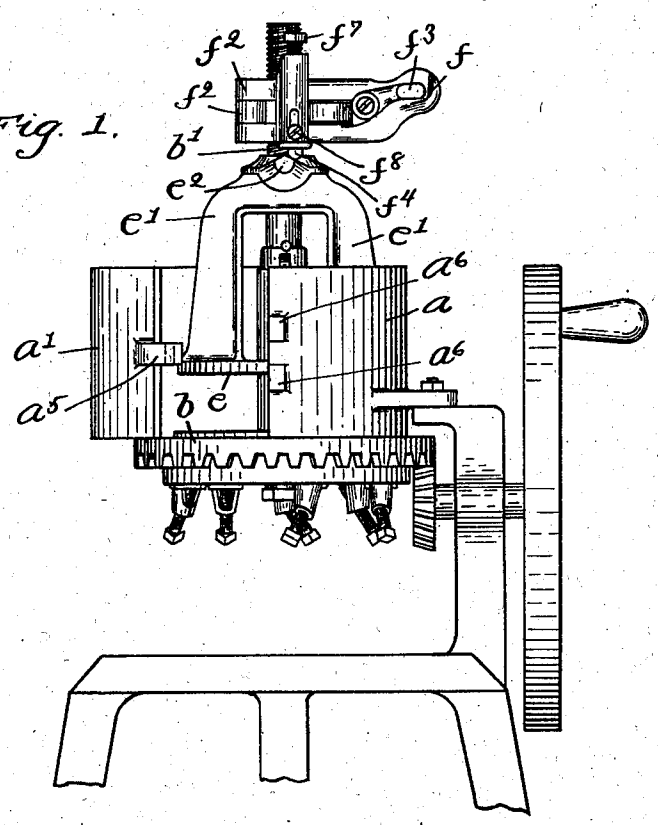
F. W. MANN.

BONE CUTTING MACHINE.

APPLICATION FILED SEPT. 27, 1901.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.



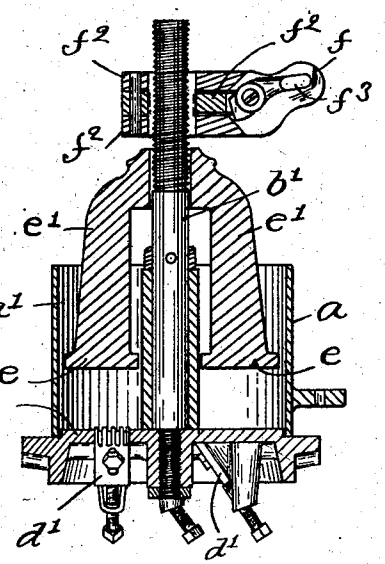


Fig 2.

Witnesses:
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W. C. Potter

Inventor:
Franklin W. Mann
by B. J. Hayes
Atty

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 730,140. PATENTED JUNE 2, 1903.

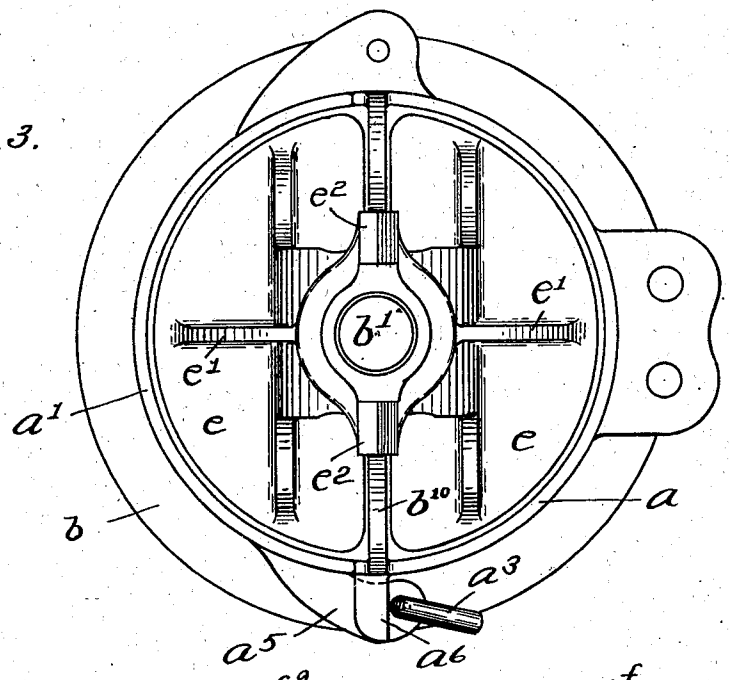
F. W. MANN.

BONE CUTTING MACHINE.

APPLICATION FILED SEPT. 27, 1901.

NO MODEL. 2 SHEETS—SHEET 2.

Fig. 3.



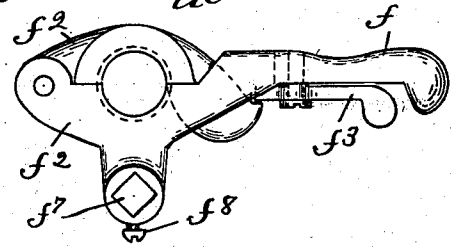


Fig. 4.

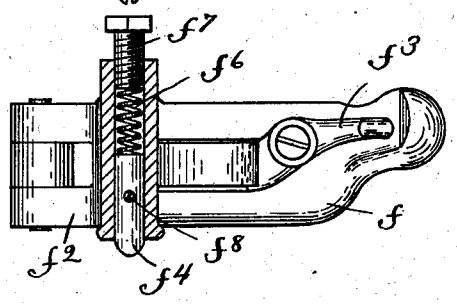


Fig. 5.

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No. 730,140. Patented June 2, 1903.

UNITED STATES PATENT OFFICE.

FRANKLIN W. MANN, OF MILFORD, MASSACHUSETTS.

BONE-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 730,140, dated June 2, 1903.

Application filed September 27, 1901. Serial No. 76,752. (No model.)

To all whom it may concern:

Be it known that I, FRANKLIN W. MANN, of Milford, in the county of Worcester and State of Massachusetts, have invented an Improvement in Bone-Cutting Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to bone-cutting machines, and is intended as an improvement on the bone-cutting machine shown and described in United States Letters Patent No. 409,480, dated August 20, 1889.

The invention has for its object to provide the machine with an automatic feeding device for the follower whereby the follower will be advanced continuously as the knives are operated and meet with but little resistance and will be held at rest or advanced at intermittent intervals as the knives meet with greater resistance, the feeding movement or advance of the follower thus depending upon or being controlled by the knives cutting the bone.

The invention also has for its object to provide means whereby access may be had to the knives carried by the bottom plate for the purpose of examining or adjusting them.

The invention consists, essentially, in a holder for the material, a knife-carrying bottom plate, a feed-screw, a follower contained in the holder, combined with an automatic feeding device for the follower consisting of a nut on the feed-screw, and means for checking its rotation thereon when the knives meet with little resistance to thereby advance the follower, consisting of a spring-pressed plunger normally engaging a suitable engaging portion, but adapted to disengage the same when the friction between the nut and feed-screw increases owing to the knives meeting with a greater resistance.

The invention also consists in a holder for the material, a knife-carrying bottom plate, a feed-screw, a follower contained in said holder, combined with an automatic feeding device consisting of an engaging portion on the follower, and a self-governing feeding-nut on said feed-screw having a yielding engaging device adapted to engage said engaging portion and advance the follower when the knives meet with little resistance, but to disengage the same when the friction between the nut and feed-screw increases due to the knives meeting with a greater resistance.

The invention also consists in a two-part or split holder for the material, one part pivotally connected or hinged to the other, and a knife-carrying bottom plate of approximately the diameter of the holder, the knives of which are accessible whenever said pivoted part is swung open.

Figure 1 shows in side elevation a bone-cutting machine embodying this invention, one of the parts of the holder being swung open to expose the knives. Fig. 2 is a vertical section of the cylinder, bottom plate, follower, and self-governing feeding-nut. Fig. 3 is a plan view of the parts shown in Fig. 2. Fig. 4 is a plan view of the self-governing feeding-nut, and Fig. 5 is a side view and partial section of the self-governing feeding-nut.

The holder for the material is herein shown as a cylinder adapted to be rigidly secured to a stand or support, and thereby held stationary.

The holder consists, essentially, of two semicircular walls a a', one of which, as a', is pivotally connected or hinged to the other and adapted to be held in fixed position by a locking-pin a^3, passing through a hole in an ear a^5, projecting from said pivoted wall when said ear is disposed between ears a^6 a^6, which project from the wall a.

The holder or cylinder has a division-wall b^{10} formed integral with one of said semi-circular walls, as a.

b represents the knife-carrying bottom plate, which is made circular and of approximately the diameter of the holder and forms the bottom wall of said holder, and said plate has a number of knives d' secured to it by suitable adjustable devices, by which they may be set in whatever position required. The said plate and knives and means for holding said knives, as well as the means for turning said plate, are all substantially as shown in the patent referred to.

In practice much difficulty has been experienced in adjusting the knives and also in working the machine when the knives become dull or broken; but by making the holder or cylinder as a split or two-part cylinder, whereby one part or wall may be swung open,

it will be seen that the knives will be exposed to view for examination, and that by then turning the bottom plate all the knives may be thus brought to view. Also it will be seen when the pivoted wall is thus swung open said knives may be accurately set.

The bottom plate b has projecting upward from it a screw-threaded rod or bar b', which is centrally disposed and has its bearings in a division-wall which is contained in the holder or cylinder, and said rod or bar is made quite long and projects above said division-wall, and the screw-thread is provided only on that portion above the division-wall. Said screw-threaded rod serves as the feed-screw. A follower or platen is contained in the holder or cylinder and comprises a split or two-part plate e and a yoke e', which straddles the division-wall, so that the parts of said plate will follow down within the holder or cylinder on each side of the division-wall. The yoke e' has a smooth or unthreaded hole through its crown for the upright feed-screw b' and is adapted to be moved up and down freely on said screw as a guide.

It is designed that the follower or platen shall act to press the material down onto the knife-carrying bottom plate, so that as said plate is turned by suitable means provided for turning it the material will be acted upon by said knives, and in accordance with this invention automatic feeding mechanism is herein provided for thus advancing the follower. The yoke e' of the follower is formed or provided with two oppositely-projecting engaging portions or stops e^2 e^2 at its crown.

A self-governing feeding-nut f^2 is provided for advancing the follower, which is preferably made as a split nut adapted to engage the threads of the feed-screw b', and one of the parts of said nut has projecting from it a handle f, and a pivoted locking device f^3 is provided for locking the parts of said split nut in engagement with said screw-threaded portion of the feed-screw.

When the feeding-nut is applied to the thread of the feed-screw and the knife-carrying bottom plate bearing said feed-screw is turned, it will be seen that said feeding-nut will turn around freely with said feed-screw unless restrained or checked and when thus turning around freely will not move down on the screw-threaded portion, and consequently will not advance the follower or platen.

For the purpose of restraining or checking the free rotation of the feeding-nut a spring-pressed plunger f^4 is provided, which is adapted to engage either one of the engaging portions or stops e^2, and while in engagement therewith said feeding-nut will be restrained or checked from rotation, and consequently will act to advance the follower or platen as the knife-carrying bottom plate is rotated.

The plunger f^4 is made as a short cylindrical bar set in a housing or bearing provided for it on the feeding-nut and disposed vertically therein, so as to move up and down, and the lower end of said plunger projects a short distance and is chamfered in opposite ways to provide a wedge-shaped or chisel-pointed end, which engages either one of the engaging portions e^2. A spring f^6, which acts upon said plunger to thrust it downward, is contained in said housing or bearing, and its tension is adjusted by means of an adjusting-screw f^7. A pin f^8 projects laterally from said plunger f^4 through a vertical slot in the housing or bearing, and said pin holds the plunger from dropping too low and also serves as a means by which it may be moved by hand whenever desired.

In operation the feeding-nut will be applied to the screw-threaded portion next the crown of the follower with the spring-pressed plunger in engagement with either one of the engaging portions or stops e^2. Then the knife-carrying bottom plate will be turned, and the feeding-nut being restrained or checked from rotation the follower will be advanced continuously.

If the knives meet with a resistance more than ordinary, then the friction between the thread of the feed-screw and nut will correspondingly increase by reason of the follower advancing slowly and the nut bearing correspondingly harder thereon, and when such resistance becomes greater than the force of the spring f^6, which holds down the plunger, then said spring will yield and the plunger slip over the engaging portion or stop e^2, at which time the follower will remain at rest while the knife-carrying bottom plate continues to turn. Thus whenever the resistance of the material being cut is less than the force of the spring f^6 the feeding-nut will engage one of the engaging portions and the follower will be advanced continuously; but whenever the resistance of the material is greater than the force of said spring the spring-pressed plunger will slip over the engaging portion and the follower will remain at rest. The feeding-nut is thus self-governing, and by providing such a feeding-nut the advancement of the follower is automatic.

The spring-actuated plunger on the feeding-nut arranged to engage an engaging portion or stop on the crown of the follower represents one practical embodiment of my invention; yet it is obvious that my invention may be otherwise carried out without departing from its spirit and scope.

I claim—

1. In a bone-cutting machine, the combination of a holder for the material, a bottom plate therefor, said parts relatively rotatable, a follower contained in said holder, an engaging portion on the follower, cutting-knives, a feed-screw passing loosely through said follower, and a threaded feed-nut on the feed-screw having a yielding engaging device adapted to automatically engage said engaging portion when the friction between said feed-nut and feed-screw is slight, to advance the follower, and to automatically disengage

said engaging portion when the friction between said feed-nut and feed-screw increases to stop the advance of the follower, substantially as described.

2. In a bone-cutting machine, the combination of a holder for the material, a bottom plate therefor, said parts relatively rotatable, a follower contained in said holder, an engaging portion on the follower, cutting-knives, a feed-screw passing loosely through said follower, and a threaded feed-nut on the feed-screw having a spring-pressed plunger adapted to automatically engage said engaging portion when the friction between said feed-nut and feed-screw is slight, to advance the follower, and to automatically disengage said engaging portion when the friction between said feed-nut and feed-screw increases to stop the advance of the follower, substantially as described.

3. In a bone-cutting machine, the combination of a holder for the material, a bottom plate therefor, said parts relatively rotatable, a follower contained in said holder, an engaging portion on the follower, cutting-knives, a feed-screw secured to said bottom plate and passing loosely through said follower, a threaded feed-nut on the feed-screw having a yielding engaging device adapted to automatically engage said engaging portion when the friction between said feet-nut and feed-screw is slight, to advance the follower, and to automatically disengage said engaging portion when the friction between said feed-nut and feed-screw increases to stop the advance of the follower, substantially as described.

4. In a bone-cutting machine, the combination of a holder for the material, a bottom plate therefor, said parts relatively rotatable, a follower contained in said holder, an engaging portion on the follower, cutting-knives, a feed-screw secured to said bottom plate and passing loosely through said follower, a threaded feed-nut on said feed-screw, and means for causing automatic engagement and disengagement between said feed-nut and follower to respectively advance or stop the advance of said follower, operated by the difference in the degree of frictional contact between said feed-nut and feed-screw, substantially as described.

5. In a bone-cutting machine, the combination of a two-part holder for the material, a bottom plate therefor, said parts relatively rotatable, a follower contained in said holder, an engaging portion on the follower, cutting-knives, a feed-screw secured to said bottom plate and passing loosely through said follower, a threaded feed-nut on the feed-screw having a yielding engaging device adapted to automatically engage said engaging portion when the friction between said feed-nut and feed-screw is slight, to advance the follower, and to automatically disengage said engaging portion when the friction between said feed-nut and feed-screw increases to stop the advance of the follower, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FRANKLIN W. MANN.

Witnesses:
B. J. NOYES,
H. B. DAVIS.