No. 725,387. PATENTED APR. 14, 1903.

# A. W. WIGGLESWORTH & C. H. NORSTROM.

## POWER TRANSMITTING DEVICE.

APPLICATION FILED SEPT. 2, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

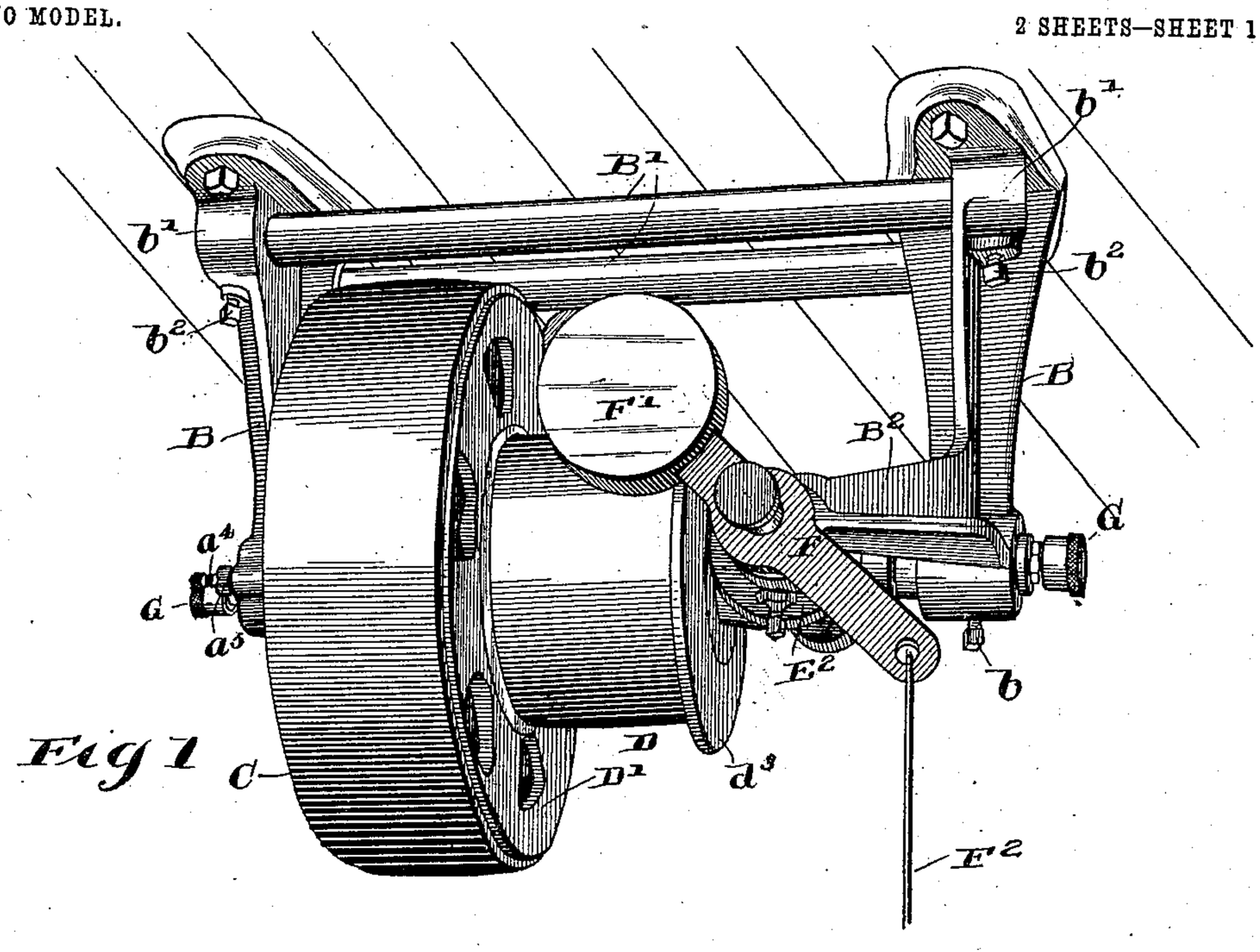


Fig 1

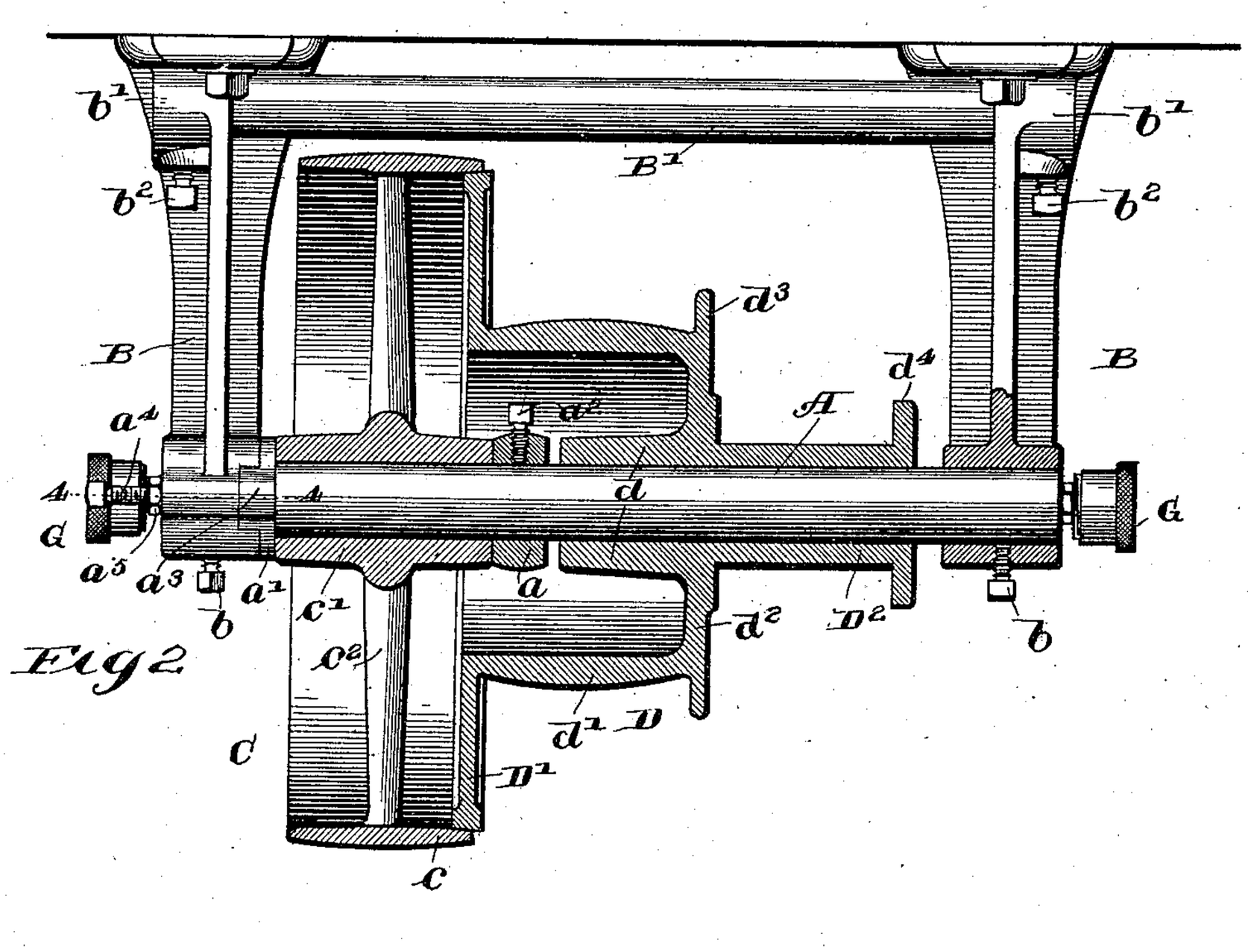


Fig 2

Witnesses:-
Carl S. Crawford
William L. Hall

Inventors:-
Albert W Wigglesworth
Carl H. Norstrom
By Poole & Brown their Attorneys

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Fig 3

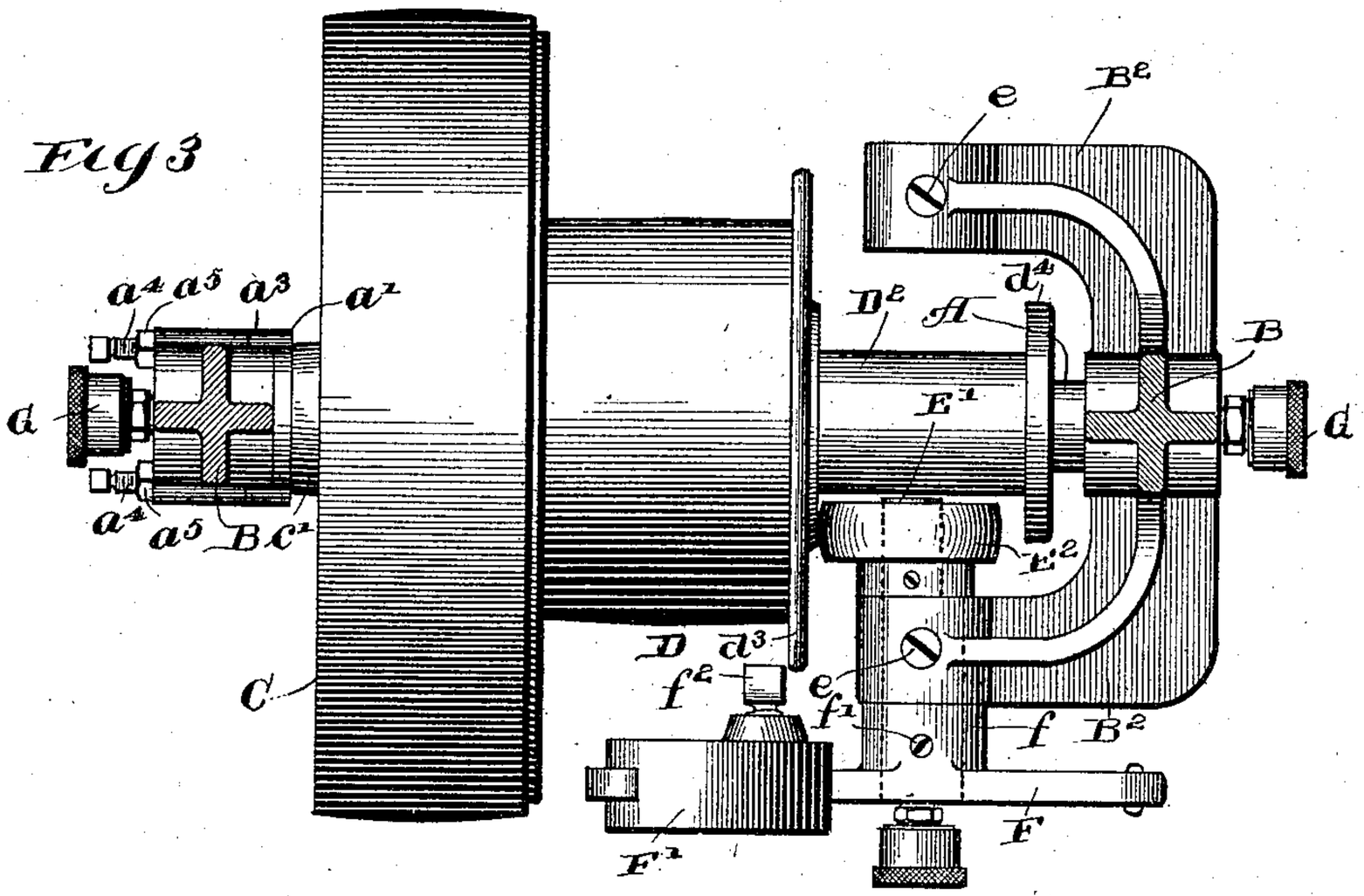
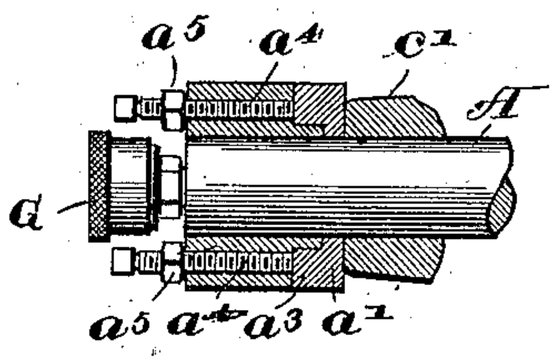



Fig 4



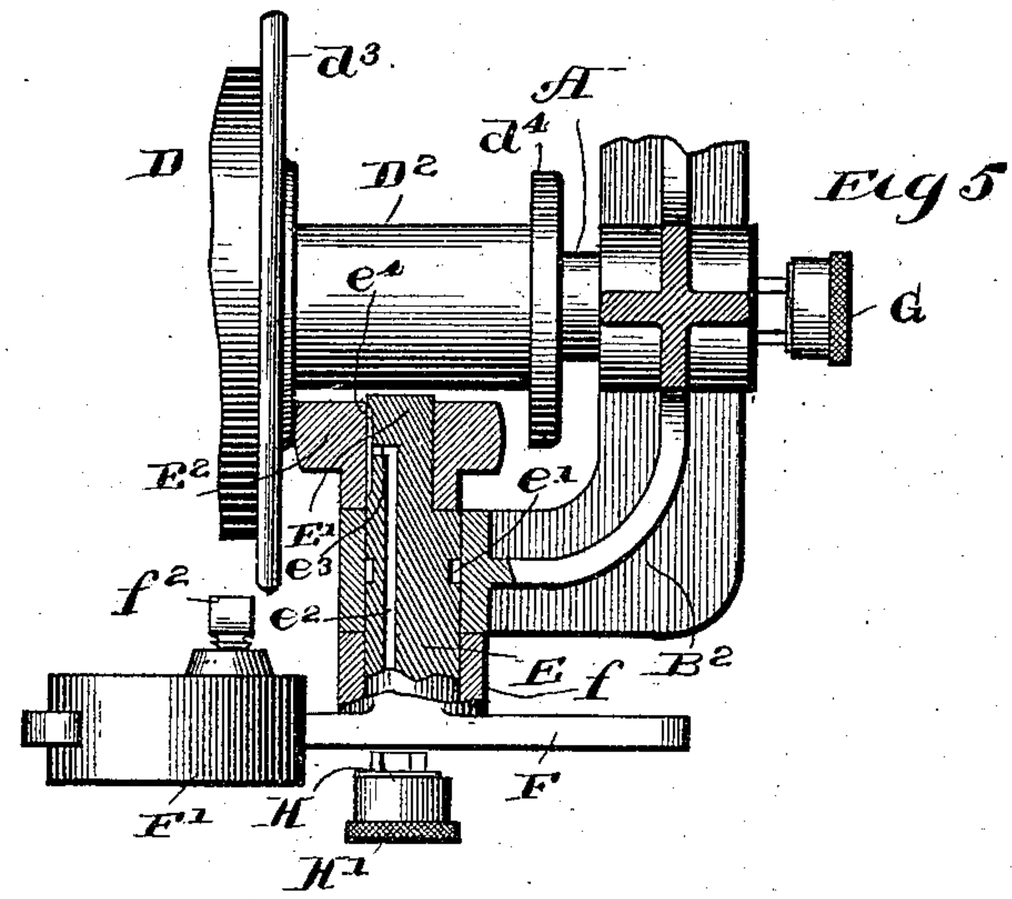
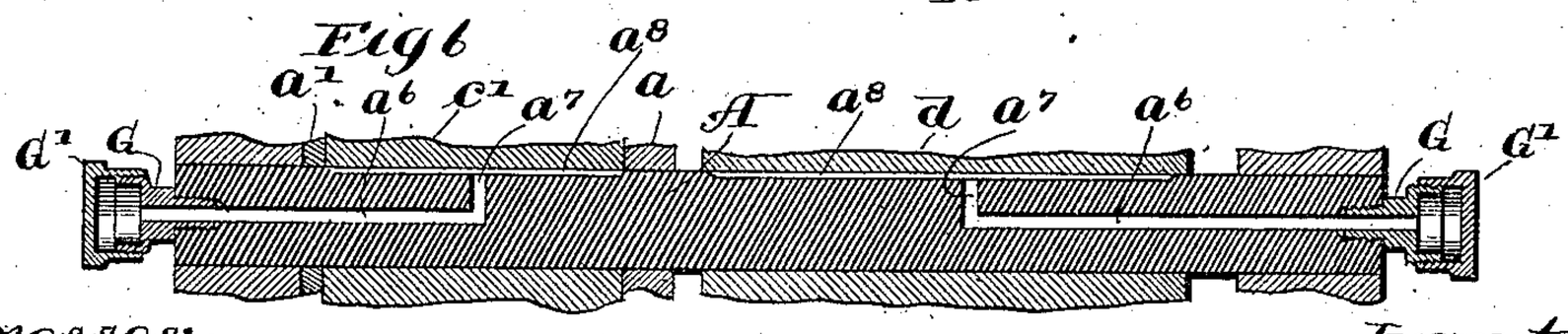




Fig 6




Witnesses:-
Earl S. Crawford
William H. Hall

Inventors:-
Albert W. Wigglesworth
Carl H. Norstrom
By Poole & Brown their Attorneys

# UNITED STATES PATENT OFFICE.

ALBERT W. WIGGLESWORTH AND CARL H. NORSTROM, OF CHICAGO, ILLINOIS, ASSIGNORS TO CHICAGO MACHINE TOOL COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

## POWER-TRANSMITTING DEVICE.

SPECIFICATION forming part of Letters Patent No. 725,387, dated April 14, 1903.

Application filed September 2, 1902. Serial No. 121,721. (No model.)

*To all whom it may concern:*

Be it known that we, ALBERT W. WIGGLESWORTH and CARL H. NORSTROM, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Power-Transmitting Devices; and we do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in power-transmitting devices for use in machine-shops and designed for transmitting power from an overhead rotary driving-shaft to a machine beneath the same.

The invention consists in the matters hereinafter set forth, and more particularly pointed out in the appended claims.

In the drawings, Figure 1 is a perspective view of a power-transmitting device made in accordance with our invention, showing the same in position on a ceiling or like superstructure. Fig. 2 is a view, partly in vertical central section, of said mechanism. Fig. 3 is a top plan view of said mechanism with the supporting-bracket shown in section. Fig. 4 is a detail horizontal section taken on line 4 4 of Fig. 2. Fig. 5 is a fragmentary view, partially in plan and partially in horizontal section, showing the mechanism for shifting the movable member of said transmitting device. Fig. 6 is an axial section of the main supporting-shaft, on which the rotative members of the mechanism are mounted, showing the means for applying a lubricant to the bearings between said rotative members and the shaft.

As shown in the drawings, A designates a horizontal shaft which is non-rotatively fixed in a bracket consisting of vertical bracket-arms B B, which are constructed at their upper ends to be attached to a ceiling or like superstructure, and transverse bars connecting the upper ends of said arms. The shaft A extends through horizontal alined openings in the lower ends of the bracket-arms and is non-rotatively fixed therein by means of set-screws *b*, extending into said openings and impinging at their inner ends against said shaft. The transverse bars B′ extend between said bracket-arms and into alined openings formed in suitable enlargements *b′* at the upper ends of said bracket-arms. Said bars are fixed to said bracket-arms by means of set-screws $b^2$, passing into said openings and impinging against said bars. The bars B′ may be made of short pipe-sections and are designed to serve as transverse frame members to rigidly connect the bracket-arms B at their upper ends.

Loosely mounted on the shaft A are two rotative pulleys C D. The pulley C is made larger than the pulley D and comprises an annular rim *c*, a central hub *c′*, and radial arms or spokes $c^2$, extending between the hub and rim. The hub of said pulley C is confined from endwise movement on the shaft A between a collar *a* at the inner end of the hub *c′* and a second collar *a′* between said hub and the adjacent bracket-arm B. The collar *a* is affixed to the shaft A by means of a set-screw $a^2$, and the collar *a′* is made non-rotative by means of projections $a^3$ thereon, which enter notches in the adjacent face of the associated bracket-arm B, as clearly shown in Fig. 2.

The pulley D is provided with a central hub *d*, which is connected with the rim *d′* of the pulley by means of a flat web or flange $d^2$ at the end of the pulley remote from the pulley C. Said pulley is movable longitudinally of the shaft toward and from the pulley C, and said pulleys are provided with complemental frictional surfaces, which when brought into engagement are adapted to transmit rotary motion from one pulley to the other. Said pulley D is herein shown as provided at its end adjacent to the pulley C with a wide radial annular flange D′, which is made of less diameter than the rim *c* of the pulley C and is adapted to enter said rim when the pulley D is moved endwise of the shaft toward the pulley C. The margin of said flange D′ is made tapered and is adapted to engage a corresponding tapered surface on the inner face of the adjacent

margin of the rim of the pulley C when said pulley D is moved endwise into engagement with the pulley C. Said pulley D is provided at its end remote from the flange D′ with an annular radial flange $d^3$, which constitutes, in effect, an extension of said web $d^2$. The belt associated with said pulley is confined between said flanges D′ and $d^3$.

The pulley C is adapted to be continuously driven by means of a suitable belt from an overhead shaft, and the pulley D is adapted to be operatively connected by a belt with a machine beneath the same to be driven from said overhead shaft. So far as the broader aspect of the invention is concerned either pulley may be the movable pulley and be moved toward the other to bring the complemental frictional surfaces thereof into driving engagement with each other. As herein shown, the pulley D is the shiftable pulley and the pulley C is stationary endwise of the shaft and is hereinafter termed the "stationary" pulley.

Means are provided for shifting the pulley D longitudinally of the shaft toward and from the stationary pulley, the shifting devices being made as follows: Said pulley D is provided at its end remote from the pulley C with a tubular extension or sleeve $D^2$, which constitutes, in effect, an extension of the hub $d$ and which has rotative bearing on the shaft A. The outer end of said extension or sleeve is provided with a narrow annular radial flange $d^4$. The space between the bracket-arm B, adjacent to the tubular extension $D^2$ of the wheel, and the pulley C is made of greater length than that of the combined length of said pulley D and its tubular extension or sleeve $D^2$ in order to give ample room for the shifting movement of the pulley to move the same into and out of driving connection with the pulley C.

E designates a horizontal rock-shaft, which is disposed at right angles to the shaft A and is mounted in a horizontal bearing-arm $B^2$, projecting forwardly and laterally from the lower end of the bracket-arm B adjacent to the pulley D. The shaft is held from endwise movement in its bearing by means of a screw *e*, extending through the bearing-sleeve and engaging at its inner end an annular groove *e′* in said shaft, as shown in Figs. 3 and 4. A second horizontal bearing-arm $B^2$ is formed on said bracket-arm B on the side thereof remote from the arm in which the shaft E is mounted. The purpose of the two bearing-arms is to enable the shifting device for the movable pulley to be operated from either side of the device. The inner end of said rock-shaft extends toward the extension or sleeve $D^2$ of the pulley D into the space between the flanges $d^2$ $d^4$ thereof. Said inner end of the rock-shaft is provided with an eccentric or crank portion E′, on which is rotatively mounted a bearing-roller $E^2$. Said bearing-roller is adapted to be brought into engagement with either of the flanges $d^2$ $d^4$ by partial rotation of the rock-shaft in the proper direction. The engagement of said roller with either of the flanges by movement of the rock-shaft described acts to move the pulley D into or out of engagement with the pulley C, depending upon the direction of rotation of said shaft. The flanges $d^2$ $d^4$ constitute shoulders on the pulley D, which coact with the eccentrically-constructed rock-shaft to shift said pulleys in both directions of its movement, and said shoulders may be otherwise constructed. The means for imparting rocking motion to said shaft E consists of a weighted lever F, which is non-rotatively fixed between its ends to said rock-shaft. As herein shown, said lever is provided with a hub *f*, which fits over the outer end of said rock-shaft E, and said hub is fixed rigidly to said shaft by means of a set-screw *f′*, extending through the hub and impinging against the shaft. When said rock-shaft is occupying one limit of its rotative movement, and therefore is holding the roller $E^2$ in engagement with the flange $d^2$ or $d^4$ of the pulley D, the actuating-lever F occupies an inclined position, as clearly shown in Fig. 1. Said actuating-lever is provided at its upper end with a weight F′, which is sufficiently heavy to hold the shiftable pulley D in frictional engagement with the pulley C and to throw said pulley D into and out of engagement with the pulley C. Said weight is attached to the lever by means of a set-screw $f^2$, extending through the weight and impinging against the lever in the manner clearly shown in Fig. 5. The lower end of the lever is adapted for connection with a cord or cable $F^2$, by means of which said lever is swung on its axis to rock the shaft E and move the eccentrically-located roller $E^2$ into engagement with one of the parts $d^2$ $d^4$ referred to. In operating the lever F to shift the pulley D into or out of engagement with the pulley C it is only necessary to swing the lever to a vertical position by a sharp pull on the cord or cable $F^2$, and the momentum of the moving weight and the weight thereof are sufficient to complete the throw of the lever and rotate the rock-shaft to the limits of its movements, and thereby force the pulley D into driving engagement with the pulley C or release said pulleys from each other. The set-screw $f^2$, by which the weight is fixed to the lever F, engages the bearing-arm $B^2$ when the lever is swung away from the pulley C and serves as a stop to limit the outward swing of said lever. The roller $E^2$ is made of a diameter less than the distance between the flanges D′ $d^3$, so that the lever F may have a lost motion when the same is thrown over to shift the pulley D, and thereby impart to said lever from the weight F a momentum which facilitates the starting of the movable pulley. This is especially useful when shifting the movable pulley away from the stationary pulley, as some force is required to separate the coacting friction-

surfaces of the pulleys when made as herein shown.

The roller $E^2$ on the eccentric or crank portion of the rock-shaft E is provided merely for the purpose of minimizing the friction between the operative parts of the eccentrically-actuating devices, and it is obvious that such rolling or antifriction contact of the parts may be otherwise effected than herein shown.

Provision is made for taking up wear between the stationary and shifting pulleys, so as to insure that the movement given to the shifting pulley by the actuating-lever F is at all times sufficient to bring the friction-surfaces of said pulleys into proper driving relation. Said take-up or adjusting means are shown in Fig. 4 and consist of two horizontal screw-shafts $a^4$ $a^4$, which extend through horizontal screw-threaded openings in the lower end of the bracket-arm B, adjacent to the stationary pulley C, and are adapted to bear against the projections $a^3$ of the collar $a'$, interposed between the hub of said pulley and the adjacent bracket-arm. Said screw-shafts are provided with jam-nuts $a^5$ for holding the same in fixed adjusted positions and are also provided at their outer ends with heads adapted for engagement by a suitable implement for adjusting said shafts and the collar $a'$.

As before stated, either of the pulleys C and D may be the continuously-driven pulley and through which power is transmitted to the device from an overhead rotary shaft. Ordinarily, as the device herein shown is constructed, the pulley D is connected directly with the machine to be driven, for the reason that the machine will usually be driven at greater speed than the overhead shaft. It will be observed that the movement of the the shifting pulley is not great, so that the shifting of the pulley D to throw the same into or out of engagement with the pulley C will have little or no effect to disturb the driving relation of the belt which connects the pulley D with the machine which is being driven.

The construction of the supporting-bracket for the device, consisting of the vertical bracket-arms, which are affixed rigidly together at their upper ends by the cross-bars B′, which are detachably connected with said arms in the manner stated, combined with the supporting-shafts A, detachably fixed to the lower ends of said arms, is of considerable importance, as it enables the device as a whole to be made wider for the reception of longer pulleys while using the same bracket-arms. When it is desired to insert pulleys having wider bearing-faces, the bars B′ and shaft A are removed and longer ones substituted in order to increase the length of the device to correspond with the increased length of pulleys. The bars B′, which may be made of common iron tube-sections, and the shaft A of standard or stock parts may be substituted at small cost. Moreover, in the manufacture of said devices it is necessary to make bracket-arms of but one size or dimension for pulleys of given diameters, and the length thereof may be readily altered to correspond with different lengths of pulleys to be used by the use of bars B′ and shaft A of proper length.

Provision is made for lubricating the bearings between the shaft A and the pulleys C and D. As herein shown, said shaft is provided at its end with axial passages $a^6$ $a^6$, which communicate at their inner ends with radial passages $a^7$ $a^7$, which extend to the outer cylindric face of said shaft and open in shallow grooves $a^8$, inclosed by the hubs of said pulleys. Communicating with said passages $a^6$ are grease-cups G, which are provided with extensions which have screw-threaded engagement with axial openings in the ends of the shaft A, and said extensions of the grease-cups are provided with central passages which communicate with the interior of the cups and with the passages $a^6$. The grease-cups are provided with closing-caps G′, by which the lubricant placed therein is confined and by which it is forced through the passages referred to into the bearings when the caps are screwed inwardly upon the cups. Similarly the bearing between the eccentric or crank portion of the rock-shaft E and the roller $E^2$ is adapted to be lubricated. Said rock-shaft is for this purpose provided with an axial passage $e^2$, which communicates with a radial passage $e^3$, extending to the outer surface of the crank portion of the shaft and communicating with a shallow groove $e^4$ in said face. A grease-cup H is attached to the outer end of said shaft in the same manner as the grease-cup G is attached to the shaft A and is provided with a cap H′, which confines the lubricant in the cup and by means of which the lubricant is forced through the passages into the bearings between the crank portion of said shaft and said roller $E^2$.

It is obvious that certain of the structural details herein shown may be varied without departing from the spirit of our invention, and we do not wish to be limited to such details, excepting as hereinafter made the subject of specific claims. It is also to be understood that the combinations set forth in the several claims are intended to be separately claimed without limitation to the use in connection therewith of other features and details of construction illustrated, but not enumerated, in such claims.

We claim as our invention—

1. A power-transmitting device comprising two rotative pulleys, one of which is movable toward and from the other pulley and both provided with complemental friction-surfaces adapted to be moved into and out of contact by movement of the movable pulley, a rock-shaft provided with an eccentric part adapted to shift the movable pulley in both directions of its movement, a vertically-swinging lever for rocking said shaft and a weight on the

upper end of said lever, said lever being connected with the movable pulley by means affording a lost motion between said parts.

2. A power-transmitting device comprising a non-rotative shaft, two pulleys loosely mounted thereon and provided with complemental friction-surfaces, one of which is stationary, longitudinally of the shaft, and the other of which is movable toward and from the stationary pulley, whereby said complemental friction-surfaces may be moved into and out of contact, said movable pulley being provided with longitudinally-separated shoulders, a rock-shaft having an eccentric portion located between said shoulders and coacting therewith to shift the movable pulley toward either limit of its movement, said shoulders being separated a distance to afford lost motion between said shoulders and said rock-shaft, and a weight coacting with said rock-shaft for effecting the final shifting of the movable pulley and holding said pulley at the limit of its movement.

3. A power-transmitting device comprising a non-rotative shaft, two pulleys loosely mounted thereon, and provided with complemental friction-surfaces, one of which is stationary, longitudinally of the shaft, and the other of which is movable toward and from the stationary pulley, whereby said complemental frictional surfaces may be moved into and out of contact, said movable pulley being provided with longitudinally-separated shoulders, a rock-shaft having an eccentric portion located between said shoulders and coacting therewith to shift the movable pulley toward either limit of its movement, a weight coacting with the rock-shaft for effecting the final shifting of the movable pulley and holding said pulley at either limit of its movement, and an antifriction-bearing roller on the eccentric portion of the shaft and made of a diameter less than the distance between said shoulders.

4. A power-transmitting device comprising two rotative pulleys, one of which is movable toward and from the other pulley, said pulleys being provided with complemental friction-surfaces adapted to be moved into and out of contact by movement of the movable pulley, a rock-shaft provided with an eccentric part adapted to shift the movable pulley in both directions of its movement, a vertically-swinging lever for rocking said shaft, a weight on the upper end of said lever, and a cord or cable attached to the lower end of said lever and depending therefrom, said lever being connected with the movable pulley by means affording a lost motion between the said parts.

5. A power-transmitting device comprising a non-rotative shaft, two pulleys rotatively mounted thereon, two collars which are adjustably fixed to said shaft and between which the hub of one of said pulleys is confined, whereby, by adjustment of said collars, said pulley may be directed toward and from the other pulley and means for shifting the movable pulley toward and from the stationary pulley.

6. A power-transmitting device comprising two hangers, a non-rotative shaft extending between and connecting the lower ends of said hangers, two pulleys rotatively mounted on said shaft, one of which is stationary longitudinally of the shaft, and the other of which is movable toward and from the first-mentioned pulley, collars adjustably fixed to said shaft on either side of the hub of the stationary pulley for confining said stationary pulley, and adjusting-screws having screw-threaded engagement with one of the hangers and adapted to bear against one of said collars.

7. A power-transmitting device comprising a non-rotative shaft, two pulleys mounted loosely thereon, one of which is stationary, longitudinally of the shaft, and the other of which is movable toward and from the stationary pulley, said pulleys being provided with complemental friction-surfaces adapted to be moved into and out of contact by movement of the movable pulley, said movable pulley being provided with longitudinally-separated shoulders, a rock-shaft having an eccentric portion located between said shoulders and coacting therewith to shift the movable pulley toward either limit of its movement, a weight coacting with the eccentric shaft for effecting the final shifting of the movable pulley in either direction and holding said pulley at the limit of its movement, and means for adjusting said stationary pulley toward the movable pulley.

8. A power-transmitting device comprising a non-rotative shaft, two pulleys loosely mounted thereon, two collars affixed to the shaft and adjustable longitudinally of the shaft, one of said pulleys being confined between said collars and the other being movable toward and from the first pulley, said pulleys being provided with complemental frictional surfaces adapted by movement of the movable pulley to be moved into and out of contact, an eccentric, and a weight coöperating with the eccentric for effecting the shifting of the movable pulley toward and from the other pulley.

In testimony that we claim the foregoing as our invention we affix our signatures, in presence of two witnesses, this 21st day of August, A. D. 1902.

ALBERT W. WIGGLESWORTH.
CARL H. NORSTROM.

Witnesses:
WILLIAM W. HALL,
GEORGE R. WILKINS.