No. 630,928. Patented Aug. 15, 1899.

G. W. PRINGLE & W. BRODIE.

WOOD TURNING MACHINE.

(Application filed Mar. 6, 1899.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.

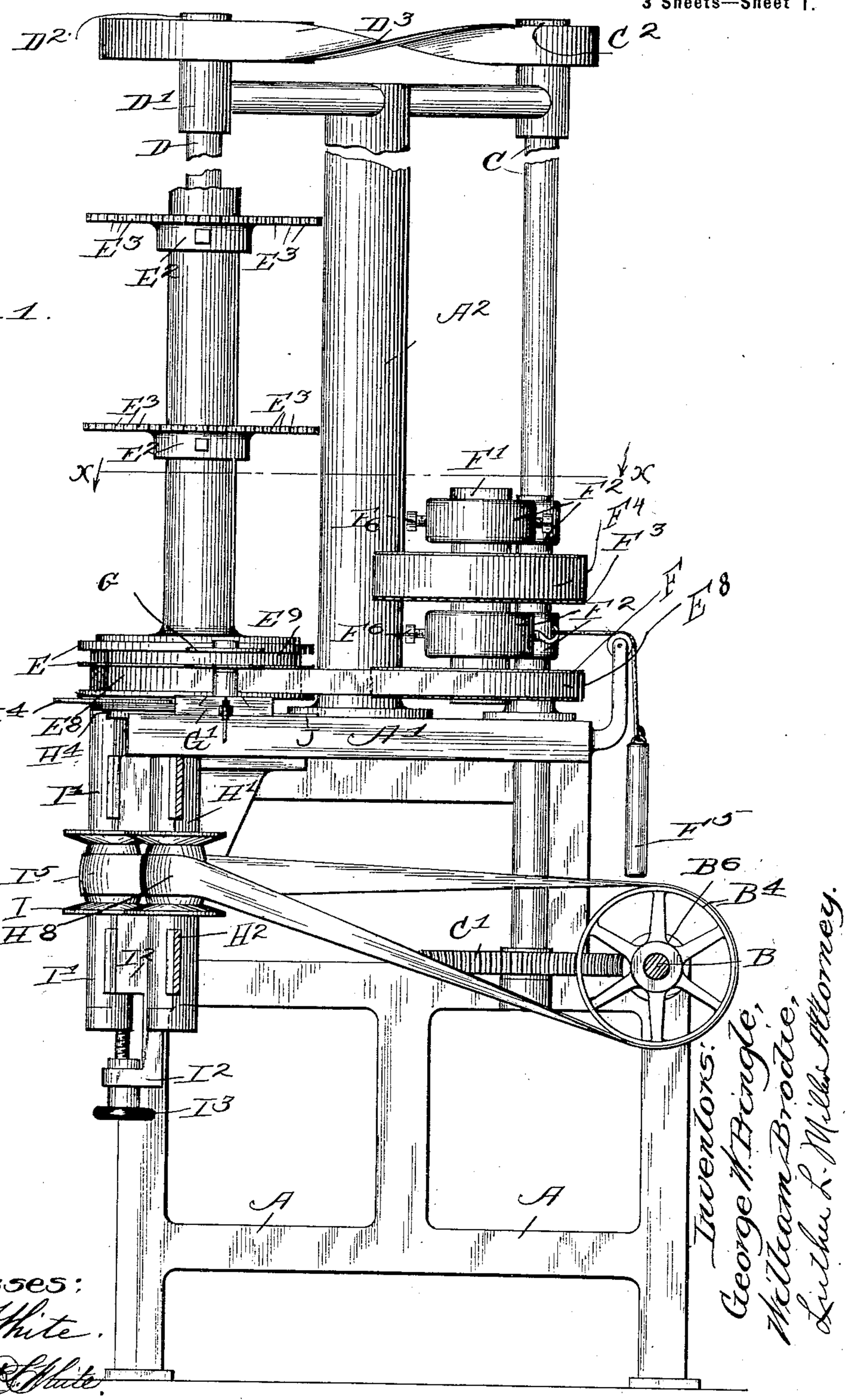

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Fig 5.

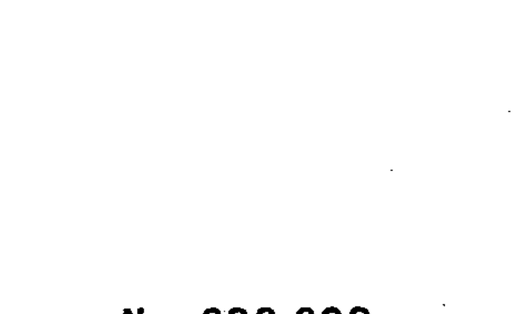


Fig. 6.

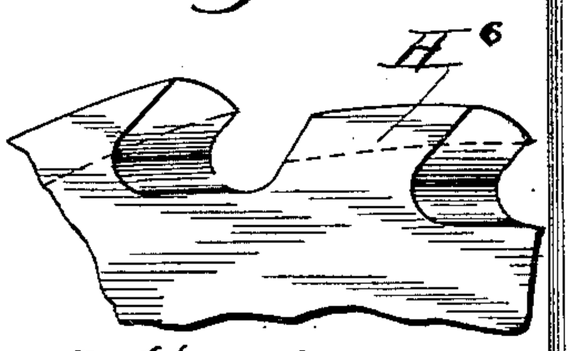
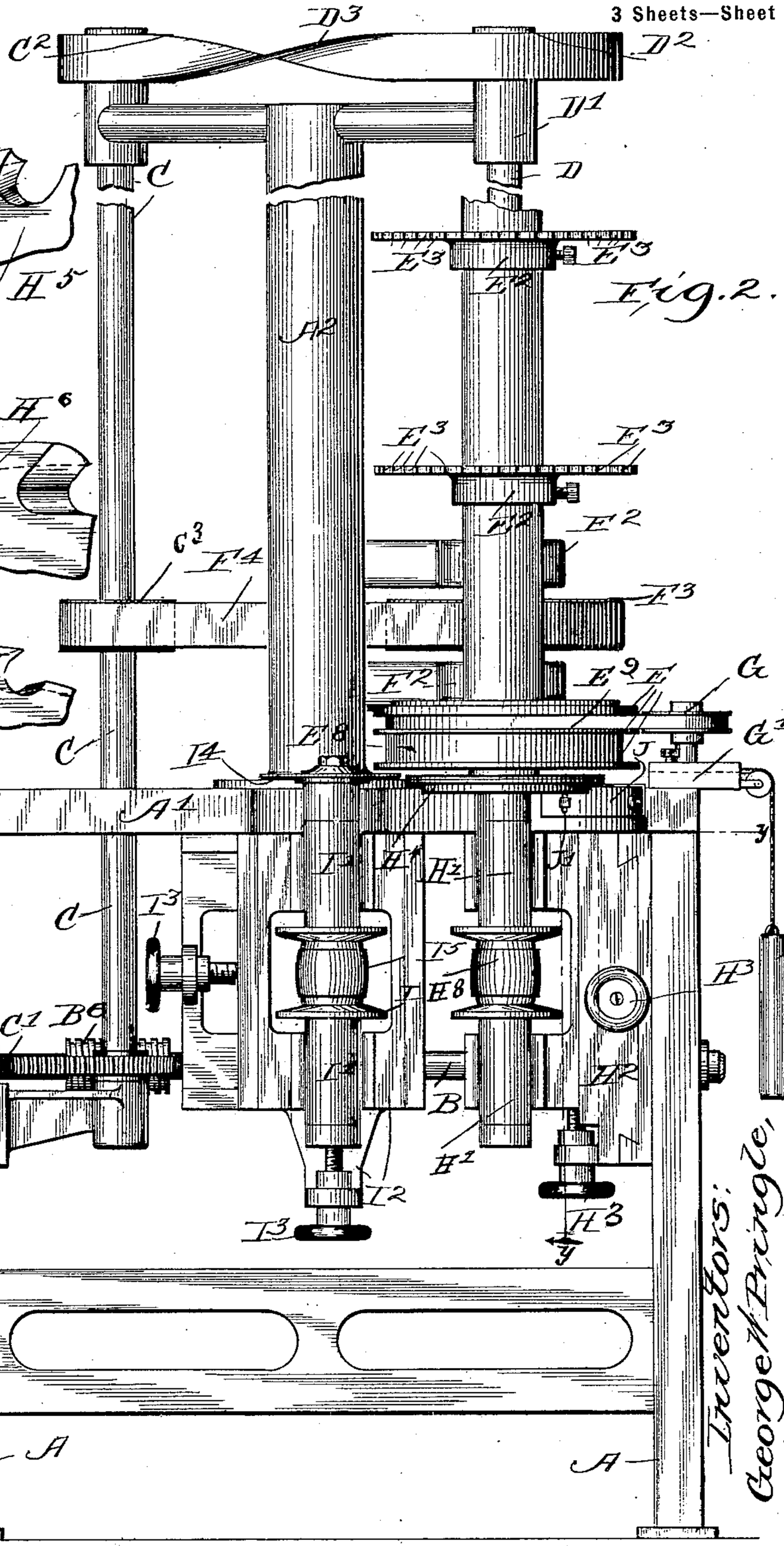


Fig. 7.



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(No Model.) 3 Sheets—Sheet 3.

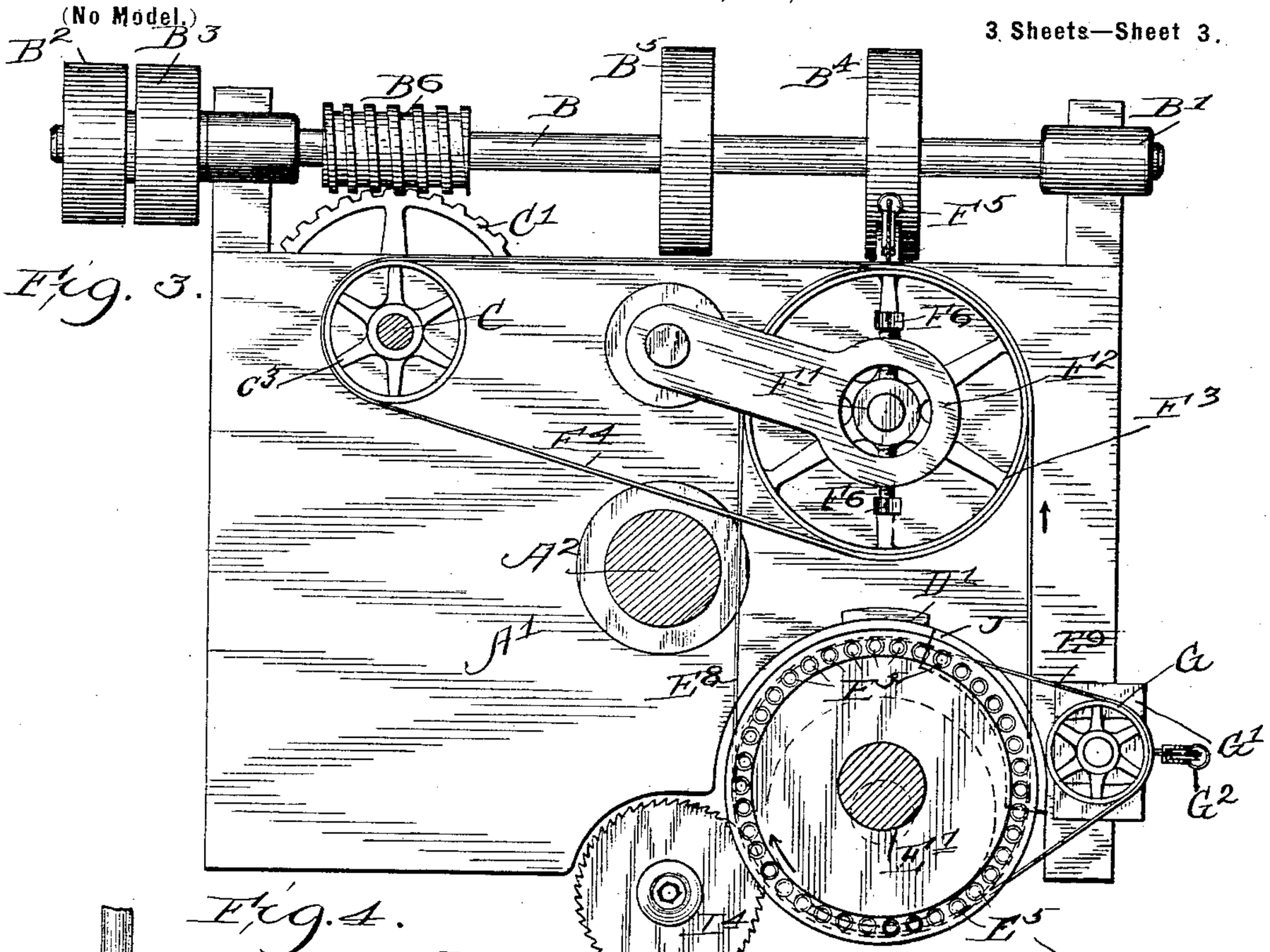

Fig. 3.

Fig. 4.

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UNITED STATES PATENT OFFICE.

GEORGE W. PRINGLE AND WILLIAM BRODIE, OF CHICAGO, ILLINOIS.

WOOD-TURNING MACHINE.

SPECIFICATION forming part of Letters Patent No. 630,928, dated August 15, 1899.

Application filed March 6, 1899. Serial No. 707,989. (No model.)

To all whom it may concern:

Be it known that we, GEORGE W. PRINGLE and WILLIAM BRODIE, citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Wood-Turning Machines, of which the following is a specification.

The object of this invention is the production of an improved automatic machine for turning small articles, and while its embodiment here shown is particularly adapted to the formation of collar-buttons it is manifest that other articles of a similar nature may be produced by mechanism which does not depart from the spirit of this invention.

In the accompanying drawings, Figure 1 is a side elevation of this wood-turning machine, showing a portion of the frame removed. Fig. 2 is an elevation of the opposite side of said machine, also showing part of the frame removed. Fig. 3 is a plan view of the mechanism on dotted line $x\ x$, Fig. 1. Fig. 4 is a vertical central section of the carrier-wheel, the driving-drum, and the cutter-head, being the respective means for carrying and for rotating the dowel-sticks and for forming them into buttons. Figs. 5, 6, and 7 are fragmentary views indicating the form of the cutting-knives ground for the formation of collar-buttons.

Like letters of reference indicate corresponding parts throughout the several views.

In the construction of this machine we provide a supporting-frame A of any suitable form, wherein A′ is the bed, and A^2 a vertical column extending upward from a point near the center of said bed. A counter-shaft B, rotatably mounted in the journal-bearings B′ on the supporting-frame A, carries the tight and loose pulleys B^2 and B^3, respectively, by which motion is imparted to said counter-shaft. The counter-shaft also carries the drive-pulleys B^4 and B^5 and the worm B^6, all fixed with relation to their supporting-shaft B.

A vertical shaft C is rotatably mounted in bearings in the supporting-frame A, adjacent to the counter-shaft B, and carries the worm-wheel C′ for engaging the worm B^6. The vertical shaft C also carries the pulleys C^2 and C^3. At the opposite side of the supporting-frame a second vertical shaft D is rotatably mounted in bearings D′ and at its upper end is provided with the pulley D^2, driven by the belt D^3, which runs upon the face of the pulley D^2 and the pulley C^2, by means of which belt D^3 and the shaft C power is transmitted from the counter-shaft B to the shaft D. At the lower end of the vertical shaft D and just above its lower bearing D′ is provided the driving-drum D^4, rigidly affixed to said shaft D. A pheripheral knife-edge D^5 projects from the face of said driving-drum, which knife-edge is held in position by the clamping-ring D^6.

A carrier-wheel E is rotatably mounted upon the hub of the driving-drum D^4 and has affixed upon its upwardly-extending tubular stem E′ the supporting-racks E^2, provided with openings or notches E^3 in their peripheries. The carrier-wheel E is provided with a series of vertical tubes E^4, arranged about its periphery. These tubes E^4 lie adjacent to the peripheral faces of the driving-drum D^4 and are cut away at their inner sides.

The wood or other material to be formed into collar-buttons is supplied in the form of dowel-sticks E^5, and these dowel-sticks are intended to be placed within the vertical tubes E^4, extending upward through the openings E^3 in the supporting-racks E^2. The periphery of the carrier-wheel E is formed in two grooves E^6 and E^7, the former for the reception of a driving-band E^8, of steel, leather, or other flexible material, and the latter for the reception of an idler-band E^9, of like material. The vertical tubes E^4 are cut away at their outer sides to permit the band E^8 to ride upon the dowel-sticks E^5, and as the driving-band E^8 is driven at a considerable rate of speed a rotatory motion is imparted to the dowel-sticks, which latter are held by the tension of the driving-band E^8 against the peripheral face of the driving-drum D^4. The idler-band E^9 is not positively driven, but by reason of its frictional contact with the dowel-sticks E^5 is caused to travel in the same direction and at substantially the same rate of speed as the driving-band E^8. The driving-drum D^4 and driving-band E^8 move in opposite directions, the former at a slightly-higher rate of speed than the latter, whereby the dowel-sticks are caused to travel in an orbit following the periphery of the driving-drum

D^4, thereby imparting a rotary motion to the carrier-wheel E. The driving-band E^8 passes over the drive-pulley F, affixed to the shaft F', which shaft is rotatably mounted in the swinging yoke F^2. The shaft F' is also provided with the pulley F^3, carrying the belt F^4, which passes over the pulley F^3 from the pulley C^3 on the shaft C, from which shaft it transmits power to said shaft F'. A weight F^5 tends to swing the yoke F^2 outward, giving tension to the driving-band E^8. Set-screws F^6 are provided in the yoke for adjusting the vertical position of the shaft F'.

The idler-pulley G has a rotatable bearing upon the sliding carriage G'. This idler-pulley carries the idler-band E^9, and a weight G^2 is provided to give tension to said idler-band. The idler-band surrounds almost all of the periphery of the driving-drum not surrounded by the driving-band, leaving a space not covered by either for the insertion and removal of dowel-sticks. To accomplish this purpose, the general direction of the idler-band E^9 is substantially at right angles to that of the driving-band E^8.

A vertical cutter-shaft H has bearings H' in the adjusting-carriage H^2. This adjusting-carriage, mounted in the frame A upon two pairs of ways, which pairs extend at right angles to each other, by means of the screws H^3, is capable of either a vertical or a lateral adjustment. The cutter-shaft H bears at its upper end the cutter-head H^4, rigidly affixed to said shaft and provided with the cutter-knives H^5, H^6, and H^7, respectively, the cutting-teeth of which cutter-knives are so formed as to provide for the proper conformation of the collar-button. The cutter-head H^4 lies just below and within the carrier-wheel E, and its knives engage the dowel-sticks projecting below the carrier-wheel. A belt H^8 transmits power from the drive-pulley B^4 on the counter-shaft B to the cutter-shaft H.

The saw-arbor I is rotatably mounted in bearings I' in the adjustable carriage I^2 similar in its manner of adjustment to the adjustable carriage H^2.

I^3 are screws for adjusting the carriage I^2.

I^4 is a saw mounted at the upper end of the saw-arbor I and so adjusted as to engage with and cut off the formed collar-button on the lower end of the dowel-sticks after the same has passed the cutter-head H^4. Power is transmitted from the counter-shaft B to the saw-arbor I by a belt I^5 passing over the pulley B^5.

A gage J, made adjustable by the vertically-elongated openings J', is arranged to limit the downward movement of the dowel-sticks in the carrier-wheel E when said dowel-sticks travel out of engagement with both the driving-band E^8 and the idler-band E^9. This space is also utilized for inserting dowel-sticks in places left vacant by the dropping out of those which have been consumed.

In operation motion is communicated to the driving-band E^8, the driving-drum D^4, the cutter-head H^4, and the saw I^4, and dowel-sticks are inserted in their places in the carrier-wheel E. The driving-band E^8 traveling in the direction indicated by the arrow in Fig. 3 and the driving-drum in the opposite direction at a slightly-greater speed of rotation rapidly rotate the dowel-sticks in the carrier-wheel E and cause said sticks and said wheel to move slowly in the direction taken by the driving-drum. This movement of the dowel-sticks brings them one after another into contact with the rapidly-revolving cutter-knives, which form a collar-button at the lower end of each one of said dowel-sticks, and the continued travel of the carrier-wheel brings the dowel-sticks into contact with the saw I^4, which cuts off the formed collar-button at the lower end of the dowel-stick. The dowel-sticks are retained from vertical displacement within the carrier-wheel by reason of the pressure of the driving-band E^8 and the indenting peripheral knife-edge D^5, also by the idler-band E^9, until the carrier-wheel has been rotated to such position that the dowel-sticks are not engaged by either of said bands. At this point the dowel-sticks drop downward through the tubes E^4 in the carrier-wheel until the lower end of the descending stick rests upon the gage J, upon which it rides until the dowel-stick is again engaged by the driving-band E^8 and a new indentation made in the stick by the peripheral knife-edge D^5. When the stick has been consumed to a length too short to be engaged by the idler-band E^9, it will be dropped from the carrier-wheel E after the driving-band E^8 ceases to engage the dowel-stick and before the adjustable gage J is encountered.

We claim as our invention—

1. In a wood-turning machine, in combination, a supporting-frame; a cutter-head; means comprising two unrecessed surfaces for frictionally holding between them the work to be operated upon; and means for positively driving said surfaces in opposite directions, whereby said work is rotated between said surfaces by the difference in direction of their travel.

2. In a wood-turning machine, in combination, a supporting-frame; a cutter-head; means comprising two unrecessed surfaces for frictionally holding between them the work to be operated upon; and means for positively driving said surfaces in opposite directions at different rates of speed, whereby said work is axially rotated and fed forward in the direction of movement of the surface traveling at the higher rate of speed.

3. In a wood-turning machine, in combination, a supporting-frame; a cutter-head; means comprising two unrecessed surfaces for frictionally holding between them the work to be operated upon, one of which surfaces has a yielding movement relative to the other of said surfaces; and means for positively driving said surfaces in opposite directions and at different rates of speed, whereby said work is axially rotated, and fed forward in the direc-

tion of movement of the surface traveling at the higher rate of speed.

4. In a wood-turning machine, in combination, a supporting-frame; a cutter-head; a carrier-wheel; a driving-drum having a regular peripheral surface; a driving-band, the surfaces of which drum and band frictionally engage the work to be operated upon; and means for moving said engaging surfaces in opposite directions and at different rates of speed, whereby said work is axially rotated, and fed forward in the direction of movement of the surface traveling at the higher rate of speed.

5. In a wood-turning machine, in combination, a supporting-frame; a cutter-head; a carrier-wheel having a series of openings therein, for holding the work to be operated upon; a driving-drum having a regular peripheral surface, and a driving-band, the surfaces of which drum and band frictionally engage said work; and means for moving said engaging surfaces in opposite directions and at different rates of speed, whereby said work is axially rotated, and fed forward in the direction of movement of the surface traveling at the higher rate of speed.

6. In a wood-turning machine, in combination, a supporting-frame; a cutter-head; a carrier-wheel rotatably mounted in the supporting-frame having a series of cylindrical openings for loosely supporting the work to be operated upon; a driving-drum having a regular peripheral surface, and a driving-band adapted to lie in contact with said work, the contacting surfaces of which drum and band frictionally engage said work; and means for moving said contacting surfaces in opposite directions and at different rates of speed, whereby said work is axially rotated, and fed forward in the direction of movement of the surface traveling at the higher rate of speed.

7. In a wood-turning machine, in combination, a supporting-frame; a cutter-head; a carrier-wheel having a series of cylindrical openings near its periphery for holding the work to be operated upon; a driving-drum for engaging the work located within the carrier-wheel; a driving-band for lying in contact with said work, located outside of the periphery of the carrier-wheel; a tightening device for said band; an idler-band for contacting with and supporting certain of said work at a point in the carrier-wheel where such work is not engaged by the driving-band; a tightening device for said idler-band; and means for imparting rotatory motion to the driving-drum and the driving-band so that their surfaces in contact with the said work shall move in contrary directions and at different rates of speed.

8. In a wood-turning machine, in combination, a supporting-frame; a cutter-head; a saw; a carrier-wheel; a driving-drum; a driving-band; means for regulating the tension of the driving-band; an idler-band for contacting with and supporting certain of said work at a point in the carrier-wheel where such work is not engaged by the driving-band; means for regulating the tension of the idler-band; and means for rotating the driving-drum and moving the driving-band in opposite directions and at different rates of speed.

9. In a wood-turning machine, in combination, a supporting-frame; a cutter-head; a carrier-wheel having a series of cylindrical openings near its periphery for holding the work to be operated upon, and having two peripheral grooves, which grooves communicate with said cylindrical openings; a driving-band for one of said grooves; an idler-band for the other of said grooves, for contacting with and supporting certain of said work at a point in the carrier-wheel where such work is not engaged by the driving-band; independent means for regulating the tension of said bands; a driving-drum for engaging the work located within the carrier-wheel; and means for rotating the driving-drum and moving the driving-band in opposite directions and at different rates of speed.

10. In a wood-turning machine, in combination, a supporting-frame; a cutter-head; a saw; a carrier-wheel having a series of cylindrical openings near its periphery for holding the work to be operated upon, and having two peripheral grooves, which grooves communicate with said cylindrical openings; a driving-band for one of said grooves; means for regulating the tension of said band; an idler-band for the other of said grooves, for contacting with and supporting certain of said work at a point in the carrier-wheel where such work is not engaged by the driving-band; means for regulating the tension of the idler-band; a gage adjacent to the carrier-wheel; means for adjusting the position of said gage; and means for adjusting the position of the cutter-head and of the saw.

11. In a wood-turning machine, in combination, a supporting-frame; a cutter-head; a carrier-wheel having a series of cylindrical openings near its periphery, for holding the work to be operated upon; and having two peripheral grooves, which grooves communicate with said cylindrical openings; a driving-band for one of said grooves, and an idler-band for the other of said grooves, for contacting with and supporting certain of said work at a point in the carrier-wheel where such work is not engaged by the driving-band; a weight and a swinging yoke for regulating the tension of the driving-band, and a weight and a pulley for regulating the tension of the idler-band; a driving-drum located within the carrier-wheel, and adapted to engage the work in the carrier-wheel; a peripheral knife-edge for said driving-drum; means for adjusting the position of the driving-drum; a saw; and means for adjusting the position of said saw.

12. In a wood-turning machine, in combination, a supporting-frame; a cutter-head; a carrier-wheel having a series of cylindrical openings near its periphery for holding the work to be operated upon; a tubular stem

for said carrier-wheel; a supporting-rack affixed to said tubular stem; said carrier-wheel having two peripheral grooves; a driving-band for one of said grooves; a weight and a swinging yoke for regulating the tension of said driving-band; an idler-band for the other of said peripheral grooves, for contacting with and supporting certain of said work at a point in the carrier-wheel where such work is not engaged by the driving-band; a weight and a pulley for regulating the tension of said idler-band; a driving-drum located within the carrier-wheel, and adapted to engage the work in the carrier-wheel; a peripheral knife-edge for said driving-drum; a clamping-ring for holding said knife-edge in position; an adjustable gage located near the carrier-wheel; a saw; means for rotating the saw and the cutter-head; and independent means for adjusting the position of the driving-drum and of the saw.

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