No. 649,374. Patented May 8, 1900.

A. TINDEL & O. ALBRECHT.

METAL TURNING LATHE.

(Application filed June 27, 1899.)

(No Model.) 7 Sheets—Sheet 1.

Fig. 6.

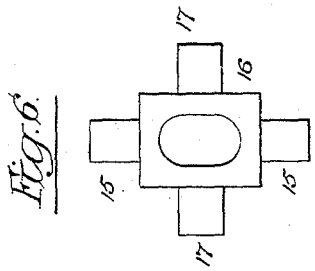

Fig. 1.

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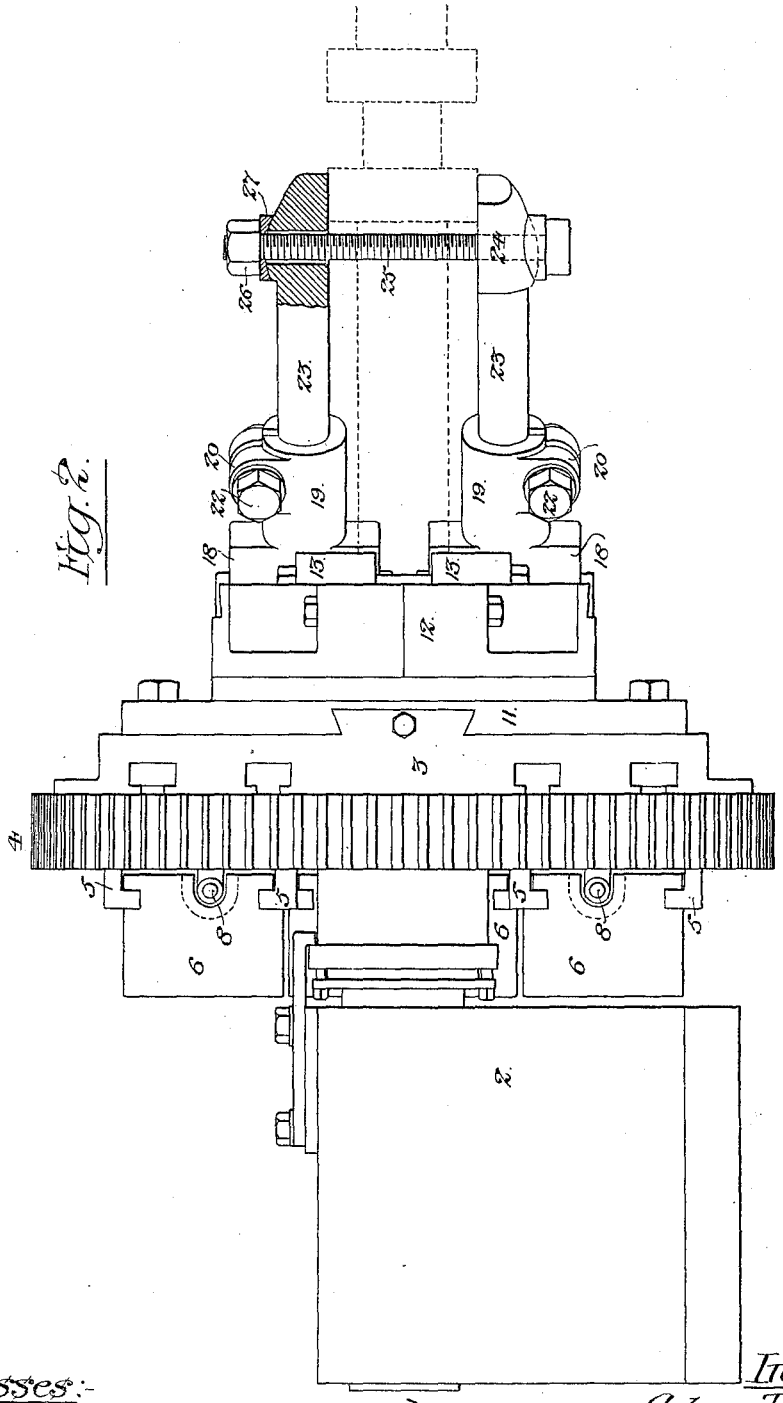
Fig. 2.



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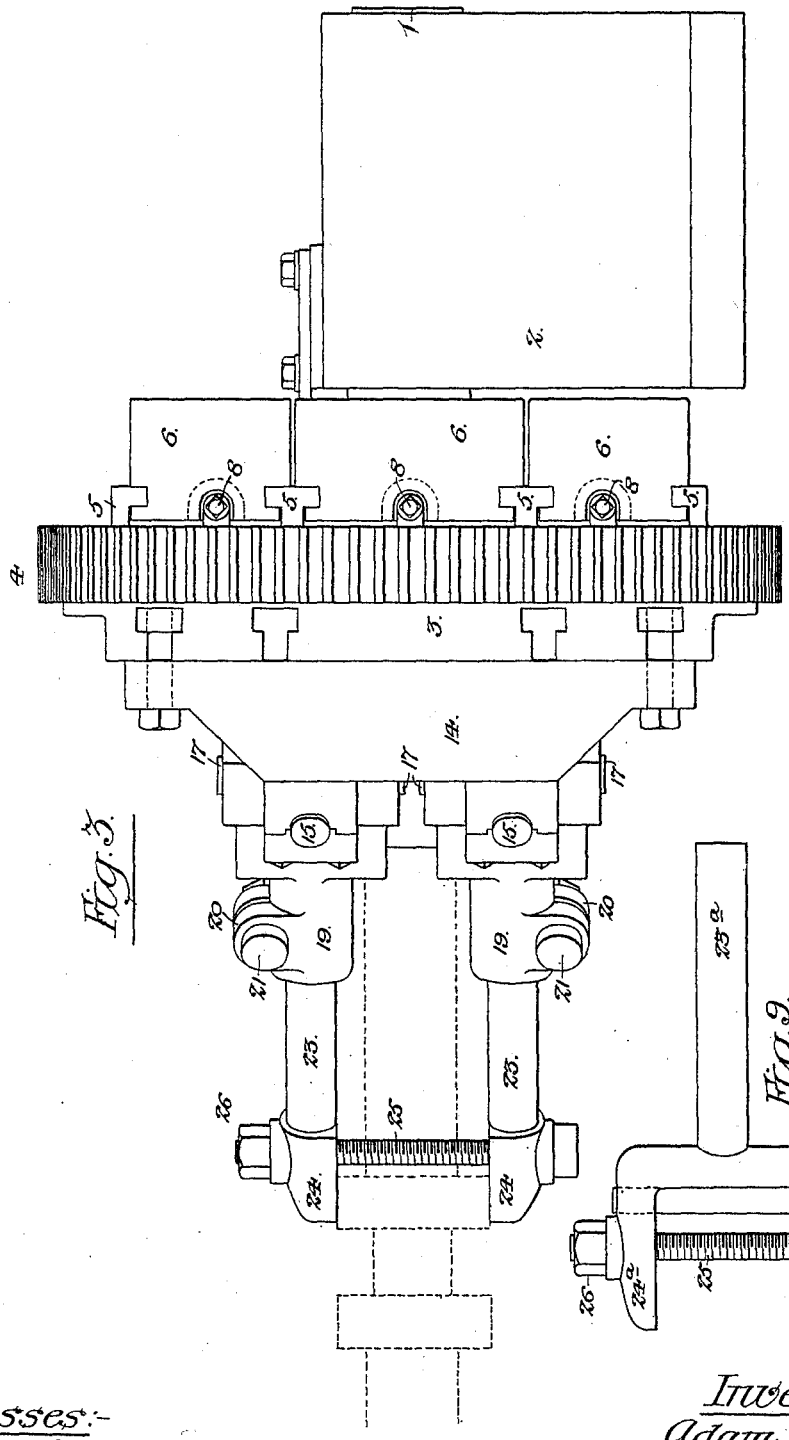

Fig. 3.

Fig. 9.

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Fig. 3.

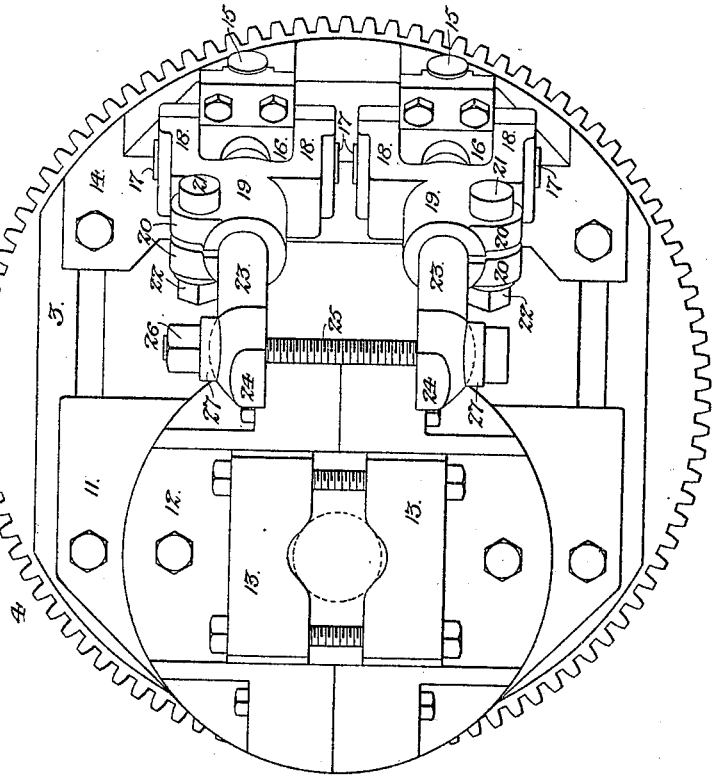

Fig. 4.

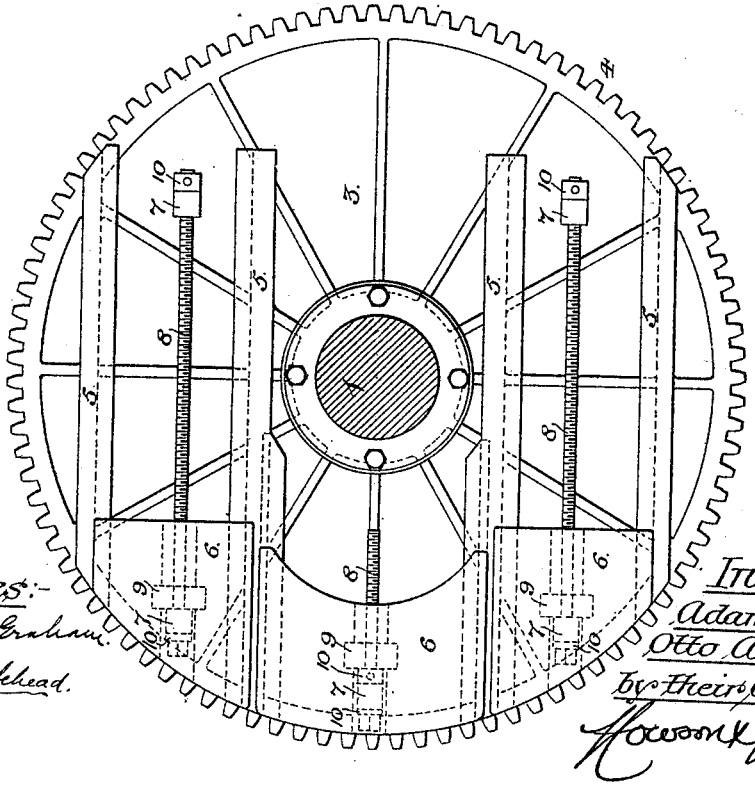

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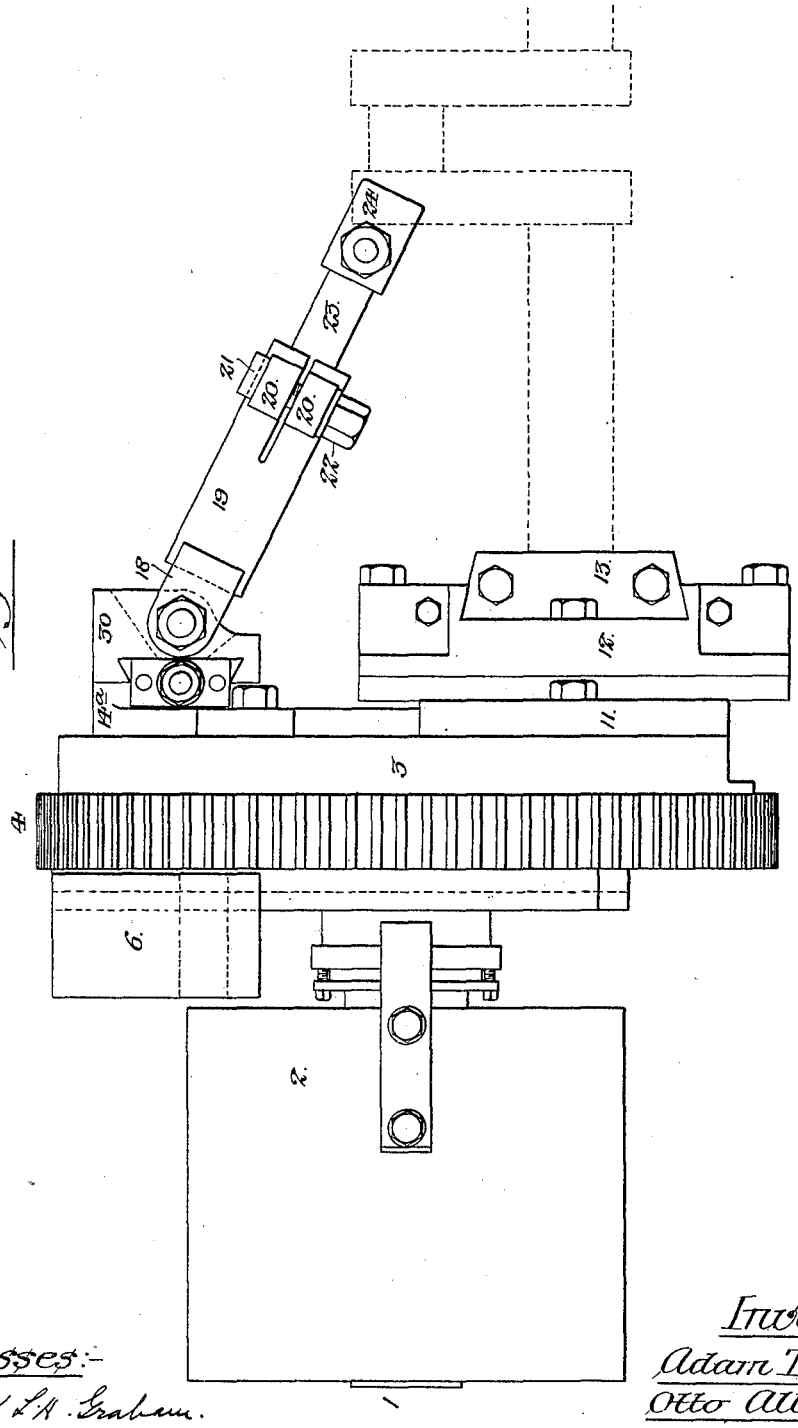
Fig. 7.



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(No Model.) 7 Sheets—Sheet 6.

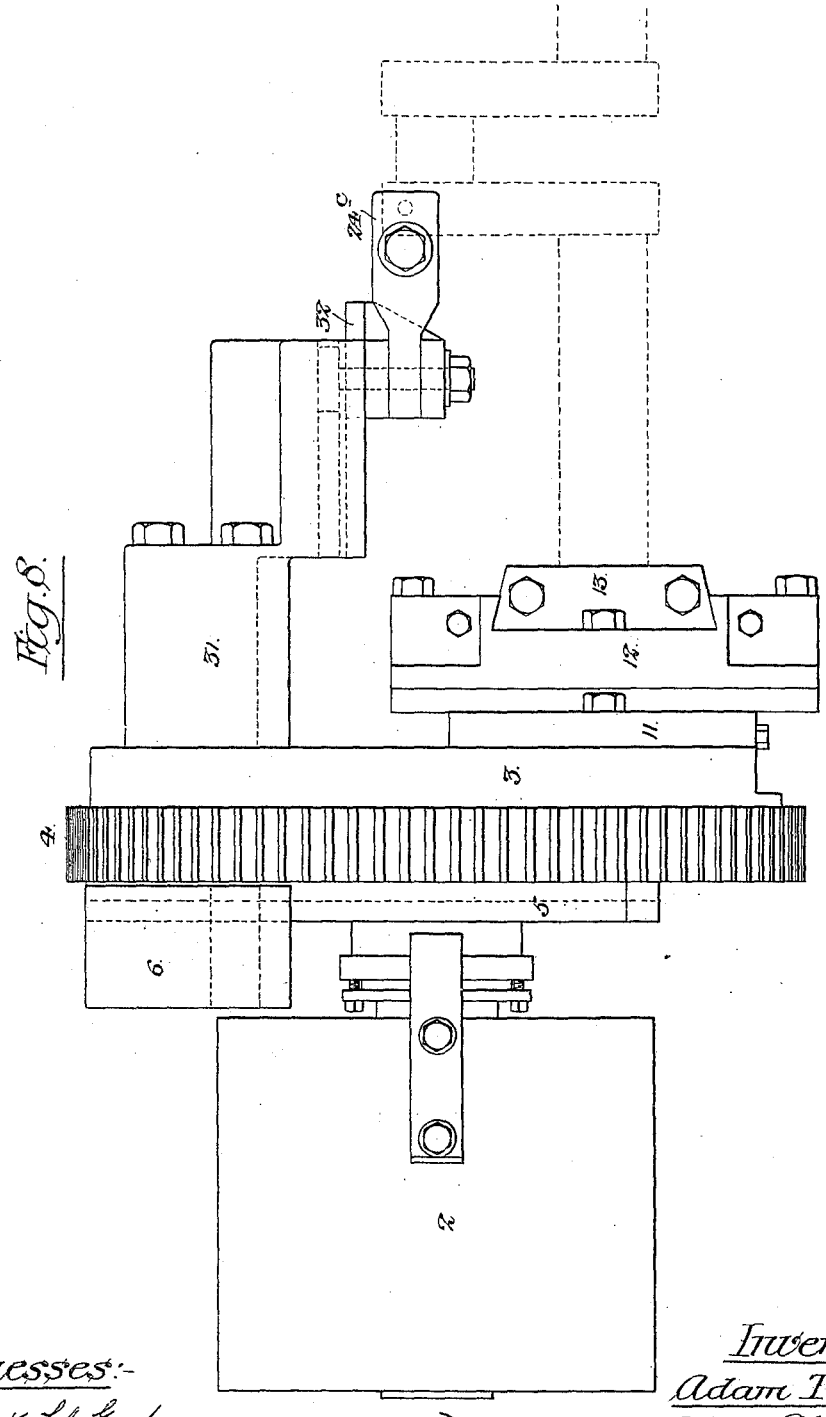

Fig. 8.

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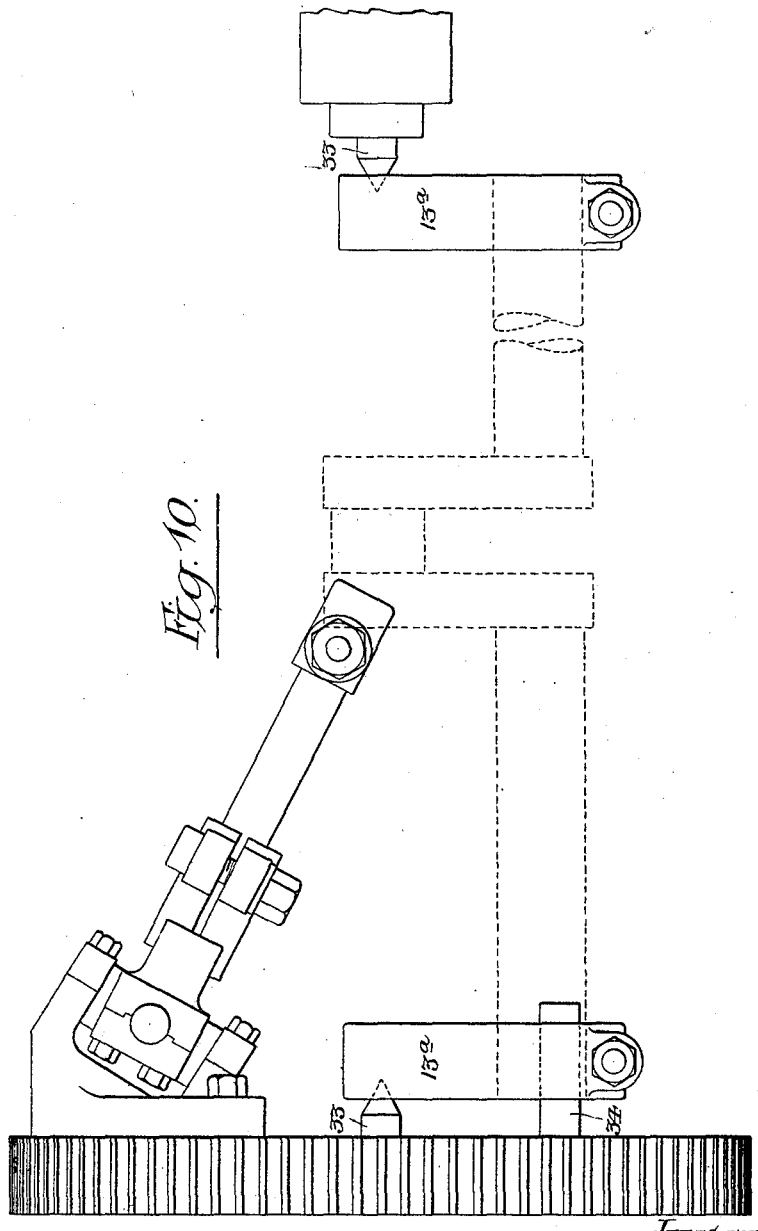

Fig. 10.

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UNITED STATES PATENT OFFICE.

ADAM TINDEL AND OTTO ALBRECHT, OF PHILADELPHIA, PENNSYLVANIA.

METAL-TURNING LATHE.

SPECIFICATION forming part of Letters Patent No. 649,374, dated May 8, 1900.

Application filed June 27, 1899. Serial No. 722,074. (No model.)

To all whom it may concern:

Be it known that we, ADAM TINDEL and OTTO ALBRECHT, citizens of the United States, and residents of Philadelphia, Pennsylvania, have invented certain Improvements in Metal-Turning Lathes, of which the following is a specification.

Our invention relates especially to lathes for turning crank-pins, eccentrics, and the like, one object of our invention being to provide means for properly counterbalancing the face-plate of the lathe, and a further object being to provide for bracing the crank, so as to prevent defective action due to the springing of the same. These objects we attain in the manner hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1 is a plan view of sufficient of a crank-pin-turning lathe to illustrate our invention. Fig. 2 is a side elevation of the same looking in the direction of the arrow *x*, Fig. 1. Fig. 3 is a side elevation looking in the direction of the arrow *y*, Fig. 1. Fig. 4 is a rear elevation of the face-plate, showing the counterbalancing-weights with their guides and adjusting devices. Fig. 5 is a front elevation of the face-plate, showing the shaft-chuck and crank-braces. Fig. 6 is a detached view of one of the pivoting elements used in connection with the crank-braces. Fig. 7 is a view similar to Fig. 1, but showing a modified form of crank-bracing device. Fig. 8 is a similar view illustrating another modification. Fig. 9 is a view of a modified form of crank-clamping brace, and Fig. 10 is a plan view showing a modified means of hanging and driving the crank-shaft.

One of the pedestals for the fixed spindle or mandrel 1 of the lathe is represented at 2, the cross-head 3 being mounted upon the projecting end of this spindle, so as to be free to turn thereon, and being confined longitudinally to the spindle by any suitable means—for instance, by the means set forth in our application, Serial No. 678,752, filed April 25, 1898.

Secured to or forming part of the face-plate 3 is a spur-wheel 4, intended to mesh with a suitable driving-pinion, whereby rotative movement can be imparted to the face-plate. On the back of the face-plate are transverse ribs 5, forming guides and bearings for a series of counterbalance-weights 6, three of these weights being shown in the present instance—one in line radially with the axis of the lathe shaft or spindle and the other two disposed, respectively, one on each side of said center weight—the guides 5 providing for the movement of all of the weights in parallel lines.

Longitudinally confined to but free to turn in bearings 7, projecting from the back of the face-plate, are adjusting-screws 8, each of these adjusting-screws engaging with a nut 9, let into and longitudinally confined to one of the counterbalancing-weights 6, so that when the adjusting-screws 8 are turned in one direction or the other the counterbalancing-weights can be caused to move toward and from a line passing diametrically through the axis of the lathe-spindle. In the present instance the adjusting-screw 8 for the central counterbalance-weight 6 is a short screw carried by a single bearing 7, longitudinal confinement of said screw being effected by means of collars 10, secured to or forming part of the screw-stem and located on opposite sides of said bearing. The outer adjusting-screws 8 are longer than the central adjusting-screw, and each is adapted to two bearings 7, one near each end of the screw, a collar 10 taking against one face of one of said bearings and another collar 10 taking against the opposite face of the other bearing in order to effect the longitudinal confinement of the screws to said bearings.

Each of the counterbalance-weights is recessed on the side next the face-plate for the reception of an adjusting-screw, and each adjusting-screw is square or otherwise formed at one end for the reception of a suitable implement whereby it may be readily turned to effect the adjustment of the weights 6. As shown in Fig. 4, all of the weights are adjusted to an extreme position on one side of the diametrical line of the face-plate in order to counterbalance a load carried by the face-plate chuck and exerting its force on the opposite side of said diametrical line; but all of the

counterbalance-weights can be moved toward the diametrical line of the face-plate in order to graduate the counterbalancing action to accord with the load carried by said face-plate, or the outer weights 6 can be caused to pass beyond the diametrical line of the face-plate in order to partially or wholly counterbalance the central weight when the work to be counterbalanced is light or no counterbalance is required.

Secured to the front of the face-plate 3 is a transversely-adjustable cross-head 11, which has a secondary face-plate 12, carrying the sliding clamping-jaws 13 of the chuck, as in our application for patent before referred to. It has been found in practice that when turning cranks of long throw or cranks located at a considerable distance from that end of the shaft which is carried by the chuck there is a tendency of the crank-arms to spring under the action of the cutting-tool, thereby interfering with the proper operation of the lathe. In order to overcome this objection, we provide means for bracing the cranks during the turning operation. Secured to but laterally adjustable across the front of the face-plate 3 is a second sliding cross-head 14, which has bearings for the trunnions 15 of two swinging blocks 16, each of these blocks having projecting studs 17 in a plane at right angles to that of the trunnions 15, and to these studs is hung the forked upper end of a yoke 18, having a projecting slotted stem 19, with ears 20, which are acted upon by a clamping-bolt 21 and nut 22, so that said projecting slotted stem constitutes a clamp for engaging and holding the longitudinal stem 23 of one of the crank clamping-jaws 24, the two jaws being connected by a transverse bolt 25, which has a nut 26, whereby the clamping-jaws may be securely confined to the outer portion of the crank-arm after the latter has been adjusted to its proper position in the lathe, as shown by dotted lines in Fig. 1. The stem 19 of each yoke 18 is tubular, so that the stem 23 of the crank clamping-jaw can be moved back and forth longitudinally through the same, and each of the pivoted blocks 16 is slotted, as shown in Fig. 6, so as to permit the inner end of the stem 23 to pass through and play in said block. By thus bracing the crank at the point where the strain is being exerted upon the same any defect in the operation of the lathe due to the springing of the crank is effectually prevented, the longitudinal adjustment of the clamp-jaws and the universal swing of the same, which is permitted by the right-angled disposition of the pivot trunnions and studs 15 and 17, providing for the proper clamping of the crank irrespective, within certain limits, of the distance of the crank from the face-plate of the lathe or of the size or throw of the crank.

Of course it will be understood that any ordinary form of ball-and-socket joint may be substituted for the right-angled pivots which we have shown, and although we prefer to employ a brace consisting of independently-swinging and independently-adjustable clamping-jaws 24 a single-stem brace may be employed, if desired. Thus in Fig. 9 we have shown such a brace consisting of a stem 25^a, having at the outer end a fixed jaw 24^a and a sliding jaw 24^b, with clamp-screw 25 and nut 26.

We find it advisable to provide the clamping-jaws 24 with rounded backs, forming seats for socketed washers 27, upon which bear, respectively, the head of the bolt 25 and the nut 26, so that if the jaws are thrown slightly out of alinement by reason of roughness or irregularity of the casting or forging of which the crank is composed the washers will shift on the rounded backs of the jaws and the proper bearing of said washers will be preserved, so that the pressure of the bolt and nut can be exerted to the best advantage upon the jaws.

While we prefer in all cases to use the universally-pivoted hangers for the crank-braces, the same are not absolutely necessary for the proper carrying out of our invention—for instance, in Fig. 7 we have illustrated a modification in which the yoke 18 is pivoted to a block 30, so as to be free to slide transversely on the face of the cross-head 14^a, and in Fig. 8 we have illustrated another modification consisting of a bent or offset arm 31, secured to and projecting forwardly from the face-plate 3 and carrying a longitudinally-adjustable block 32, to which is pivoted, so as to swing laterally, the crank clamping-jaw 24^c. There may be one of these blocks 32 carrying both jaws or a separate block for each jaw. Different means than the chuck-jaws 13 may also be used for mounting and driving the crank-shaft. Thus in Fig. 10 we have shown the crank-shaft mounted in clamp-arms 13^a, which engage the center pins 33 of the face-plate and tail-stock, a dog 34 or other suitable projection on the face-plate engaging the adjacent arm 13^a, so as to cause the same to rotate with the face-plate. By mounting the counterbalance-weights on the back of the cross-head they are out of the way and do not interfere with the operation of the lathe or with the application or removal of the work.

Having thus described our invention, we claim and desire to secure by Letters Patent—

1. In a counterbalancing device for lathes, the combination of the face-plate with a counterbalance-weight guided so as to be adjustable transversely across said face-plate, and an adjusting-screw whereby the transverse movement of said weight is effected, substantially as specified.

2. The combination, in a counterbalancing device for lathes, of the face-plate with the counterbalance-weight adjustable transversely across said face-plate, an adjusting-screw longitudinally confined to bearings on

the face-plate, and a nut secured to the counterbalance-weight and engaging with said adjusting-screw.

3. The combination, in a counterbalancing device for lathes, of the face-plate, and a counterbalance-weight adjustable transversely thereon across the diametrical line of the face-plate, whereby it may occupy a position on either side of the said line of the face-plate.

4. The combination, in a counterbalancing device for lathes, of the face-plate, a counterbalance-weight adjustable in a radial line on one side of the diametrical line of the face-plate, and another counterbalance-weight adjustable transversely so that it may occupy a position on either side of said diametrical line of the face-plate.

5. The combination, in a counterbalancing device for lathes, of the face-plate and a pair of counterbalance-weights disposed on opposite sides of the axis of said face-plate, and adjustable across the face-plate so as to occupy positions on either side of the diametrical line of the same.

6. The combination, in a counterbalancing device for lathes, of the face-plate, a central counterbalancing-weight occupying a position at one side of the diametrical line of the face-plate and adjustable from and toward said diametrical line, and other counterbalance-weights disposed one on each side of the central weight, and adjustable transversely across the face-plate so as to occupy positions on either side of the diametrical line of the same.

7. The combination, in a crank-pin-turning lathe, of means for mounting and rotating the crank-shaft, and a brace for the outer portion of the crank-arm, independent of said shaft-rotating devices, said brace having jaws between which the crank-arm is confined.

8. The combination, in a crank-pin-turning lathe, of means for mounting and rotating the crank-shaft, and a longitudinally expansible and contractible brace having jaws for engaging the outer portion of the crank-arm, said brace being independent of the shaft-rotating devices.

9. The combination, in a crank-pin-turning lathe, of means for mounting and rotating the crank-shaft, and a brace for the outer portion of the crank-arm, said brace being mounted so as to be free to swing, and being independent of the shaft-rotating devices.

10. The combination, in a crank-pin-turning lathe, of means for mounting and rotating the crank-shaft, and a brace for the outer portion of the crank-arm, said brace being pivoted so as to be free to swing and having a portion which is adjustable longitudinally, and being independent of the shaft-rotating devices.

11. The combination, in a crank-pin-turning lathe, of the face-plate, means for mounting and rotating the crank-shaft, and a brace for the outer end of the crank-arm, said brace having a universally-swinging connection with the face-plate.

12. The combination, in a crank-pin-turning lathe, of the face-plate, means for mounting and rotating the crank-shaft, and a brace for the outer portion of the crank-arm, said brace having a universally-swinging connection with the face-plate, and also having a longitudinally-adjustable portion.

13. The combination, in a crank-pin-turning lathe, of means for mounting and rotating the crank-shaft, and a brace for the outer portion of the crank-arm, said brace having clamping-jaws with curved backs, socket-washers bearing thereupon, and a bolt and nut bearing on said washers.

14. The combination, in a crank-pin-turning lathe, of means for mounting and rotating the crank-shaft, and a brace for the outer portion of the crank-arm, said brace comprising a pair of clamping-jaws which are mounted so as to be free to swing, and means for causing said clamping-jaws to engage the crank-arm.

15. The combination, in a crank-pin-turning lathe, of means for mounting and rotating the crank-shaft, and a brace for the outer portion of the crank-arm, said brace comprising a pair of clamping-jaws each mounted so as to be free to swing in all directions, and means for causing said clamping-jaws to confine the crank-arm between them.

16. The combination, in a crank-pin-turning lathe, of means for mounting and rotating the crank-shaft, and a brace for the outer end of the crank-arm, said brace comprising a pair of clamping-jaws each mounted so as to be free to swing and each having a longitudinally-adjustable portion, and means for causing said clamping-jaws to confine the crank-arm between them.

17. The combination, in a crank-pin-turning lathe, of means for mounting and rotating the crank-shaft, and a brace for the outer portion of the crank-arm, said brace comprising a pair of clamping-jaws each mounted so as to be free to move in all directions, and each having a longitudinally-adjustable portion, and means for causing said clamping-jaws to confine the crank-arm between them.

18. The combination, in a crank-pin-turning lathe, of means for mounting and rotating the crank-shaft, and a brace for the outer portion of the crank-arm, said brace comprising a hollow slotted stem hung so as to be free to swing, a portion for engaging with the crank-arm having a stem adjustable longitudinally in said hollow stem, and means for contracting the latter so as to confine the stem of the brace thereto.

19. The combination, in a crank-pin-turning lathe, of the face-plate, means for mounting and rotating the crank-shaft, and a brace for the outer end of the crank-arm, said brace comprising a block hung to the face-plate so as to be free to swing in one direction, and a

hollow slotted stem hung to said block so as to be free to swing in a direction at right angles thereto, a portion for engaging with the crank-arm, said portion having a stem which is adjustable longitudinally in the slotted hollow stem, and means for contracting the latter so as to confine the stem of the brace thereto.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

ADAM TINDEL.
OTTO ALBRECHT.

Witnesses:
LEMUEL I. MORRIS,
H. W. ROSS.