No. 646,078. Patented Mar. 27, 1900.

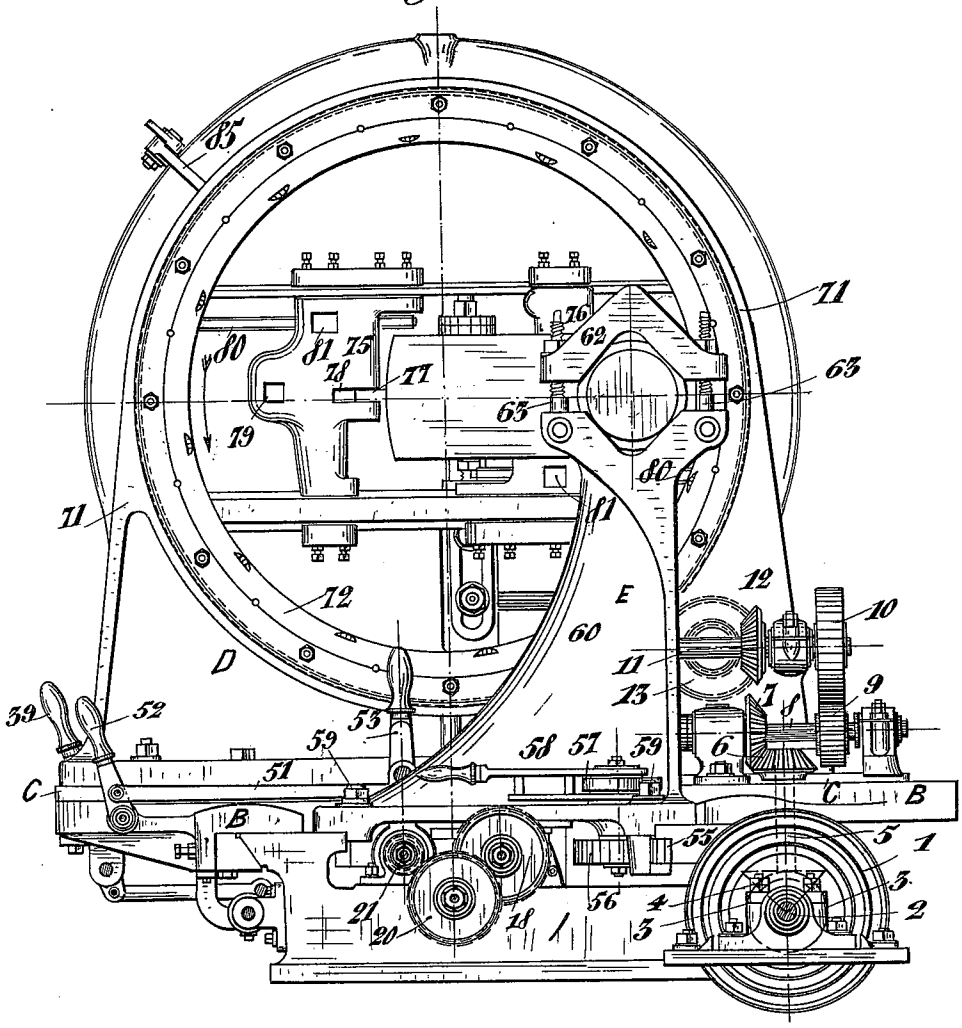
J. MOLL.

LATHE FOR TURNING CRANK SHAFTS.

(Application filed July 1, 1899.)

(No Model.) 8 Sheets—Sheet 1.

Fig. 1.



Witnesses:

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Johann Moll

by B. Singer

Att'y.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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(No Model.) 8 Sheets—Sheet 2.

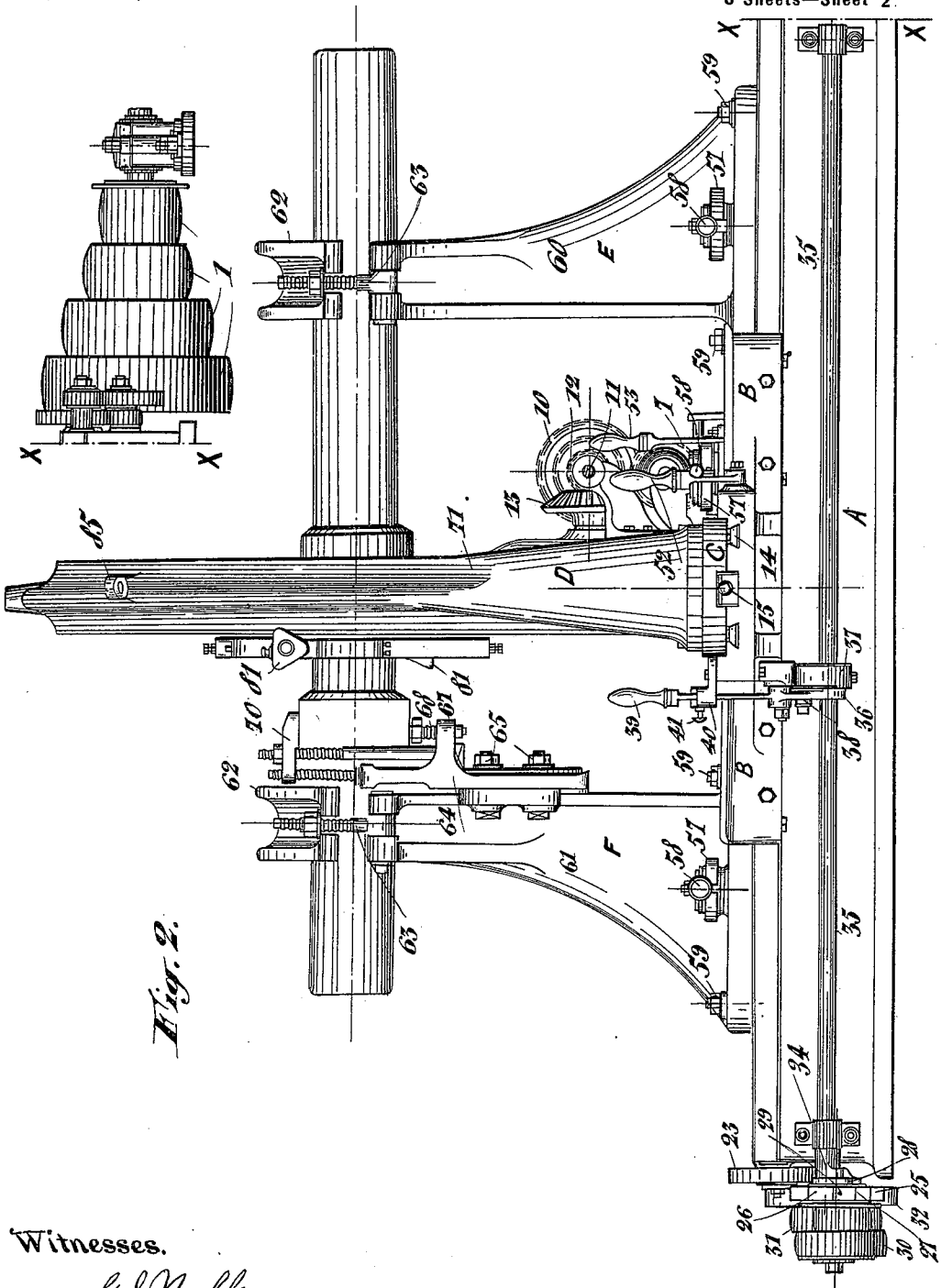


Fig. 2.

Witnesses.

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(No Model.) 8 Sheets—Sheet 3.

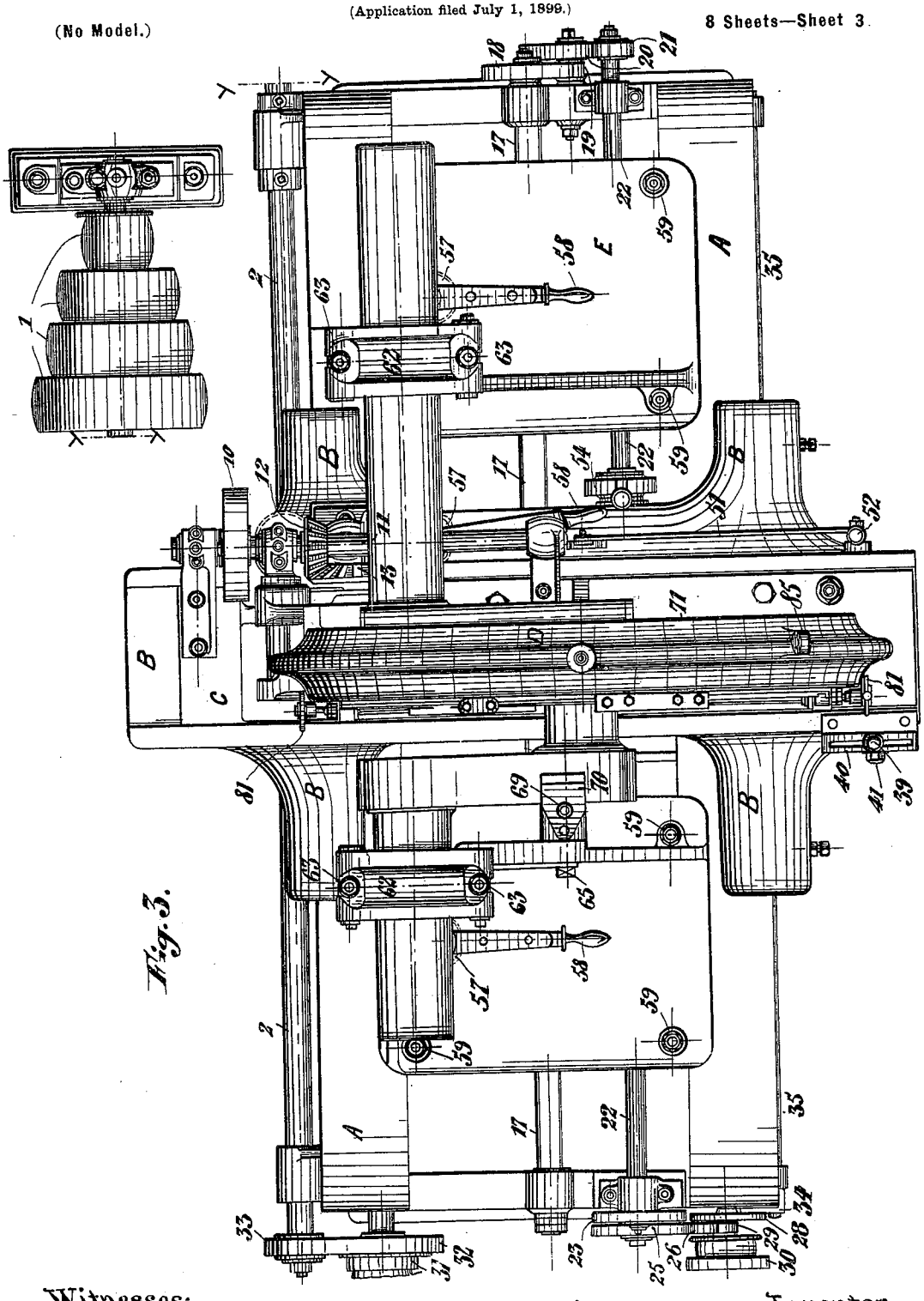


Fig. 3.

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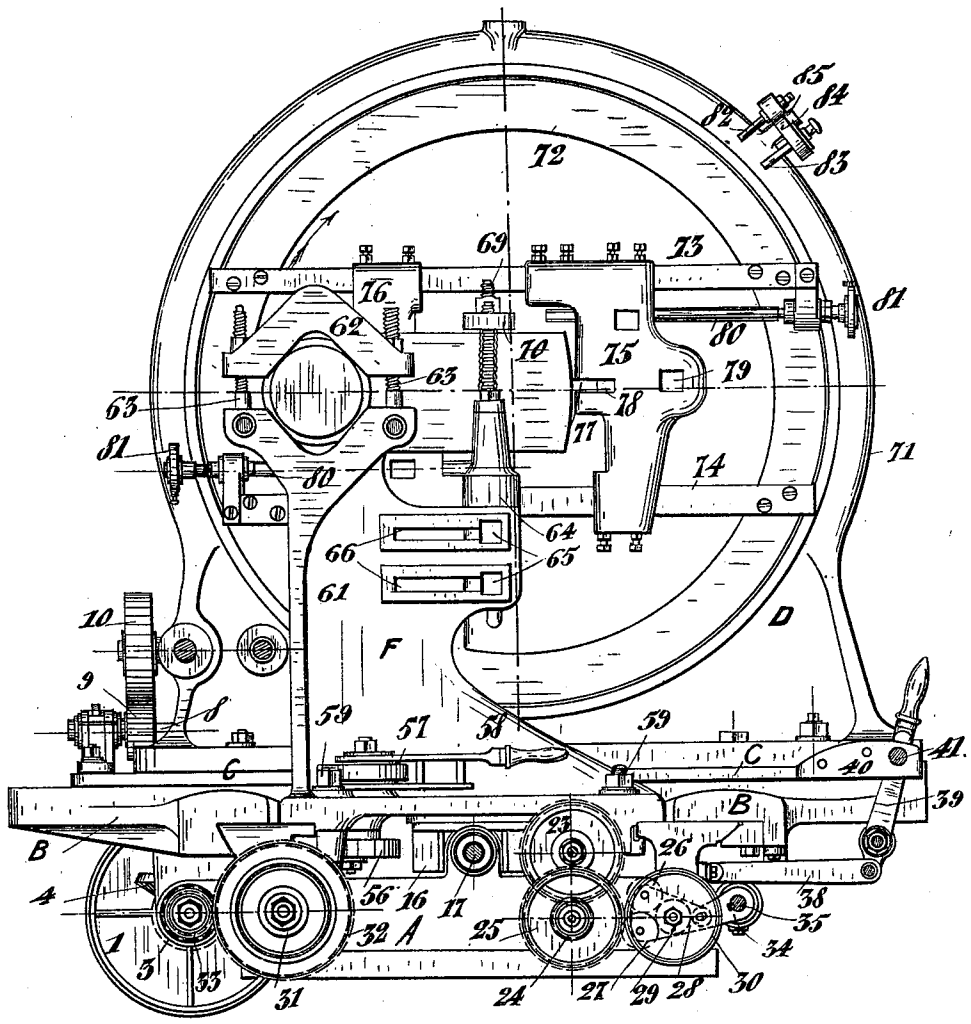
J. MOLL.

LATHE FOR TURNING CRANK SHAFTS.

(Application filed July 1, 1899.)

(No Model.) 8 Sheets—Sheet 4.

Fig. 4.



Witnesses:
G. S. Noble
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LATHE FOR TURNING CRANK SHAFTS.

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(No Model.) 8 Sheets—Sheet 5.

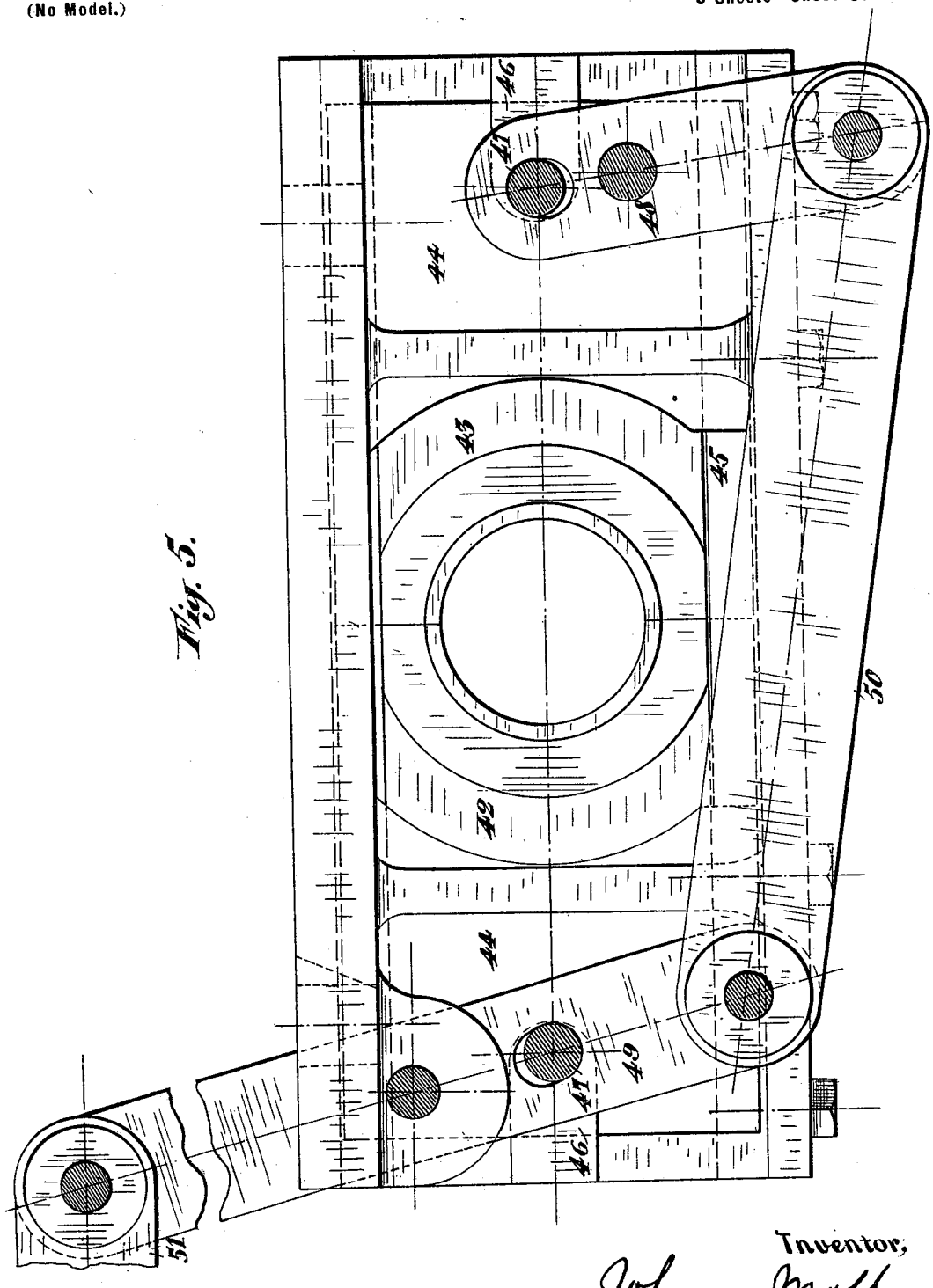


Fig. 5.

Witnesses:
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LATHE FOR TURNING CRANK SHAFTS.

(Application filed July 1, 1899.)

(No Model.) 8 Sheets—Sheet 6.

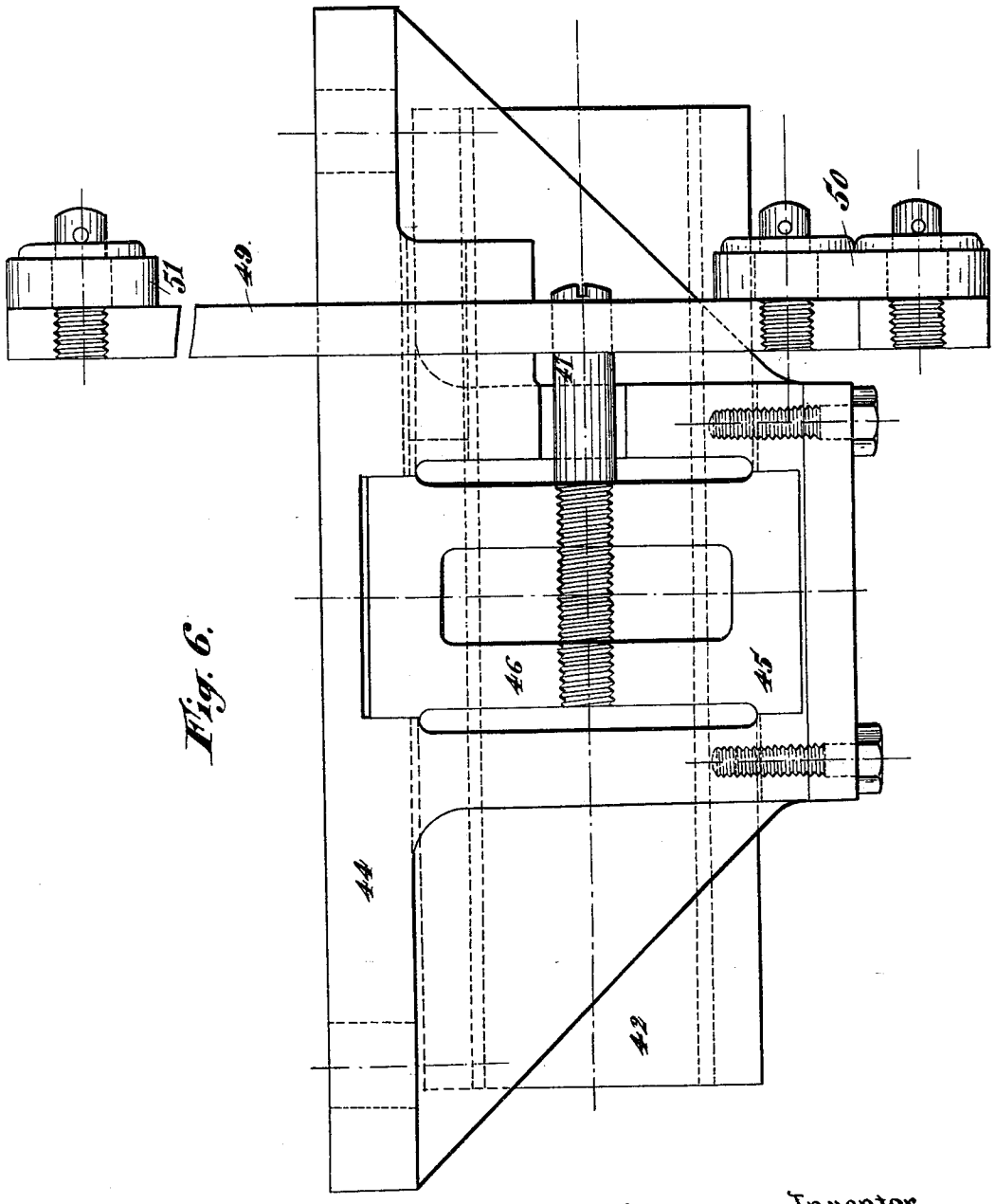


Fig. 6.

Witnesses:
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Patented Mar. 27, 1900.

J. MOLL.

LATHE FOR TURNING CRANK SHAFTS.

(No Model.)

(Application filed July 1, 1899.)

8 Sheets—Sheet 7.

Fig. 7.

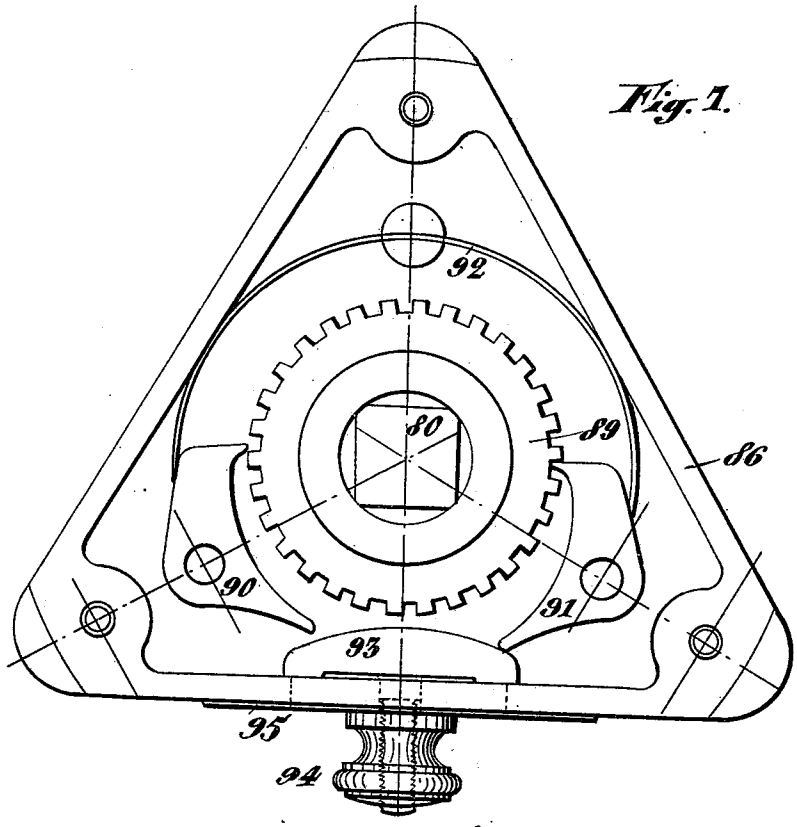
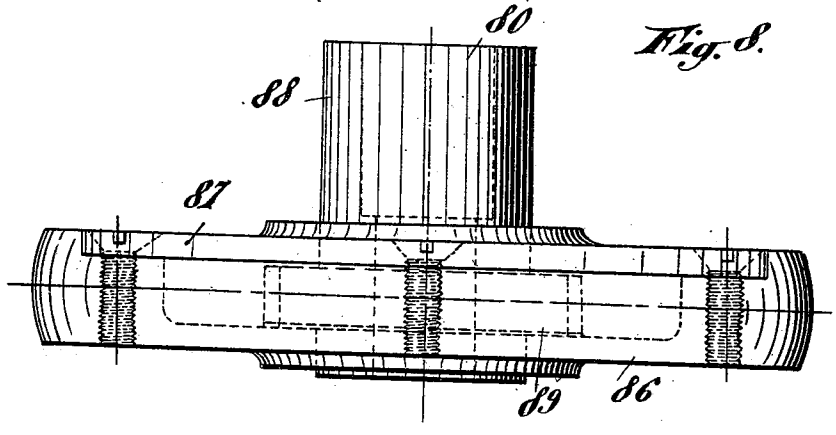


Fig. 8.



Witnesses:

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J. MOLL.

LATHE FOR TURNING CRANK SHAFTS.

(Application filed July 1, 1899.)

(No Model.) 8 Sheets—Sheet 8.

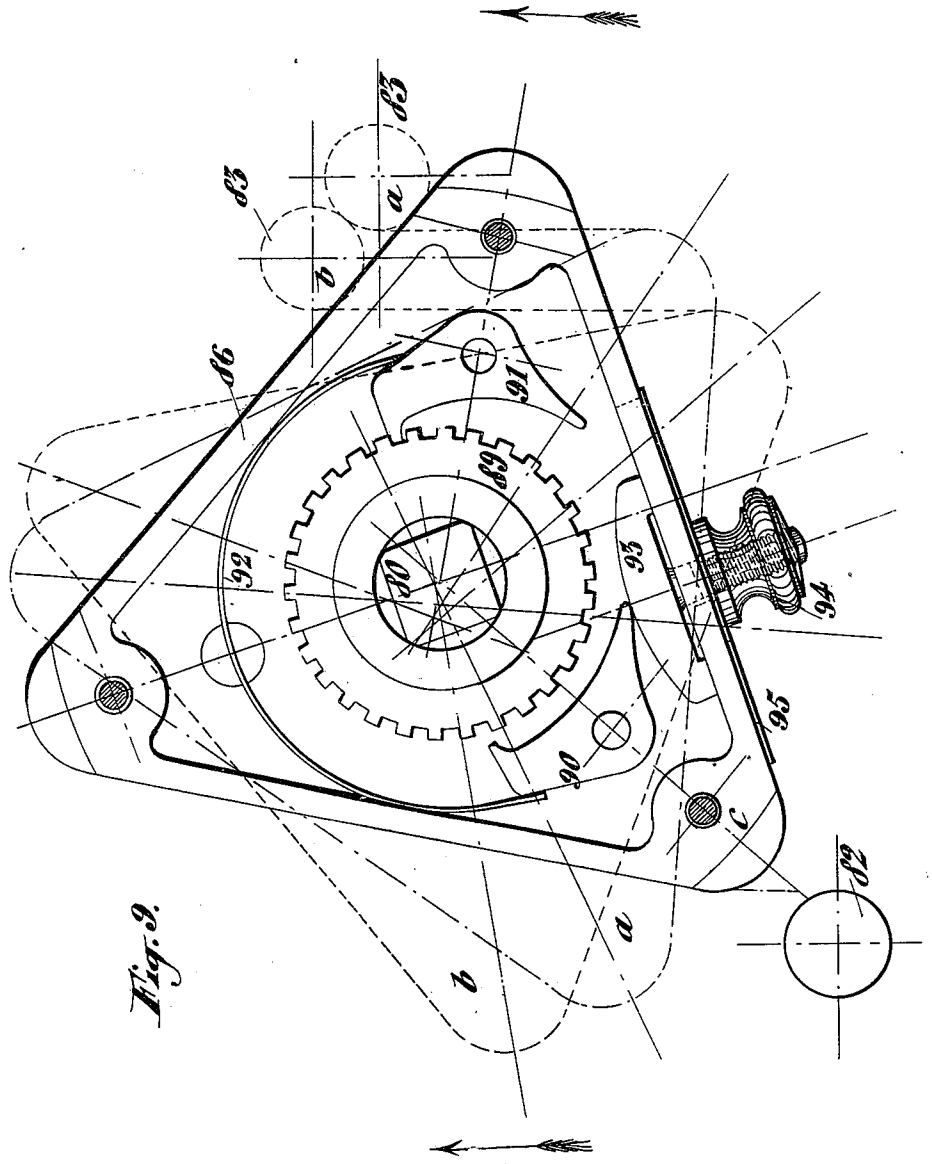


Fig. 9.

Witnesses:

G. S. Noble.

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UNITED STATES PATENT OFFICE.

JOHANN MOLL, OF AUGSBURG, GERMANY.

LATHE FOR TURNING CRANK-SHAFTS.

SPECIFICATION forming part of Letters Patent No. 646,078, dated March 27, 1900.

Application filed July 1, 1899. Serial No. 722,502. (No model.)

To all whom it may concern:

Be it known that I, JOHANN MOLL, a citizen of the Empire of Germany, residing at Augsburg, Germany, have invented certain new and useful Improvements in Lathes for Turning Crank-Shafts, of which the following is a specification.

This invention relates to improvements in lathes, the object being to provide a machine of this kind in which crank-shafts or crank-pins may be readily and easily turned and the inner sides of cranks surfaced without it being necessary to rotate the crank-shaft, whereby great loss of time and much trouble are avoided and more accurate work done than would be possible by the usual devices heretofore employed for the same purpose.

The improvements consist in the construction, novel combination, and arrangement of parts fully described hereinafter and specifically pointed out in the appended claims.

In order that this my invention may be the more readily understood and carried into effect or practice, reference is hereby made to the accompanying drawings, forming a part of this specification, and in which—

Figure 1 is a side elevation, from the right hand, of a lathe constructed in accordance with my invention. Fig. 2 is a front elevation. Fig. 3 is a plan view, and Fig. 4 is a side elevation from the left hand of the lathe. Figs. 5 and 6 are enlarged detail views of the detachable yoke, and Figs. 7, 8, and 9 are enlarged detail views of the device for actuating the feed-screws of the tool-holders.

In the drawings like letters and numerals refer to like parts throughout all the figures.

The improved machine is principally composed of the bed-plate A, the carriage B, the regulating-plate C, the turning device D, and the supports E F.

The crank-shaft to be turned is supported on the supports E F and passed through the turning device D, which may be transversely adjusted by means of the regulating-plate C, so that the center of said device is rotated on the center line of the crank-pin or at a distance equal to the length of the crank-arm. The lateral displacement of the device D for turning crank-pins is effected by means of the carriage B and the feed of the tools for planing or surfacing the inner sides of crank-arms is effected by means of a device operated by the rotation of the turning device D, said device being out of engagement when it is desired to turn crank-pins so that the rotation of the turning device does not produce the feeding of the tools. The rotation of the turning device is obtained by means of gearings hereinafter fully described with other parts of the operating mechanism. The movement is transmitted to the machine by means of the drive-pulley 1, keyed on the shaft 2. A bevel gear-wheel 3, the hub of which is provided with an inner key, is mounted in brasses under the carriage B and adapted to slide along said shaft 2 in a longitudinal keyway provided on the latter. Said wheel 3 meshes with another bevel-wheel 4, mounted on the end of a vertical shaft 5, arranged in the carriage B and carrying at its other end a bevel-wheel 6, meshing with wheel 7. Through the latter passes a shaft 8 by means of a key and keyway, said shaft being loosely mounted in a bearing on carriage B and journaled in the regulating-plate C. The shaft 8 carries a gear-wheel 9, meshing with another gear-wheel 10, mounted on the shaft 11, which carries the bevel gear-wheel 12, meshing with wheel 13, mounted on the frame of the turning device D and made integral with another gear-wheel meshing with the toothed rim of the inner ring of said device to rotate the same.

The turning device D is secured on the regulating-plate C, holding said device at right angles with the axis or center line of the crank-shaft and serving to move the device transversely to said shaft in accordance with the length of the crank-arms to be worked. The regulating-plate C is moved in grooves 14, provided in the carriage B, and said plate may be secured in adjusted positions by means of a screw 15.

The lateral movement of the turning device D is obtained by the displacement of the carriage B. To this end the latter is provided with a detachable yoke 16, actuated by means of a screw-shaft 17. On the end of said shaft 17 is mounted a gear-wheel 18, meshing with another gear-wheel 19, mounted on an intermediate shaft carrying a gear-wheel 20, meshing with a wheel 21 on the end of a shaft 22, the other end of which carries

a gear-wheel 23, meshing with a gear-wheel 24 on an intermediate shaft, which carries another gear-wheel 25, meshing with one of the wheels 26 27 on the clutch 28, the axle of which carries the gear-wheel 29 and pulleys 30. The latter are suitably connected by means of belts or equivalents with pulleys 31, mounted on an intermediate shaft carrying a gear-wheel 32, meshing with the gear-wheel 33 on the aforesaid shaft 2.

The clutch 28 is actuated by means of an arm 34 on the shaft 35, on which may move longitudinally another arm 36, mounted in a brass 37 of the carriage B and pivotally connected with a rod 38, actuated by means of a lever 39, pivoted at the front of the carriage and adapted to be adjusted in a slot 40 by means of a bolt or equivalent 41. The clutch 28 serves to bring into engagement the wheels 29, 27, and 25 or the wheels 29, 26, and 25, as desired, in accordance with the movement to be imparted to shafts 22 and 17.

The yoke 16, which produces the movement of the carriage B by the rotation of the screw-shaft 17, is composed of two halves 42 43, (see Figs. 5 and 6,) housed in a box or casing 44, secured to the carriage B. Said yoke-sections are provided with a lower extension 45, engaging a recess in said box 44 to prevent the yoke from rotating, and with a lateral extension 46, to which is secured a pin 47, serving to move the yoke-sections laterally and to detach them from the screw-shaft 17 or to bring them into engagement with the latter. Said pins are moved in grooves provided in said box 44 and actuated by means of levers 48 49, pivoted on the box and connected with each other by means of a rod 50. The lever 49 is operated by means of a rod 51, provided with a lever 52, pivoted on the carriage B. The yoke 16 is mounted in the box 44 to admit of a certain play, so that slight deviations of the screw-shaft 17 do not influence the direction of the carriage.

The carriage B may be moved by hand by means of a lever 53, actuating a wheel 54 by means of pawl and ratchet, said wheel being adapted to slide along the shaft 22 and mounted in a brass under the carriage B. The movement of said wheel 54 and shaft 22 is transmitted to shaft 17 and 16 and carriage B, as already described. During the displacement by hand of the carriage the above-mentioned clutch is placed so as to disengage the wheels 26 and 27 from the wheel 25.

The carriage B and the supports E F may be moved by hand—for instance, for adjusting the shaft to be worked in place—by means of a rack 55, secured to the frame A and engaged by a wheel 56, provided for each support and for the carriage. Each wheel 56 is provided with a ratchet 57 and a lever 58, having a pawl for engaging said ratchet. When it is desired to move the supports E F, it is necessary to loosen the nuts 59, serving to secure said supports on the frame A, and when it is desired to move the carriage it is necessary to detach the yoke 16 from the screw-shaft 17 by means of the lever 52.

The supports E F are composed of standards 60 61, serving to support the ends of the shaft to be worked, said shaft ends being held in place by means of clamps or saddle-pieces 62, secured in place by means of screw-bolts 63. The support F is furthermore provided with means for supporting cranks, said means embodying an upright 64, adapted to be moved laterally by means of screw-bolts 65 in horizontal grooves 66, provided in the standard 61. The upright 64 has a horizontal arm 67, in which a bolt 68 may be moved, the crank-arm of the shaft to be worked resting on the head of said bolt. Said crank-arm is tightened by means of a screw-bolt 69 and claw 70.

The turning device D is composed of an outer ring 71, secured onto the regulating-plate C, and of an inner ring 72, provided with an annular dovetailed rib engaging a corresponding groove in said outer ring, said inner ring being adapted to be rotated in said outer ring. The inner ring 72 is provided on one side with a toothed rim to receive the movement by means of the aforedescribed gear-wheels. To opposite sides of said inner ring are secured two parallel cross-bars or guides 73 74, on which the tool-holders 75 76 are adapted to be moved. The tool 77 may be inserted into the tool-holder longitudinally at 78 for turning crank-pins and transversely for planing the surface of the inner sides of the crank-arms or transversely at 79 for planing the surface of the inner sides of longer crank-arms.

For turning crank-pins the device D is rotated and moved laterally. For planing or surfacing said device is rotated without moving laterally, the tool-holders being moved radially by means of the feed-screws 80 engaging the nuts 81 in the tool-holders. Said feed-screws are actuated by means of devices 81, operated during the rotation of the ring 72 by two lugs 82 83, secured to an arm 84, held in a bracket 85, preferably made integral with the outer ring 71. The said device 81 (see Figs. 7, 8, and 9) embodies a triangular box or casing 86, through the center of which passes said screw 80. The box or casing 86 is closed by means of a cover 87 and adapted to freely move with the latter about a sleeve 88, keyed upon the end of screw 80. Said sleeve 88 carries a gear-wheel 89, housed in said box or casing 86. Two pawls 90 91, pivoted in the latter, are normally held in engagement with said gear-wheel 89 by the action of a spring 92. A block 93, provided with a screw and nut 94, bearing against a plate spring 95, is moved laterally in one of the walls of said box 86 and serves to disengage one of the pawls 90 91, as required. When the block 93 is in its central position, both pawls are in engagement and the feed-screws 80 may be actuated by hand in either direction by means of the device 81. When the pawl 91 is engaged only,

the lugs 82 83 operate to rotate the screws 80 to the left hand, and when the pawl 90 is engaged only the screws 80 are rotated to the right hand—that is, in the first case the tool-holder moves toward the center of the apparatus and in the second case said tool-holder moves away from said center. The positions of said lugs 82 83 are indicated in Fig. 9. The lug 83 may occupy different positions for the purpose of modifying the movement of the feed-screws 80. When the lug 83 is in the position indicated by reference-letter *a*, the triangle 81 comes before the lug 82 in the position indicated by dotted lines *a* to occupy the position indicated at *c* after passing said lug 82 and before passing the lug 83, in passing which latter it comes back into the position *a*. When the lug 83 is in the position *b*, said triangle will successively occupy the positions *b c b*. In the second case the feed-screws will be rotated at a greater velocity than in the first case.

The feed-screws are rotated in one direction only when one pawl is engaged. In the positions shown in the drawings, the pawl 91 being alone engaged, the feed-screws are rotated to the left hand only by the action of the lug 82, and, the return of the triangle under the action of the lug 82 disengaging the pawl 91 from the ratchet 89, the feed-screw 80 will not be actuated in this period.

It will be readily understood that many changes and modifications may be made in the relative arrangement and minor details of construction of the various parts without departing from the scope or sacrificing any of the advantages of the invention, and I wish it therefore to be understood that I do not restrict myself to the precise arrangement and construction herein shown and described.

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

1. The improved lathe for turning crank-shafts, comprising a rotatable turning device, a regulating-plate carrying said turning device, a carriage carrying the regulating-plate, a bed-plate to support the carriage, supports secured upon said bed-plate, a device for actuating the turning device, means for automatically moving the carriage, means for moving said carriage by hand, and means for disengaging the automatic device when the turning apparatus is to be actuated by hand, substantially as set forth.

2. The improved lathe for turning crank-shafts, comprising a bed-plate, a carriage, a regulating-plate and suitable crank-shaft supports, in combination with an outer ring secured on the regulating-plate, a revoluble ring properly guided in said outer ring, adjustable tool-holders on the inner ring, means for feeding the tool-holders during the operation of the machine, means for rotating the inner ring, and means for actuating said carriage, substantially as set forth.

3. The improved lathe for turning crank-shafts, comprising a bed-plate, a carriage, a regulating-plate and crank-shaft supports, in combination with an outer relatively-stationary ring secured on said regulating-plate, a revoluble inner ring properly guided in said outer ring, cross-bars of suitable form on said inner ring, movable tool-holders on said cross-bars, means for automatically feeding the tool-holders on said cross-bars, means for rotating the inner ring, and means for feeding the said carriage, substantially as set forth.

4. The improved lathe for turning crank-shafts, comprising a bed-plate, a carriage, a regulating-plate and crank-shaft supports, in combination with an outer relatively-stationary ring secured on said regulating-plate, an inner revoluble ring properly guided in said outer ring, cross-bars of suitable form on said inner ring, tool-holders adapted to slide on said cross-bars and actuated by means of feed-screws, means for automatically actuating the latter, means for rotating the inner ring, and means for feeding the said carriage, substantially as set forth.

5. The improved lathe for turning crank-shafts, comprising a bed-plate, a carriage, a regulating-plate and crank-shaft supports, in combination with an outer relatively-stationary ring secured on said regulating-plate, an inner revoluble ring properly guided in said outer ring, movable tool-holders in said inner ring, screw-shafts engaging said tool-holders and means for turning said shafts as said inner ring is rotated, means for rotating the inner ring and means for feeding the said carriage, substantially as set forth.

6. The improved lathe for turning crank-shafts, comprising a bed-plate, a carriage, a regulating-plate and crank-shaft supports, in combination with an outer relatively-stationary ring on said regulating-plate, an inner revoluble ring properly guided in said outer ring, movable tool-holders on said inner ring, feed-screws engaging said tool-holders, a double catch and ratchet device on said feed-screws and adapted to engage a stationary lug or equivalent as said inner ring is rotated, to automatically feed the tool-holders in either direction along their respective guideways, means for rotating said inner ring, and means for feeding the said carriage, substantially as set forth.

7. The improved lathe for turning crank-shafts, comprising a bed-plate, a carriage, a regulating-plate, a revoluble turning device, and crank-shaft supports, in combination with a detachable yoke housed in a box or casing under the carriage, a feed-screw engaging said yoke and serving to feed said carriage, means for actuating said feed-screw and means for rotating the said turning device, substantially as and for the purpose set forth.

8. The improved lathe for turning crank-shafts, comprising a bed-plate, a carriage, a regulating-plate, a revoluble turning device, and crank-shaft supports, in combination with a clutch device carrying an engaging wheel

and an intermediate wheel, a system of levers for operating said clutch device, means for automatically feeding the carriage, and means for rotating the said turning device, substantially as set forth.

9. The improved lathe for turning crank-shafts, comprising a bed-plate, a carriage, a regulating-plate, a turning device, and crank-shaft support, in combination with a clutch device, a system of levers for operating said clutch device, means for feeding the carriage by hand, and means for rotating the said turning device, substantially as set forth.

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