

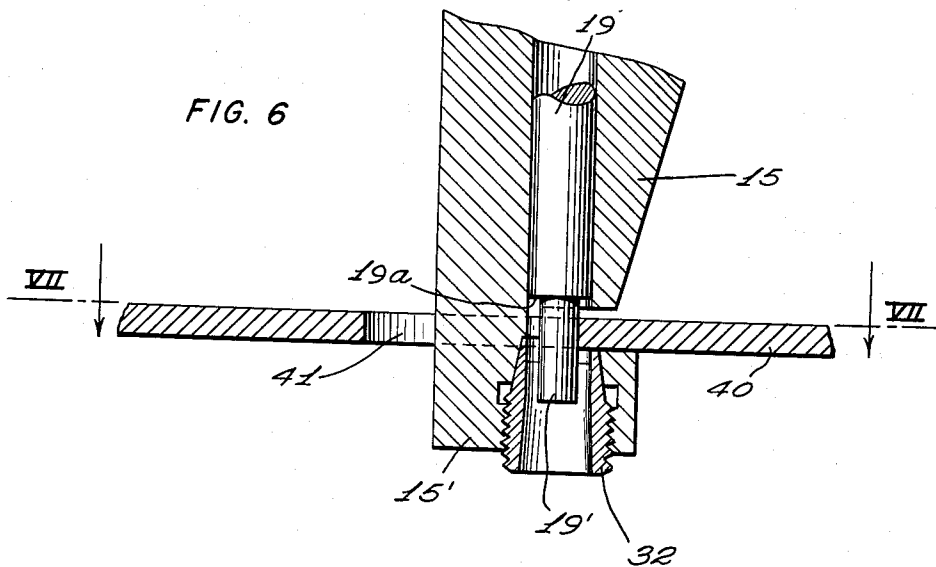
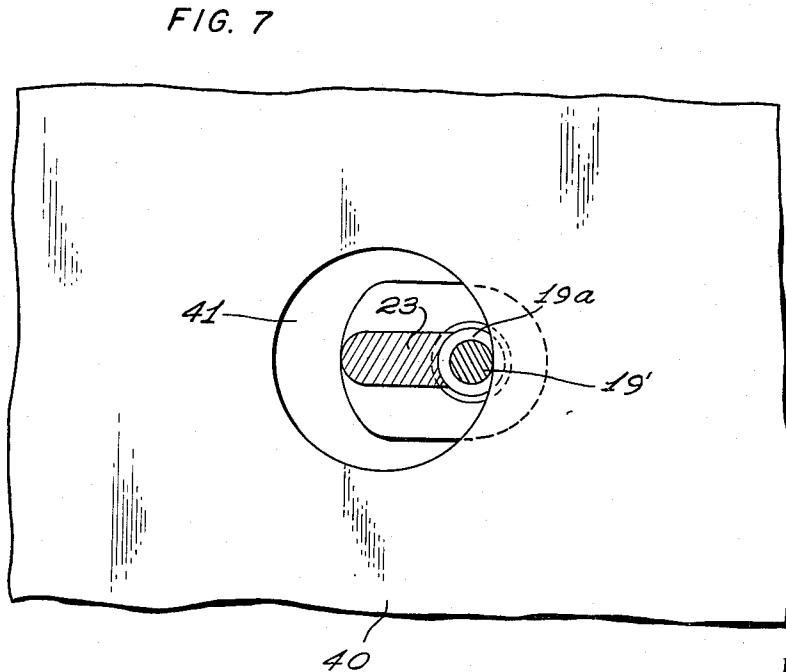
June 8, 1954

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NIBBLING MACHINE

2,680,292

Filed March 13, 1950

2 Sheets-Sheet 2



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2,680,292

NIBBLING MACHINE

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Application March 13, 1950, Serial No. 149,388

Claims priority, application Switzerland
September 29, 1949

3 Claims. (Cl. 30-228)

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This invention relates to nibbling machines, i. e. to high-speed punching devices, and more especially to the type of portable nibblers provided with means for limiting the feed of the sheet material to be cut between two working strokes to a predetermined maximum.

The hand-operated nibblers are provided with a reciprocating punch which cooperates with a die located in its path.

In the use of these hand-applied nibblers difficulties have been encountered for instance when cutting out a circular section of a work-piece which is fixed in position, because it then becomes necessary to turn the nibbler as a whole through 360° about its punching axis. Since the nibbler has the driving motor mounted in its handle, its length in horizontal direction frequently meets an obstacle which renders it impossible to turn the device about its working head through a complete circle. Working in such a way has moreover proved to be very awkward.

It is an object of this invention to improve portable nibblers as hitherto used by making the punch and the die cooperating with it capable of being rotated manually by the operator through a full circle, while the tool is in operation.

In the drawings affixed to this specification and forming part thereof an embodiment of this invention is illustrated diagrammatically by way of example.

In the drawing:

Fig. 1 is a side view, partly in axial section;

Fig. 2 is a cross-section on the line A—A in Fig. 1;

Fig. 3 is a cross-section on the line B—B in Fig. 1 viewed from below;

Fig. 4 is a cross-section viewed from above on the line C—C in Fig. 1;

Fig. 5 is an elevation of the punching die;

Fig. 6 is a vertical section of the manually movable head or guide surrounding the punching tool and of the die seated in its carrier; and

Fig. 7 is a view of a horizontal section on the line VII—VII in Fig. 6, looking in the direction of the arrows, showing the punching tool in position in a perforation of a metal plate operated upon by the tool.

Referring to the drawing, 1 is the motor casing, 2 is the motor shaft and 3 is a pinion on this shaft which meshes with a larger gear 4 of a reduction gearing, being mounted together with the pinion 5 on a stationary axle 6 which is supported in the motor casing and the gear case 7 respectively. This case is fixed to the motor casing 1 by means of screw bolts 8. Another axle 55

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9 mounted in both casings supports the last gear 10 of the reduction gearing. Screws such as 11 or other means may be provided to prevent the axles from turning.

The gear 10 is formed with an eccentric hub 10' loosely embraced by the annular head of a rod 12 and is turned continuously, but at reduced speed when the motor is running.

The gear case ends, perpendicular to the motor-axis, in a cylindrical extension 13 the circumferential surface of which is threaded, and is formed with a central bore containing a cylindrical liner 14 which serves as a guide for the cross head linking the eccentric rod 12 to the head 20 of the punching tool 19.

The punching tool extends through a tool head 15 projecting into the liner 14 with a short neck 16 and having a flange 17 formed around its top.

A threaded cap 18 screwed on the casing extension 13 holds the tool head 15 applied against the bottom of extension 13, the axial length of the cap 18 being such that on the cap being screwed down on the said extension the head 15 remains fit to be turned by hand.

The punch 19 is axially reciprocable in the central boring of the head 15 and its top 20 is so dimensioned as to fit in the liner 14 for ready axial movement. The top is slotted to embrace the end of the eccentric rod 12 which is linked to it by a journal 21 and, on the eccentric 10' being rotated, reciprocates in the bore of the head 15.

The nibbling tool 19 is a cylindrical steel rod, to the lower end of which is fixed a cylindrical extension 19' of materially lesser diameter. The lower end of the cylindrical steel rod 19 forms the punch proper in the form of an edge 19a which extends through a full circle and renders it possible to nibble the work 40 from the wall 41 (see Figs. 6 and 7) in any direction without turning the punch around its axis.

On the bottom end 15' of the head 15 is mounted the punching die 32, and right above it the bottom end of the tool head 15 is formed with a deep notch 22 extending near to 300° around the punch 19 and leaving the main body and the bottom end of the head 15 connected with each other only by a narrow neck 23 (Fig. 4). The width of this notch is somewhat less than the length of stroke of the punch. The neck 23, being comparatively highly stressed by the rapidly succeeding punching or nibbling strokes, is preferably made of non-hardened high-duty material. The hardened steel punch preferably co-

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operates with a likewise hardened die. To this end the bore at the foot of the head is larger in diameter than the die and a part of its length is formed with screw thread, the remainder being conical. In this bore is removably inserted the threaded die 32 of hardened steel.

Since the tool head 15 is capable of circumferential movement through 360° in both directions relative to the gear case 7, the notch 22 can always be so adjusted as to take up that position which is most favorable for the operation which is going on at any time. In order to be able to fix the head with its notch in any desired position, a notched cap 24 is secured to the head 15, for instance by means of a set screw 25 (Fig. 1), and near the notches 26 of this cap a double armed locking lever 27, acted upon by a spring 30, is seated on an axle 29 fixed in the motor casing so as to extend into one of the notches 26 on the cap. By pressing on the free arm 27 of the locking lever, the cap 24 and the head can be released for circumferential adjustment. Near the lever 27 the motor switch 31 is arranged which can be operated by means of the same finger that releases the lever 27.

I wish it to be understood that I do not desire to be limited to the exact details shown and described, for obvious modifications will occur to a person skilled in the art.

I claim:

1. A nibbling machine, comprising a casing, a reciprocating power-driven mechanism mounted in said casing, a punching tool rod secured with one of its ends to said power-driven mechanism to be reciprocated thereby, a punching edge all around said tool rod, a guiding sleeve mounted on said casing to be rotated around said tool rod which it guidingly surrounds, a die receiving and guiding the free end of said tool rod and means to firmly secure said die to said guiding sleeve,

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said means exposing said punching edge between said die and said guiding sleeve.

2. A nibbling device, comprising a casing, a reciprocating power-driven mechanism mounted in said casing, a punching tool rod secured with one of its ends to said power-driven mechanism to be reciprocated thereby, a punching edge on and all around said tool rod, a guiding sleeve mounted on said casing to be manually rotated around said tool rod which it guidingly surrounds, latching means to hold said sleeve in a selected position on said casing, a die receiving and guiding the free end of said tool rod and means to firmly secure said die to said guiding sleeve, said means exposing said punching edge between said die and said guiding sleeve.

3. A nibbling device, comprising a casing, a reciprocating power-driven mechanism mounted in said casing, a punching tool rod secured with one of its ends to said power-driven mechanism to be reciprocated thereby, a punching edge all around said tool rod, a guiding sleeve mounted on said casing to be freely rotated around said tool which it guidingly surrounds, latching means to hold said sleeve in a selected position on said casing, a die receiving and guiding the free end of said tool rod and a narrow neck integrally joining said die to said sleeve permitting a large portion of said punching edge to be exposed.

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