

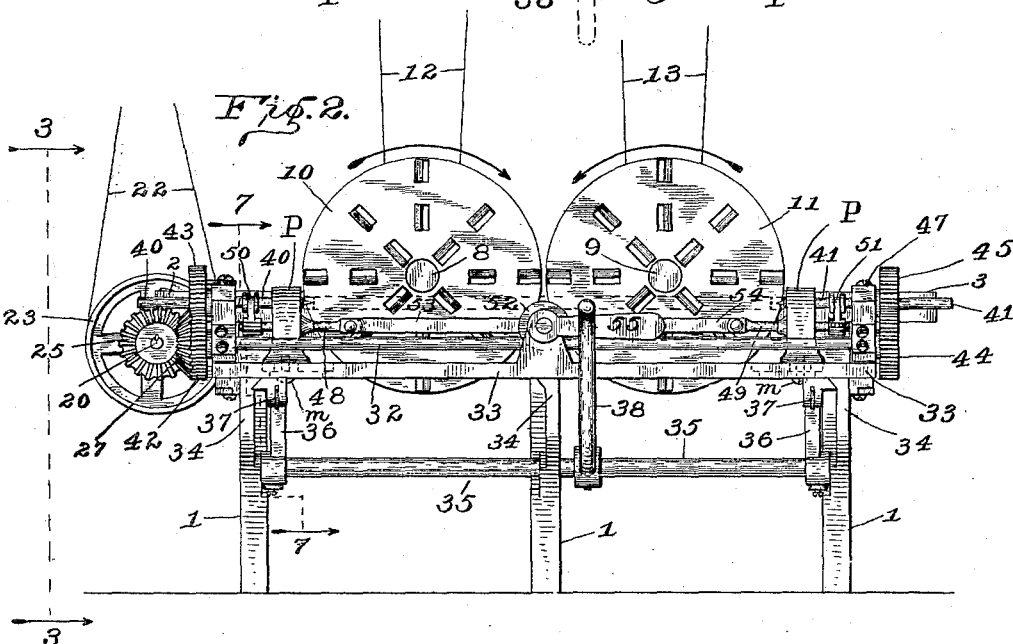
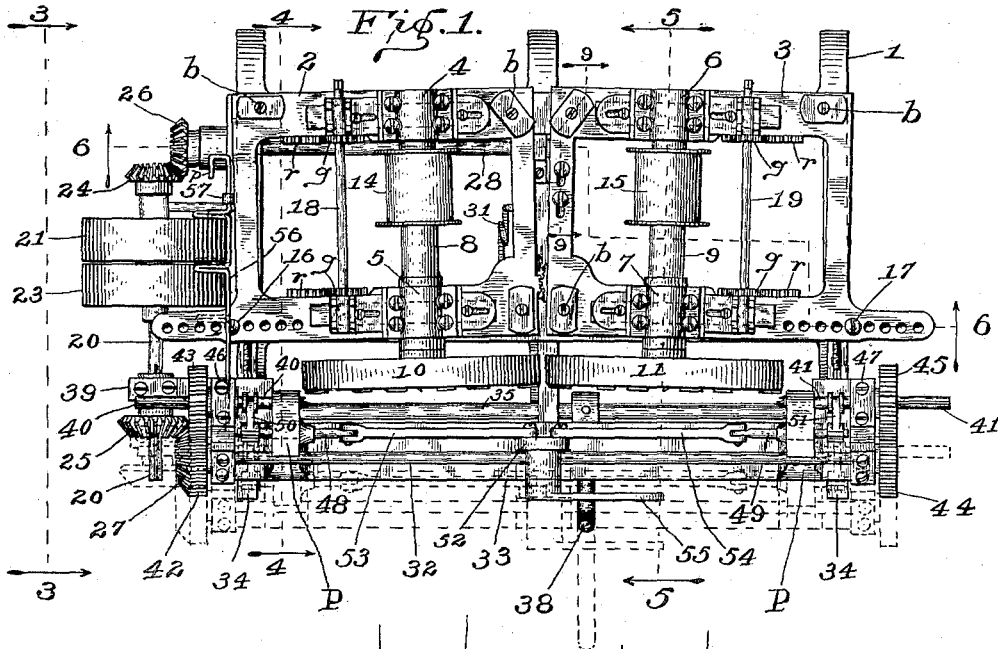
C. C. HICKEL.

SINGLETREE AND NECK YOKE LATHE.

(Application filed June 19, 1900.)

(No Model.)

3 Sheets—Sheet 1.



WITNESSES:

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CHRISTOPHER C. HICKEL, OF MUNCIE, INDIANA.

SINGLETREE AND NECK-YOKE LATHE.

SPECIFICATION forming part of Letters Patent No. 659,868, dated October 16, 1900.

Application filed June 19, 1900. Serial No. 20,837. (No model.)

To all whom it may concern:

Be it known that I, CHRISTOPHER C. HICKEL, a citizen of the United States, residing at Muncie, in the county of Delaware and State of Indiana, have invented certain new and useful Improvements in Singletree and Neck-Yoke Lathes, of which the following is a specification.

The object of my said invention is to produce a machine by which singletrees, doubletrees, and neck-yokes may be formed rapidly and efficiently and with the least possible waste or loss of parts.

A machine embodying my said invention will be first fully described and the novel features thereof then pointed out in the claims.

Referring to the accompanying drawings, which are made a part hereof, and in which similar reference characters indicate similar parts, Figure 1 is a top or plan view of a machine embodying my said invention, the chuck being shown open, but otherwise in the position it occupies when the machine is in operation in full lines, and thrown back ready to receive a new blank in dotted lines; Fig. 2, a front elevation thereof; Fig. 3, an end elevation as seen from the dotted line 3 3 alongside Figs. 1 and 2; Fig. 4, a transverse sectional view as seen from the dotted line 4 4 in Fig. 1; Fig. 5, a transverse sectional view as seen from the dotted line 5 5 in Fig. 1; Fig. 6, a longitudinal sectional view as seen from the dotted line 6 6 in Fig. 1; Fig. 7, a detail sectional view, on an enlarged scale, as seen from the dotted line 7 7 in Fig. 2; Fig. 8, a view of a portion of the chuck and attached mechanism as seen when looking outwardly from the cutter-heads, as indicated by the dotted lines 8 8; Fig. 9, a detail sectional view as seen from the dotted line 9 9 in Fig. 1, and Fig. 10 a detail view showing the construction by which the belt-shifter is enabled to act as a stopping device for the fast pulley.

Upon a suitable frame 1 I mount two cutter-head carriages 2 and 3, which are in most respects exactly alike. Upon these carriages are adjustable bearings 4, 5, 6, and 7, in which the shafts 8 and 9, carrying the cutter-heads 10 and 11, run, these shafts and cut-

ter-heads being driven by belts 12 and 13, running to pulleys 14 and 15 on said shafts, respectively. Said cutter-head carriages are secured to the frame 1 by pivots 16 and 17, respectively, said pivots being positioned at those corners nearest the outer edges of the cutter-heads, as shown, and at the other corners by clamping-bolts *b*, which pass down through slots in the frame of said carriages and enter the frame 1, the several slots being in effect arcs of circles struck from said pivots. The cutter-head carriages are thus permitted to swing on the pivots, shifting the cutters in and out, the motion at the inner edges being the greatest, for purposes which will hereinafter appear. As shown in Fig. 1, numerous holes are provided for the pivots 16 and 17, so that the pivotal point can be shifted as desired from a point immediately adjacent to the outer edges of the cutter-heads to a point considerably distant therefrom, with a resultant changing of the form of the article being made, as will hereinafter appear.

The several boxes or bearings 4, 5, 6, and 7 are adapted to be shifted longitudinally of the carriages 2 and 3 and the cutter-heads thus brought nearer to or farther apart, as may be desired, in making articles of different lengths and shapes. The boxes are mounted on slides on the carriages, and the pairs of boxes are connected, respectively, by shafts 18 and 19, upon which are spur gear-wheels *g*, which engage, respectively, with racks *r*, secured rigidly to the frames of the carriages 2 and 3. The boxes are held to the frames by bolts passing through slots, as shown, and when it is desired to adjust said boxes nearer to or farther from each other it is only necessary to loosen the bolts, turn the shafts 18 and 19 by means of suitable cranks or wrenches, and retighten the bolts, when they will be secured firmly in the new position. The shafts, spur-gears, and rack-bars being all precisely similar, the movement of all corresponding parts will be uniform.

The articles to be turned—namely, singletrees, doubletrees, and neck-yokes—are commonly oblong in cross-section, especially in the center, and it is therefore necessary to provide a means by which the cutters shall

advance toward and recede from the piece of wood being turned in a fixed and unvarying relation to the rotation of such piece of wood itself. I have therefore provided a connected
5 mechanism for operating the chucks and for swinging the cutter-head carriages on their pivots, as will now be explained.

At one end of the machine is a shaft 20, upon which is a tight pulley 21, by which it
10 is driven by means of a suitable belt 22, and a loose pulley 23, to which said belt may be shifted when it is desired that the mechanism of my improved lathe shall come to a rest. There are also upon this shaft 20 bevel-gears
15 24 and 25, which intermesh, respectively, with the corresponding bevel-gears 26 and 27 on shafts forming part of the carriage-reciprocating mechanism and the chucking mechanism, respectively. The shaft 28 of the chucking
20 mechanism, on which the gear 26 is secured, is mounted in bearings in the frame 1 and bears a cam 29, which, in the arrangement shown, engages with a projection 30 (which should have an antifriction roll or truck *t* in its face)
25 on the frame of the carriage 3, so that as said shaft revolves said cam operates to push said carriage over by its contact with said projection. A strong spring 31 bears at one point against the frame 1 and at another point, in
30 the arrangement shown, against the carriage 2. The carriages 2 and 3, as shown in Fig. 1, are so connected by means of segments or otherwise as to permit them an independent pivotal movement, while at the same time
35 causing them to move uniformly toward or away from the article being turned. The spring acts oppositely to the cam 29, and its force is arranged to hold the carriages as far away from the article being turned as possible,
40 while the cam as it revolves from time to time forces said carriages forward. By means of the connections before mentioned and a proper proportioning of the gears the chuck carrying the article to be turned is revolved
45 once during each reciprocal motion of the cutter-carrying carriages, so that its greatest diameter is operated upon when said carriages are forced farthest back by means of the spring and its smallest diameter is operated
50 upon when said carriages are forced farthest by the cam, as will be readily understood.

The shaft 20, as before stated, drives both the cutter-head-carriage-reciprocating and the chucking mechanism. The bevel-pinions
55 24 and 26 are of the same size, and the bevel-pinions 25 and 27 are of the same size. The shaft 32, which forms a part of the chucking and chuck-propelling mechanism, consequently revolves at the same rate of speed as
60 the shaft 28, forming a part of the cutter-head-carriage-operating mechanism. This shaft 32 is mounted in suitable bearings in a sliding frame or carriage 33, mounted on suitable ways on the brackets 34 of the frame 1.
65 This frame or carriage 33 is moved in and out

by means of a rock-shaft 35, having arms 36, which are connected by links 37, uniting said arms and said frame or carriage, the whole being operated through a lever 38, as will be readily understood. The sliding frame or
70 carriage 33 includes a bearing 39 for the hub of the bevel-pinion 25, which is mounted and revolves therein, being driven by the shaft 20, as before stated. Said pinion is secured to rotate with said shaft 20 by means of a
75 spline on said shaft, which permits said pinion a free movement longitudinally thereof, thus permitting it to travel with the other chucking and chuck-propelling mechanism as the same is operated by the levers 38, as
80 indicated by the dotted lines in Fig. 1. Said carriage 33 also has two adjustable pillars P, in which are bearings for the ends of the chucks 40 and 41 and also for the plungers 48 and 49. These pillars are capable of longi-
85 tudinal movement on the carriage 33 and are thus adjustable to accommodate the adjustment of the other parts when it is desired to change the machine to operate on different-sized blanks. Said pillars are held to the
90 body of the carriage by machine-bolts *m* and are kept in proper position by grooved ways in the face of said carriage, into which corresponding projections on the contacting
95 faces of the pillars enter. Also mounted in the sliding frame or carriage 33 are the chucks proper, 40 and 41, which engage with the ends of the piece of wood being turned. These are given their rotary movement by means of
100 pairs of spur-gears 42 43 and 44 45, one member of each pair being mounted on the shaft 32 and the other member of each pair on the shaft of the chuck 40 or 41. The hubs of the spur-gears 43 and 45 are mounted in bearings
105 46 and 47 on the frame 33, which bearings keep them in place, while they are connected to the shaft-like portions of the chucks 40 and 41 by means of splines thereon, and thus give said chucks their rotary movement. The chucks are forced endwise into and out of
110 engagement with the piece being turned by plungers 48 and 49, having bifurcated arms 50 and 51, which pass up between collars on the shaft portions of the chucks 40 and 41, as shown. These plungers 48 and 49 are oper-
115 ated from a central disk 52, through links 53 and 54, by means of a handle or lever 55.

The belt-shifter 56 is connected at one end to the chuck-carriage 33, while the other end is supported by means of a bearing 57 on the
120 frame 1. As the chuck-carriage is moved back and forth by means of the lever 38 the belt-shifter moves with it, so that when the chuck-carriage is moved to the position shown by dotted lines in Fig. 1 the driving-belt is
125 shifted to the idle pulley 23, with the consequence that the mechanism ceases motion. In order that the motion shall stop at precisely the desired point, I have provided a projection *p* on the belt-shifter 56, which ex-
130

tends down and is adapted to engage with the rim of the fast pulley 21 and to come in contact with an arm or projection *a* within the rim of said pulley, which of course as the belt is leaving said pulley and passing onto the pulley 23 causes the pulley 21, with all the mechanism driven thereby, to immediately stop and to always stop at the same point.

As an auxiliary to or substitute for the hand-lever 38 I may attach a foot-lever to the rock-shaft 35, as indicated by dotted lines in Fig. 3.

The operation of this machine is as follows:

When it is desired to make a whiffletree or neck-yoke with round ends and with a center of oblong shape, the pivots 16 and 17 are shifted to the holes adjacent to and immediately behind the outer edges of the cutter-heads 10 and 11, the cutter-heads themselves having been previously adjusted to that position where said outer edges of the cutter-heads will just reach the ends of the neck-yoke or singletree to be formed by means of the shafts 18 and 19 and the pinions thereon and the racks with which they engage. When the parts are thus adjusted, there is no perceptible movement of the outer edges of the cutter-heads caused by the cam 29 and the spring 31, the movement of the cutter-head carriages only resulting in a movement of said cutter-heads substantially such as would result from pivoting the outer edges and swinging the inner edges. This arrangement gives the greatest taper to the part being worked.

When it is desired that the ends of the article being turned shall also be oval in form, then the pivots 16 and 17 are shifted to other of the holes, the exact point of pivoting depending upon the shape desired. When it is desired to have the greatest oval possible, the pivots are shifted into the outer holes. In the drawings the pivots are shown at an intermediate point, and thus arranged to produce a shape commonly desired. The machine having been adjusted to the work required, the piece of wood forming the blank is placed between the chucks 40 and 41, which are forced toward each other by a proper movement of the handle or lever 55 through the intermediate parts, as before explained. During this operation the carriage 33 has occupied the position most distant from the cutter-heads, as indicated by the dotted lines in Fig. 1. After the blank is in place and firmly clamped there then the carriage 33 is moved up toward the cutter-heads by means of the lever 38, which brings said blank against the cutters, which, being in rotation, operate thereon and turn it down to the shape desired. When the turning has been completed, the carriage 33 is pulled away by means of the lever 38, a new blank inserted, and the operation repeated. Whenever it is desired to stop the machine, it may easily be done by means of the belt-shifter 56.

Having thus fully described my said invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, in a wood-turning lathe, of a suitable framework, two cutter-head carriages mounted thereon, cutter-heads mounted in said carriages, means whereby said cutter-head carriages may be simultaneously swung from pivotal points, a suitable chuck, means for driving said chuck and thus revolving the blank adjacent to the cutter-heads, and mechanism connecting the chuck-driving means with the cutter-carriage-reciprocating means whereby the same are caused to move in a fixed relation to each other.

2. The combination, in a wood-turning lathe, of a suitable frame, two cutter-head carriages mounted thereon and secured thereto by pivots at opposite points, means for swinging said cutter-head carriages on said pivots and thus moving the adjacent edges of the cutter-heads simultaneously to and from the work, a chuck for holding said work, a carriage for said chuck, means for moving said carriage toward and away from the cutter-heads, and means for imparting simultaneous motion to the chuck and to the cutter-head-carriage-operating mechanism.

3. The combination, in a wood-turning lathe, of a frame, cutter-heads mounted thereon, said cutter-heads being in the form of large disks with a series of cutters in their faces, a chuck-carriage also mounted on said framework, means for moving said chuck-carriage toward and from the cutter-heads, gears for driving the chucks mounted to rotate in bearings in the carriage, the chuck-shafts being mounted therein and having a free longitudinal movement in respect thereto as described, plungers having forked or bifurcated arms engaging with said chuck-shafts and adapted to move them longitudinally, a central disk, links connecting the same to said plungers, and a handle or lever for operating said disk.

4. The combination, in a wood-turning lathe, of a frame, a chuck-carriage, appropriate chucks therein, cutter-head carriages also mounted on the said frame, pivots securing said cutter-head carriages to said frame at opposite points, a cam operating against a projection on one of said cutter-head carriages to drive the same and its fellow in one direction, and a spring connected to the main frame and to one end of said carriages for driving said carriages in the opposite direction to that in which they are driven by said cam, and means whereby said carriages are united and caused to move together.

5. The combination, in a wood-turning lathe, of a framework, a suitable work-holding chuck, two cutter-head carriages adjustably secured to said framework, cutter-heads provided with shafts mounted on said carriages, boxes by which the same are so mount-

ed, and means whereby each pair of boxes
may be simultaneously adjusted longitudi-
nally of said carriages, whereby the cutter-
heads may be adjusted toward or from each
5 other.

6. The combination, in a wood - turning
lathe, of a frame, a movable chuck-carriage
thereon, a driving-shaft, a tight and a loose
pulley on said driving-shaft, and a belt-shifter
10 connected to the chuck-carriage and adapted
to shift the belt from the tight to the loose
pulley as the chuck-carriage is moved away

from the cutter-heads, said belt-shifter being
provided with a projection adapted to engage
with and stop said tight pulley, substantially 15
as set forth.

In witness whereof I have hereunto set my
hand and seal, at Indianapolis, Indiana, this
15th day of June, A. D. 1900.

CHRISTOPHER C. HICKEL. [L. S.]

Witnesses:

CHESTER BRADFORD,
JAMES A. WALSH.