July 28, 1964 O. BRANDT 3,142,076

COLLAPSING DIE HEAD WITH TRIP MEANS SELECTIVELY POSITIONED TO PERMIT MANUAL COLLAPSE

Filed May 16, 1962 2 Sheets-Sheet 1

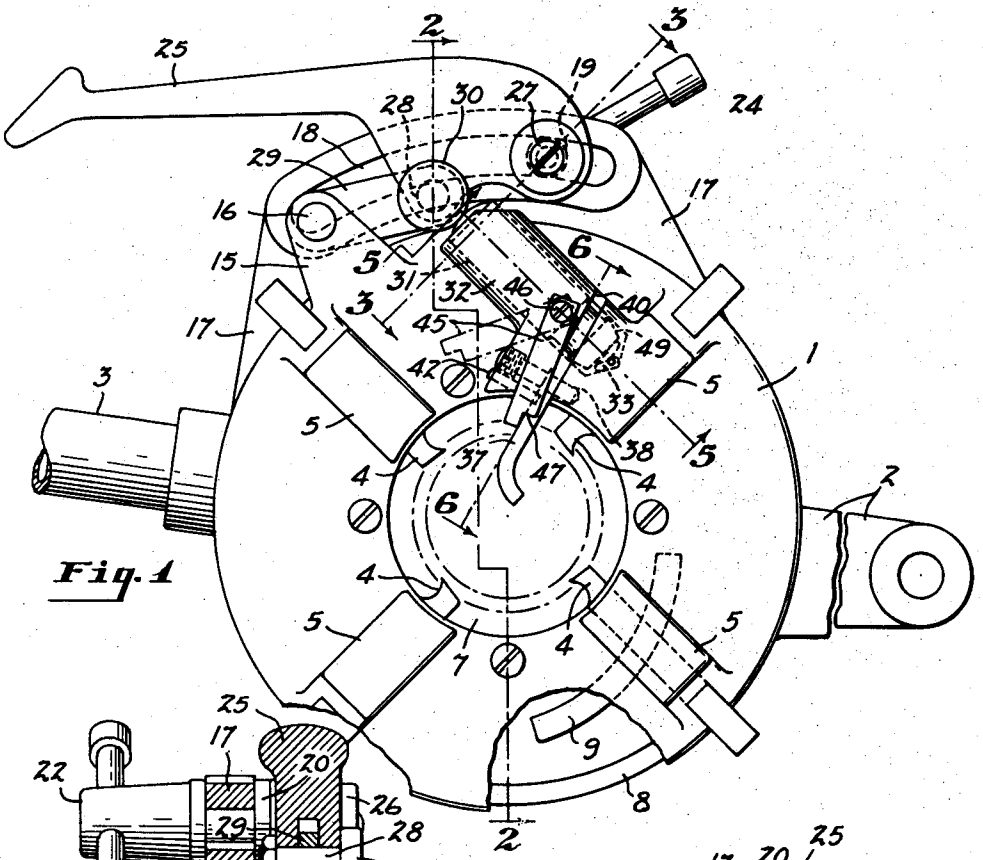

Fig. 1

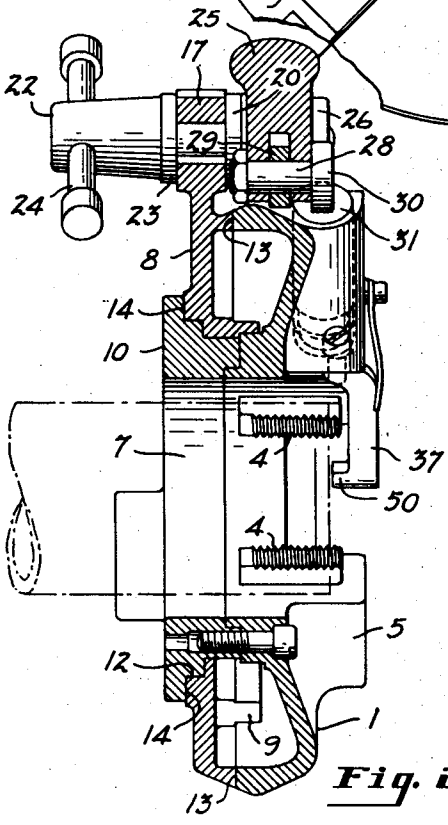

Fig. 2

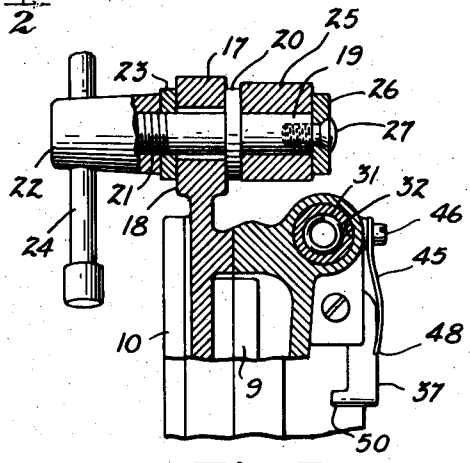

Fig. 3

INVENTOR

Ove Brandt

BY McCoy, Greene & DeGroteluis

ATTORNEYS

July 28, 1964 O. BRANDT 3,142,076

COLLAPSING DIE HEAD WITH TRIP MEANS SELECTIVELY POSITIONED TO PERMIT MANUAL COLLAPSE

Filed May 16, 1962 2 Sheets-Sheet 2

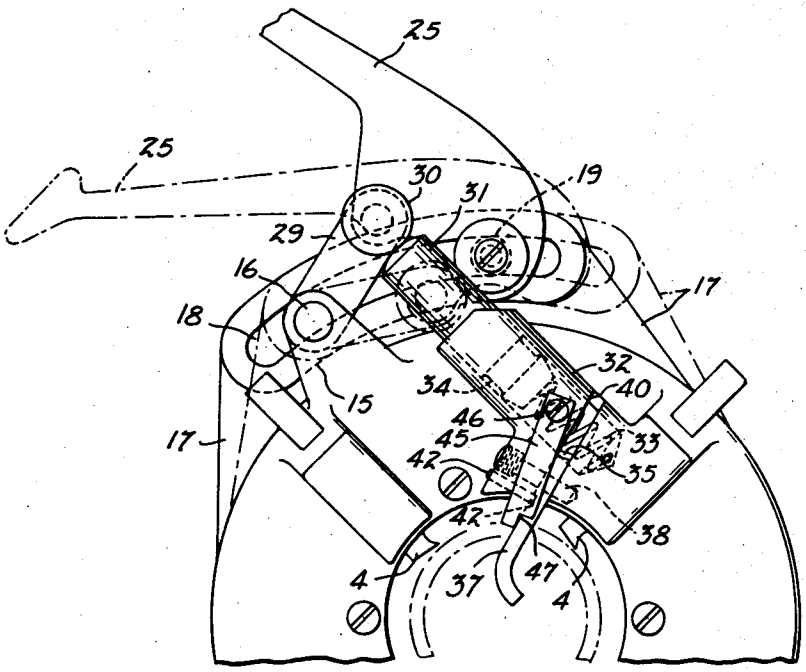

Fig. 4

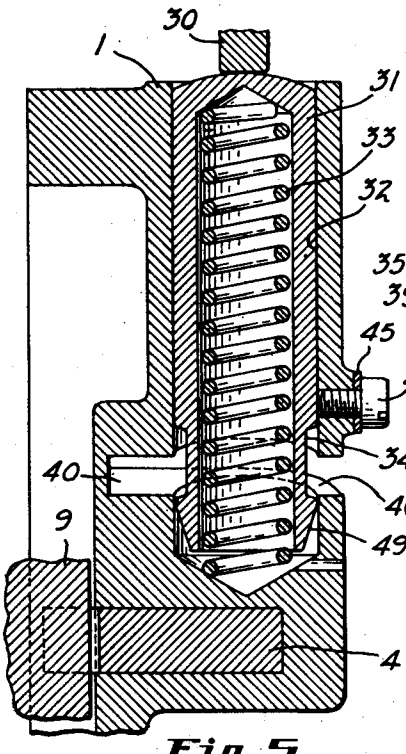

Fig. 5

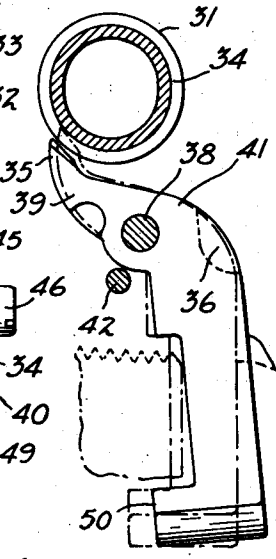

Fig. 6

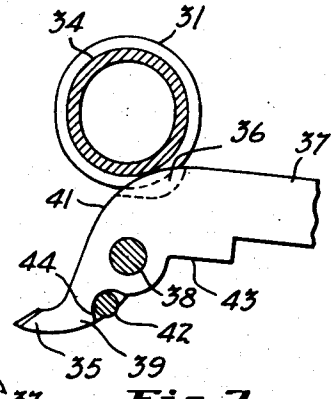

Fig. 7

INVENTOR

Ove Brandt

BY McCoy, Greene & De Grotenhuis

ATTORNEYS

United States Patent Office 3,142,076 Patented July 28, 1964

3,142,076

COLLAPSING DIE HEAD WITH TRIP MEANS SELECTIVELY POSITIONED TO PERMIT MANUAL COLLAPSE

Ove Brandt, South Euclid, Ohio, assignor to The Plymouth Corporation, Wickliffe, Ohio, a corporation of Ohio

Filed May 16, 1962, Ser. No. 195,120
5 Claims. (Cl. 10—96)

This invention relates to thread cutting die heads and more particularly to the provision of an automatic control of the thread cutting chasers for moving the chasers out of cutting position when a predetermined length of thread has been cut, the automatic control device being so designed that it may be quickly and easily set either for automatic control of the chasers or to permit manual control of the chasers when it is desired to cut threads of indeterminate length or of a length greater than the standard length for a particular size of pipe.

In the die head of the present invention means is provided for moving one or more chasers from their thread cutting position to a non-cutting position. A manual means is provided for actuating the chaser moving means and a spring pressed actuating member is also provided together with means for releasably locking said member in a retracted position where it does not interfere with the actuation of the chaser moving means manually. When the locking means is released the actuating member acts upon the chaser moving means to shift the chasers out of their cutting position. For automatically releasing the chasers after a predetermined length of thread has been cut a trip arm is provided which is adjustable on the die head to a position in the path of the workpiece or to a non-tripping position laterally clear of said path. When the trip arm is actuated by engagement of the workpiece therewith, the locking means for the actuating member is released to automatically shift the chasers out of thread cutting position.

It is often desirable to control the operation of the chasers manually rather than automatically and, to permit such control, the trip arm may be moved to and held in a position laterally clear of the work and means is also provided for locking the spring operated actuating member in retracted position when the trip arm is in its non-tripping position so that the chasers are controlled solely by the manual actuating means. The actuating member is preferably in the form of a spring pressed plunger and this plunger is locked in retracted position by means of detents carried by the trip arm, one of which serves to hold the plunger retracted until the trip arm is engaged and tripped by the workpiece and the other of which serves to lock the plunger in retracted position while the trip arm is in its non-tripping position.

Reference should be had to the accompanying drawings forming part of this specification in which:

FIGURE 1 is a front elevation of a die head embodying the invention;

FIG. 2 is a vertical section taken on the broken line indicated at 2—2 in FIG. 1;

FIG. 3 is a fragmentary section taken on the line indicated at 3—3 in FIG. 1;

FIG. 4 is a fragmentary front elevation showing the thread cutting chasers, the cam plate and the cam plate actuating member in the position that they occupy when the thread cutting chasers are moved radially to a position clear of the work;

FIG. 5 is a fragmentary section taken on the line indicated at 5—5 in FIG. 1;

FIG. 6 shows the trip arm positioned in the plunger locking position from which it is automatically released and in the path of the pipe being threaded; and

FIG. 7 shows the trip arm positioned in the plunger locking position in which it is out of the path of the pipe being threaded.

In the accompanying drawings the invention is shown applied to a thread cutting die head of a type commonly used for pipe threading. The die head is provided with a body portion 1 which is supported in fixed position by suitable means such as supporting arms 2 and 3 rigidly attached to the body 1. The body 1 supports one or more thread cutting chasers 4 mounted in holders 5 that are slidable radially in the body 1. The body 1 is of annular form to provide a central opening 7 through which a pipe or other workpiece being threaded is fed axially and the chasers 4 are movable radially into and out of cutting position with respect to the workpiece. The radial shifting of the chasers 4 is effected by means of an annular cam plate 8 that is rotatably mounted on the body 1 and that is provided with a cam rib 9 engageable with each of the holders 5 to shift the chasers to and from their cutting position. The cam plate 8 is supported upon a bearing ring 10 rigidly attached to the body 1 and provided with a shouldered periphery on which the cam plate 8 turns. The periphery of the ring 10 has a cylindrical bearing portion 12 that is coaxial with the die head and the cam plate is held against axial movements with respect to the body 1 by thrust bearing faces 13 and 14 on the body 1 and ring 10 which engage opposite sides of the plate 8.

The body 1 has a lug 15 projecting radially from its periphery which receives a pivot pin 16 and the cam plate 8 has a wide radially projecting portion 17 provided with an arcuate slot 18 centered with respect to the axis of the head. A pivot pin 19 is secured in adjusted position in the slot 18. The pivot 19 has an integral flange 20 intermediate its ends that engages the outer face of the plate 8 and a threaded inner end portion 21 which receives a nut 22 which clamps a washer 23 against the inner face of the plate and clamps the pivot pin 19 in adjusted position in the slot 18. The nut 22 may be provided with an actuating handle 24 for convenient operation. A lever 25 is pivoted on the pin 19 outwardly of the flange 20 and between the flange 20 and a washer 26 held against the outer end of the pin by means of a screw 27. The lever 25 has a pivot pin 28 spaced laterally from the pivot 19 and a short link 29 connects the pivot pin 28 to the pivot pin 16. The inner end of the lever 25 and the link 29 provide a toggle connection between the pivots 16 and 19 fixed to the body 1 and the cam plate 8. When the lever 25 is swung radially outwardly the toggle is broken and the pivot 19 is moved toward the pivot 16, shifting the cam plate 8 angularly with respect to the body 1 and causing the cam 9 to simultaneously shift the chasers radially outwardly from their cutting position to a non-cutting position out of engagement with the work.

In the innermost position of the lever 25 the toggle pivot 29 is moved slightly past dead center, the inward movement of the toggle being limited to a position where the chasers are in thread cutting position. By adjusting the pivot pin 19 in the slot 18 the holders 5 can be adjusted radially inwardly or outwardly for properly positioning the chasers for operation on workpieces of different diameters. In any position of adjustment of the cam plate 8 with respect to the body 1 the toggle connection formed by the lever 25, link 29 and pivot 28 imparts a radial movement of the holders 5 sufficient to move the chasers into and out of cutting position with respect to a workpiece.

The die head and toggle actuator as above described is of conventional construction, the present invention being concerned with an improved trip operated device by means of which the chaser releasing mechanism can be

automatically actuated when a thread of a predetermined length has been cut.

The pivot pin 28 is provided with a cylindrical head 30 which is of a diameter to project radially inwardly past the inner edge of the lever 25 for engagement with the outer end of a plunger 31 that is slidably mounted in a cylindrical chamber 32 formed integrally with or rigidly secured to the body 1. A spring 33 in the chamber 32 presses the plunger 31 toward the head 30 in a direction to shift the toggle pivot radially outwardly and to move the cam plate 8 angularly with respect to the body 1 to shift the chasers out of thread cutting position. The plunger 31 is provided with a circumferential groove 34 adjacent its inner end which is adapted to receive a detent 35 and a detent 36, either of which serves to retain the plunger 31 in retracted position. While the plunger is locked in its retracted position the lever 25 can be operated at any time to shift the chasers to or from their cutting positions.

The detents 35 and 36 are carried by a trip arm 37 which is pivoted to swing about a pivot 38 on the body 1 outwardly of the opening 7 and disposed transversely with respect to the axis of the head. The trip arm 39 is movable on the pivot 38 from a position in which it lies in the path of a workpiece being threaded to a position where it is laterally clear of said path. The detent 35 is carried by a laterally projecting outer end portion 39 of the trip arm 37. The detent 35 is so positioned that when the arm 37 is swung radially inwardly to a position in which its inner end extends into the path of a workpiece being fed through the central opening 7 of the head, the detent 35 will be positioned in a slot 40 formed in the wall of the chamber 32 in position to engage in the circumferential groove 34 of the plunger to lock the plunger in retracted position. The arm 37 has a shoulder portion 41 disposed laterally of the pivot 38 on the side thereof opposite the lateral extending portion 39 and this shoulder has a portion notched to provide a detent 36 which extends into the slot 40 in position to engage in the groove 34 when the trip arm 37 is swung to its outermost position where it is laterally clear of the work passing through the opening of the die head. A stop pin 42 disposed radially inwardly of the pivot pin 38 engages with shoulders 43 and 44 on the trip arm 37 to limit the swinging movement of the arm 37 in either direction, the trip arm when in its innermost position being in the path of the workpiece with the detent 35 in locking position and in its outermost position being positioned laterally clear of the work with the detent 36 in its locking position.

In order to yieldingly hold the trip arm in its tripping position, a leaf spring 45 is pivoted to the chamber 32 to swing laterally with respect to the trip arm 37 and into and out of engagement with the trip arm 37. The leaf spring 45 has a notched end 47 engageable with the trip arm 37 and an inturned positioning portion 48 engageable with a side of the trip arm 37. When in engagement with the trip arm 37, the spring 45 serves to yieldably hold the trip arm in its locking position with respect to the plunger and to yieldably resist movement of the arm in a direction to release the locking detent 35. When the trip arm 37 is swung to its outermost non-tripping position the detent 36 is moved to its locking position. The plunger 31 can be moved to its retracted position by actuation of the lever 25 and may be held by the lever 25 while either of the detents is moved into engagement with the groove 34. To facilitate engagement of the detents with the groove 34 the inner end 49 of the plunger 31 is tapered so that when the plunger is moved to its innermost position by means of the lever 25 the tapered end will engage with either of the detents which might be in locking position to brush the detent to one side while the tapered portion 49 is passing the detent, whereupon the detent may be moved back into locking position in the groove 34 to retain the plunger in retracted position. When the trip arm is in work engaging position the spring 45 yieldably presses the arm in a direction to hold the detent 35 in locking position so that after the tapered portion 49 has moved past the detent the detent will be shifted by the spring 45 into locking position in the groove 34. When the trip arm is in its outermost non-tripping position the arm may be pressed manually toward its locking position so that it will enter the groove 34 after the tapered end 49 has moved past the detent 36 or the arm may be moved to locking position while the plunger is held in fully retracted position by the lever 25. The detent 36 is so formed that it has a substantial area engaged by the wall of the groove 34 so that the engagement of the detent with the plunger provides a frictional retaining means to hold the trip arm in its retracted position as well as to lock the plunger in retracted position. When the trip arm is moved to its non-tripping position locking the plunger 31 in its retracted position, the movement of the chasers is controlled solely by means of the manually operable lever 25 so that threads of any desired length may be cut.

It is to be understood that in accordance with the provisions of the patent statutes, variations and modifications of the specific devices herein shown and described may be made without departing from the spirit of the invention.

I claim:

1. In a thread cutting die head having an opening through which a workpiece to be threaded may be fed, a radially movable thread cutting chaser, means for moving said chaser into and out of thread cutting position and manually operable means for actuating said chaser moving means, retractable means engageable with said moving means for automatically actuating said chaser moving means independently of said manually operable means to move the chaser out of thread cutting position after a predetermined length of thread has been cut comprising a spring operated member for actuating said chaser moving means to move said chaser out of cutting position, releasable means for holding said member in a retracted position where it does not interfere with the manual operation of said moving means comprising, a trip arm movably mounted on said head for adjustment to a tripping position in the path of a workpiece being fed through said head or to a non-tripping position clear of said path, locking means engageable with said spring operated member to hold the same in retracted position, said locking means being connected to said trip arm for movement into locking position upon movement of the trip arm to tripping position and to releasing position upon movement of the trip arm by the work piece and a second locking means connected to said trip arm for movement into locking engagement with said spring operated member for holding it in retracted position when said trip arm is moved out of the path of the work and for retaining said trip arm in non-tripping position.

2. In a thread cutting die head having an opening through which a workpiece to be threaded may be fed, a radially movable thread cutting chaser, means for moving said chaser into and out of thread cutting position and manually operable means for actuating said chaser moving means, retractable means engageable with said moving means for automatically actuating said chaser moving means independently of said manually operable means to move the chaser out of thread cutting position after a predetermined length of thread has been cut comprising a spring operated member for actuating said chaser moving means to move said chaser out of cutting position, releasable means for holding said member in a retracted position where it does not interfere with the manual operation of said moving means comprising a trip arm movably mounted on said head for adjustment to a tripping position in the path of a workpiece being fed through said head or to a non-tripping position clear of said path, locking means engageable with said spring actuated member to hold the same in retracted position, said locking means being movable with said trip arm into locking position upon movement of the trip arm to tripping position and

to releasing position upon movement of the trip arm by the work piece and a second locking means movable with the trip arm into locking engagement with said spring operated member for holding it in its retracted position when said trip arm is moved out of the path of the work and for retaining said trip arm in its non-tripping position.

3. In a thread cutting die head having an opening through which a workpiece to be threaded may be fed, a radially movable thread cutting chaser, means for moving said chaser into and out of thread cutting position and manually operable means for actuating said chaser moving means, a spring actuated plunger engageable with said moving means for actuating said chaser moving means to move said chaser out of its thread cutting position independently of said manually operable means, a trip arm pivotally mounted on said head to swing about an axis transverse to the path of movement of a workpiece through said head and movable about said axis to a tripping position in the path of a workpiece or to a non-tripping position laterally clear of said path, means including a detent carried by said trip arm movable into locking position with respect to said plunger for locking

said plunger in its retracted position when said arm is moved to its tripping position and out of its locking position for releasing said plunger when said trip arm is moved by engagement of the workpiece with it, and means including a second detent carried by said trip arm movable into locking position with respect to said plunger for locking said plunger in retracted position when said trip arm is moved to its non-tripping position.

4. In a thread cutting die head the combination as set forth in claim 3 in which the two detents are integral with the trip arm and alternately engageable with the plunger.

5. In a thread cutting die head the combination as set forth in claim 3 in which a leaf spring is mounted on the die head for engagement with the trip arm when in tripping position to yieldably resist movement of the trip arm by the workpiece.

References Cited in the file of this patent

UNITED STATES PATENTS

873,334	Westrip	Dec. 10, 1907
1,701,846	Harrison	Feb. 12, 1929