This invention relates to improvements in roller box tools.
Roller box tools according to the invention are made in such a manner as to eliminate lengthy times in setting up by skilled setters, whereas unskilled operators can set them up on their own jobs in a very few minutes by simple adjustments. It is necessary to adjust only one roller which in turn takes up errors in the machine between the head and tail stock and automatically centralises itself.

The tool is similarly easy to set for quick setting. Two rollers, one spring loaded, are adjusted through a train of gearing for centralising and simultaneously operated, for various diameters. The tool is contained in a housing which can be raised or lowered by an adjusting screw on to the stock to which is to be machined, after which the tool is locked for operation.

In the accompanying drawings which illustrate one example of the invention,

FIGURE 1 is a front elevation, partly in section of the roller box tool, the rollers and tool being in the inner most stock engaging position;
FIGURE 2 is a side sectional elevation on II—II,
FIGURE 3 is a rear elevation partly in section;
FIGURE 4 is a sectional detail of the tool carrier; and,
FIGURES 5 and 6 are detail views of the slide members.

A body member, generally designated 1 is provided with means for securing it to the turret or tail stock of a machine tool, for example, a back plate 2, screwed into the back of the body member, and provided with a tail stock or turret engaging spigot 3. The machined stock passes through a central bore 4.

The front face of the body member 1 is provided with slots 5, 6, for the reception of slide members, generally designated 7, 8. Each of the slide members 7, 8, is provided with side flanges 9, 10. The slide members are retained in the body member 1 by retaining plates 13 secured to the face of the body member.

The slide member 8 has a toothed rack cut in the tang 9 and the slide member 7 has a toothed rack cut in the tang 9.

Toothed racks 14 are engaged by gear pinions 16, 17.
Both gear pinions are double ended, that is, they both have a toothed gear wheel at each end of a central stub shaft 18 carried in the body member 1. The gear pinions mesh with a spur gear 22 mounted on a bush 23 in the body member 1.

A worm gear 24, meshes with the spur gear 22. The worm gear 24 has a plain end 25 terminating in a slotted head 26. The plain end 25 passes freely through a flanged nut 27 screwed into the threaded upper portion 28 of a compartment 29 in the body member 1. The flanged nut 27 restrains the worm gear 24 from axial movement in one direction and a ball 30, held in position by an adjusting grub screw 31 prevents axial movement of the worm gear in the other direction.

From the foregoing description it will be obvious that rotation of the worm gear 24 will rotate the spur gear 22 and pinion gears 16, 17, causing the slide members 7, 8 to move radially inwardly or outwardly on the toothed racks 14, 15, towards or away from the longitudinal axis of the bore of the body, thereby accommodating machined stock of different diameter.

Each slide member 7, 8, is provided at one end with a stock engaging roller 32, 33 respectively.

The slide member 8 has its associated roller 33 mounted on a spindle 34 having an enlarged keyed head 35 and a threaded portion 36. The spindle 34 passes through a hole 37 in the slide member 8 and the threaded portion 36 is securely engaged by a nut 38 in a recess 39 in the rear face of the slide member 8, locking the spindle into place.

Ball tracks for balls 41 corresponding to a ball track on the spindle and a thrust washer 40 afford a running fit for the roller 33 when tightened, by the key in the head 35.

The slide member 7 has its associated roller 32 mounted on a spindle 42 having an enlarged keyed head 43 and a threaded rear portion 44. The spindle 42 passes through a slot 45 in the slide member 7 and the threaded portion 44 has threaded thereon a nut 46 and washer 47 in a recess 48 in the rear surface of the slide member.
When tightened up by rotating the head 43, the nut 46 and washer 47 bear against flanges 49 in the recess 48. When the nut 46 is loosened the spindle 42 is free to move up or down within the confines of the slot 42 subject to locking means hereinafter described.

Ball tracks for balls 51 corresponding to a ball track on the spindle and a thrust washer 50 afford a running fit for the roller 32 when tightened by the head 43.

The upper portion of the slide member 7 is drilled as far as the slot 45 and the upper end of the resultant hole 52 is tapped at 53. A spring 54 is inserted in the hole and bears on the spindle 42. A pilot screw 55 is screwed into the tapped hole 53, the pilot screw 55 having a shank 56, of reduced diameter.

When it is desired that machined stock should be passed through the bore of the body, an initial adjustment of the rollers 32, 33 is made to allow the machined stock to be passed into the bore, and any inaccuracies of alignment between the stock feeding chuck and the turret or tail stock are accommodated by the resilient floating action of the roller 32 the spindle 42 of which can rise and fall within the confines of the slot 45 under the action of the spring 54. Once the necessary adjustment has been made the head 43 is turned to lock the spindle and the pilot screw is advanced so that the shank 56 bears on the spindle 42 to prevent undesirable radial movement.

A tool post housing 57 consists of a substantially rectangular box having a stud 58 projecting from one end, the stud passing through a slot 59 in a lug 60 cast on the body member 1. A nut 61 clamps the tool post housing to the lug 60 in any desired longitudinal axial position within the confines of the slot 59.

A tool 62 is carried in a tool container 63 positioned within the confines of the tool post housing 57. The tool 62 is locked in position by a stud 64.

An adjusting screw 65 is carried in the tool post housing 57, the head 66 of which protrudes beyond the tool post housing. The tool container 63 is provided with a threaded side 67 engaging the adjusting screw 65 so that rotation of the adjusting screw will move the tool container 63 within the confines of the tool post housing 57, the remainder of the hole passing through the tool post carrier is cleared enabling the adjusting screw to be quickly raised or lowered when engaging the screw thread in the container.

The tool container is provided with a threaded tubular member 68 onto which is screwed a cap 69, at the opposite end of which is provided a flange 70. The cap 69 itself is provided with a tapped hole, the cap 69 being threaded an adjusting stud 70. Thus, when the stud 64 is loosened, the tool may be adjusted by manipulation of the adjusting stud 70.

A quick setting of the tool relatively to the stock may be obtained by pulling the head 66 of the adjusting screw
65 outwardly, after loosening the cap 69. The tool container 63 will thus be pulled to the end of the tool post housing. The head 66 is then released and the tool container, and tool, will slide towards the stock. When the tool has assumed the correct position the tool container is clamped in position by tightening the cap 69.

A variety of tools may be fitted into the tool container.

In place of the worm and spur adjustment described each pinion gear may be adjusted, as by a key passed through the body member to enter a slot in the end face of a pinion gear.

I claim:

1. A roller box tool comprising a body member having a central opening therethrough, synchronously adjustable roller means movable toward and away from the center of said central opening, a tool housing having a stud projecting therefrom, said body member having a lug with a slot therein through which said stud passes, means on said stud for fixing said housing in adjusted position along said slot, a tool container, a chamber in said tool housing in which said tool container may slide and being elongated along the axis of said stud and perpendicular to the axis of said stud, a bolt mounted in said tool housing for rotatable movement and extending in a direction parallel to the axis of said stud, said tool container being formed with a threaded opening therethrough in alignment with said bolt so that turning said bolt moves the tool container toward and away from said stud, a tool, an opening in said tool container in which said tool is mounted and extending in a direction normal to the axis of said slot and said stud, a set screw for holding said tool in fixed position with respect to said tool container, means for adjusting the position of said tool in said container including a screw in the base of said container and extending along the axis of said opening therein so that the amount of tool projection into the central opening may be adjusted when the set screw is released, said screw being at the lowest portion of the container and said tool housing being disposed at the lower portion of said body member so that when said screw is retracted said tool retracts from the center of the central opening by gravity, whereby the tool may be adjusted along three perpendicular planes.

2. A roller box tool as claimed in claim 1, wherein the synchronously adjustable roller means comprises two rollers one of which is spring biased inwardly towards the center of the central opening.

3. A roller box tool as claimed in claim 1, wherein the synchronously adjustable roller means includes radial slots communicating with the central opening, slides mounted for reciprocating movement in said slots, roller supporting means on each slide, a roller supported by each of said means for rotation about an axis substantially parallel to the axis of said central opening, only one of said means supporting its roller resiliently for adjustment longitudinally of the respective slide and the other said means supporting the respective roller with its axis in fixed relation to the respective slide, and a gear train for moving said slides towards and away from the axis of said central opening in the body member, said gear train including a rack formed along one surface of each slide, a pinion engaged with each rack, a spur gear engaging said pinions, and a worm gear in driving relation with said spur gear so that movement of said worm gear gives a corresponding movement of said slides in the slots.

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