(No Model.) 7 Sheets--Sheet 1.

J. S. TAYLOR & S. W. CHALLEN.

Brackets and Bearings for Shafting and Shafts.

No. 231,866. **Patented Aug. 31, 1880.**

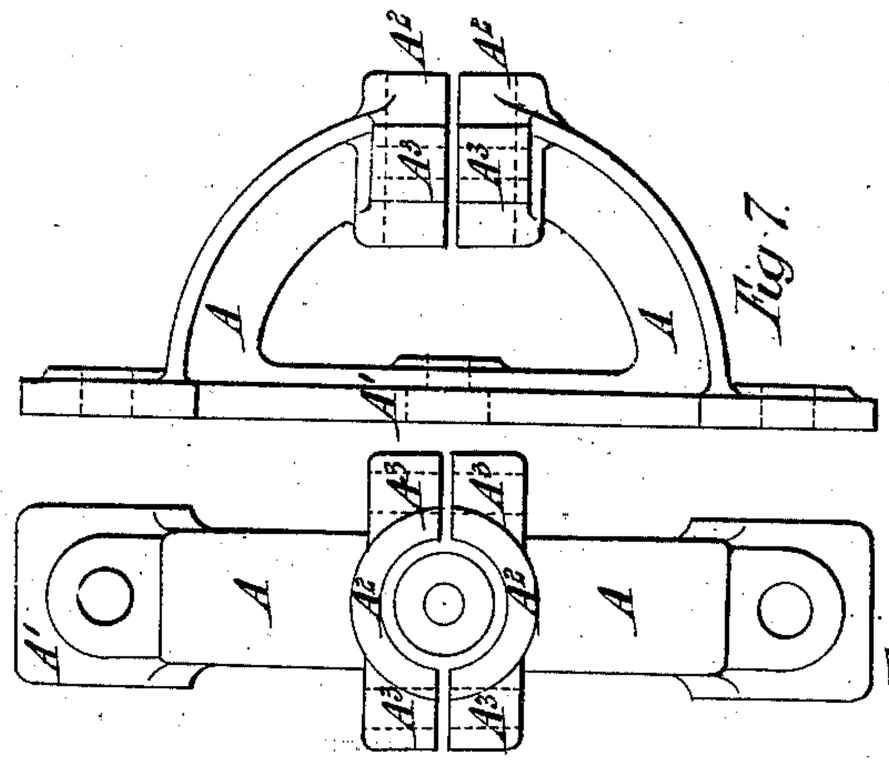
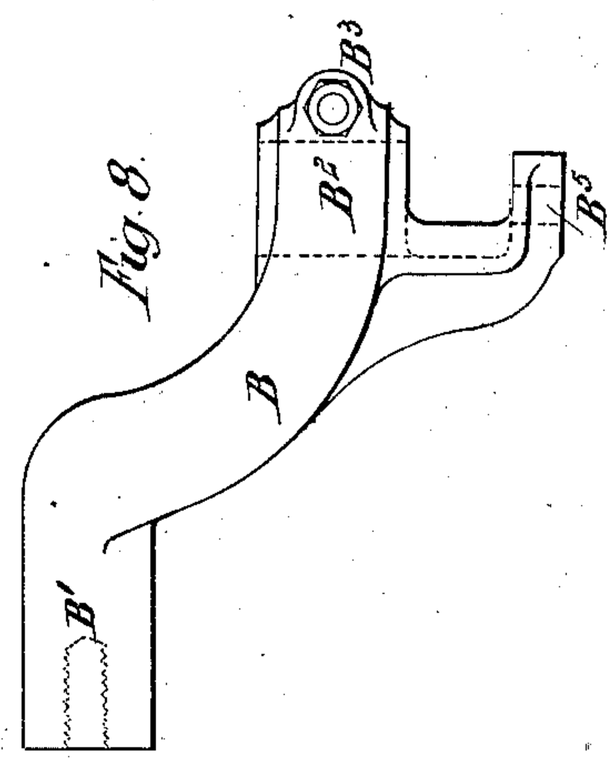


Fig. 6.

Fig. 7.



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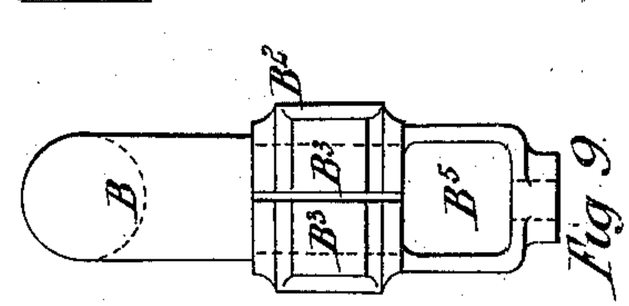
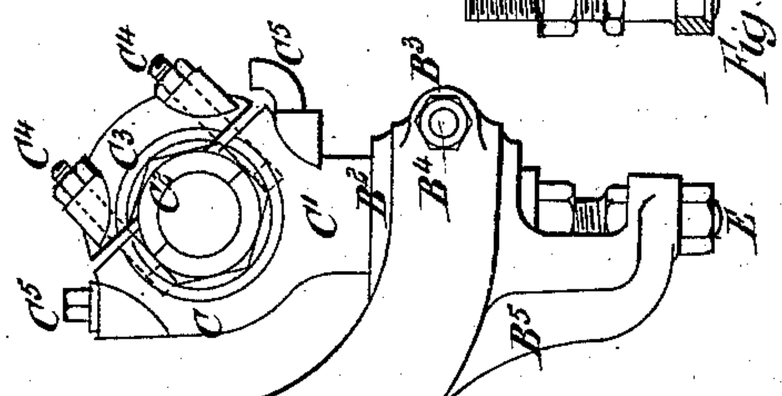


Fig. 9.



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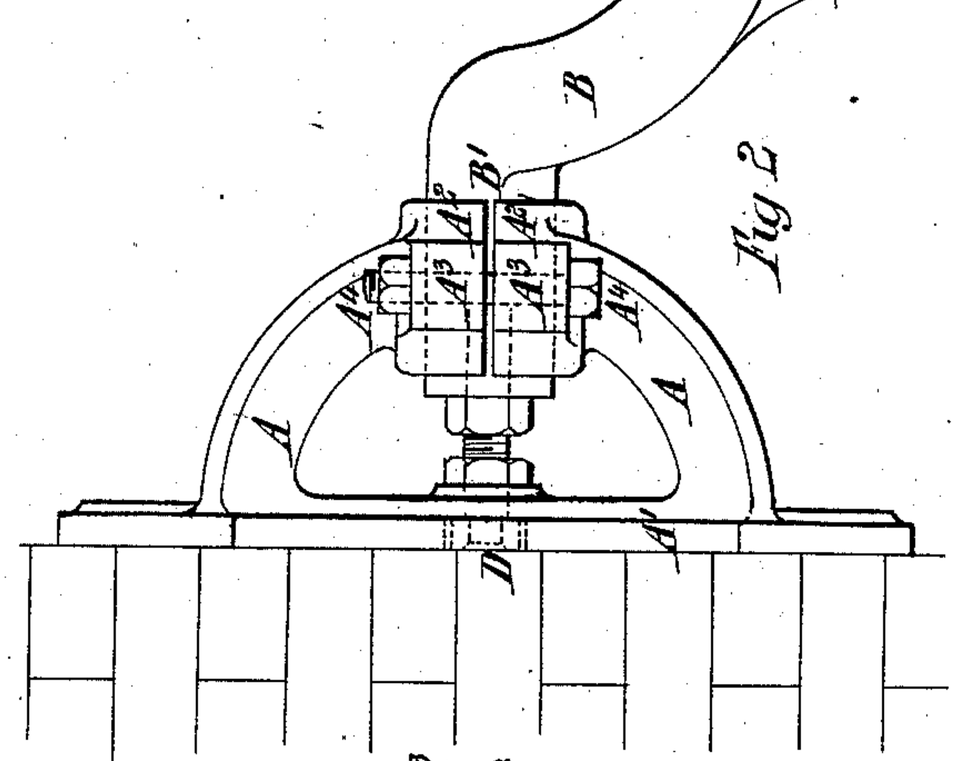

Fig. 2.

Fig. 4.

Fig. 1.

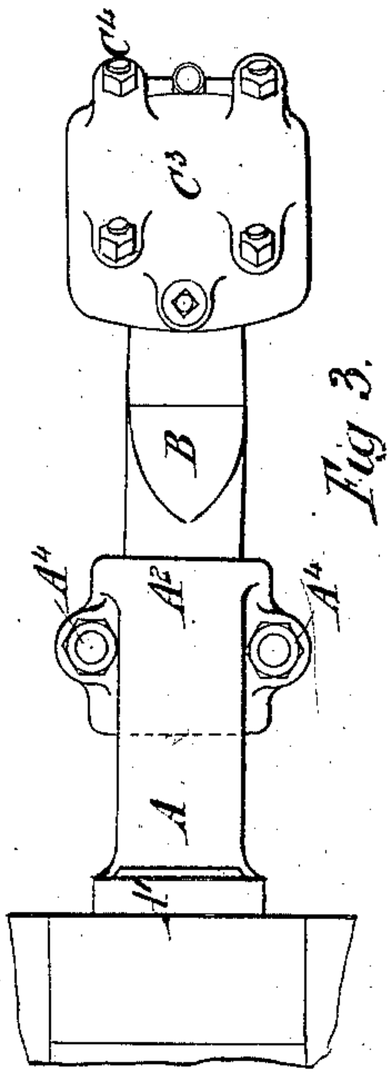

Fig. 3.

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(No Model.) 7 Sheets--Sheet 2.

J. S. TAYLOR & S. W. CHALLEN.

Brackets and Bearings for Shafting and Shafts.

No. 231,866. **Patented Aug. 31, 1880.**

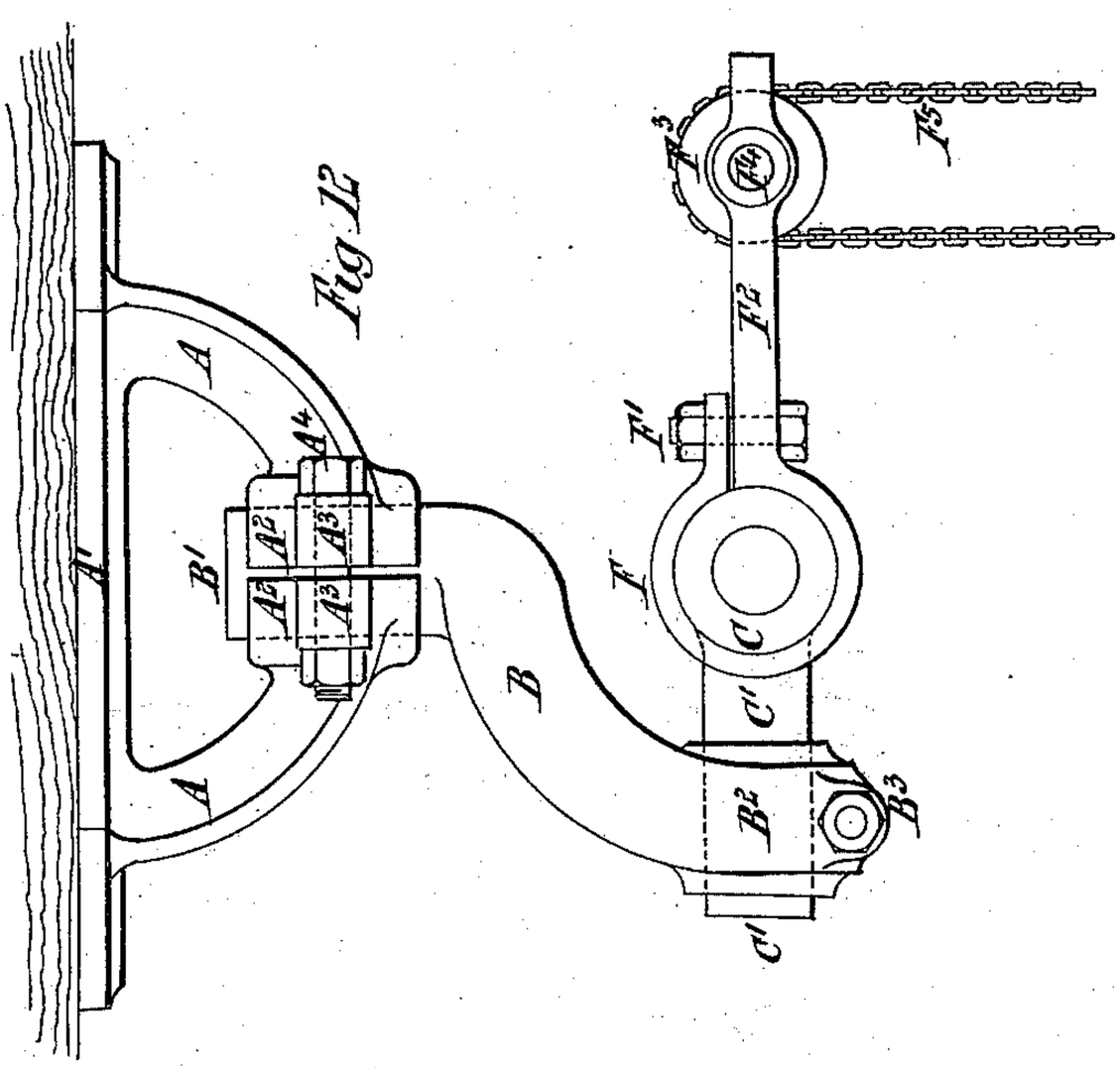


Fig. 12.

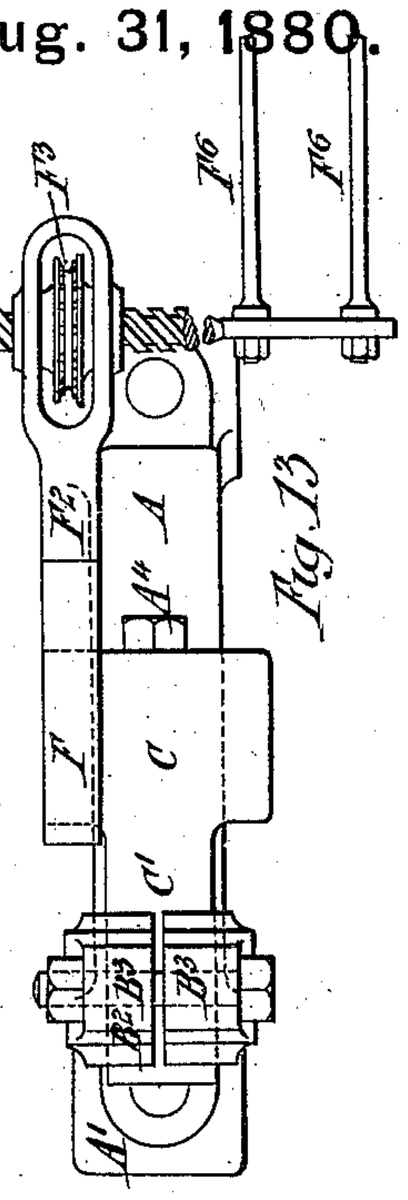


Fig. 13.

Fig. 14.

Fig. 16.

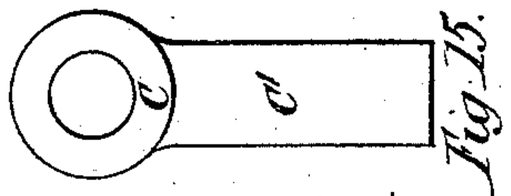
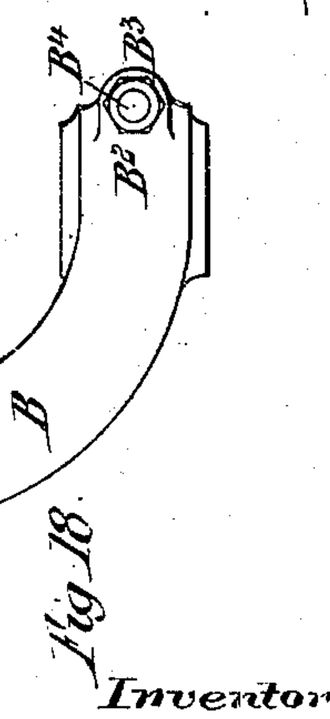


Fig. 15.

Fig. 10.



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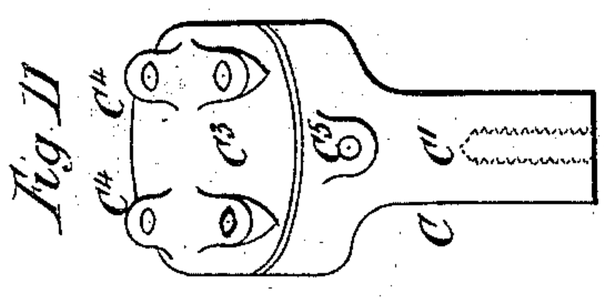

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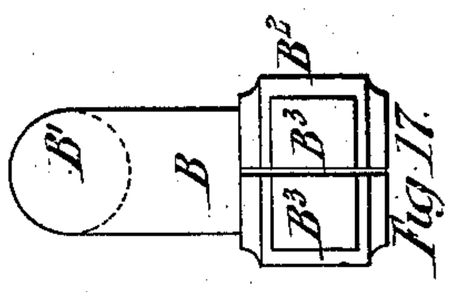

Fig. 17.

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J. S. TAYLOR & S. W. CHALLEN.

Brackets and Bearings for Shafting and Shafts.

No. 231,866. Patented Aug. 31, 1880.

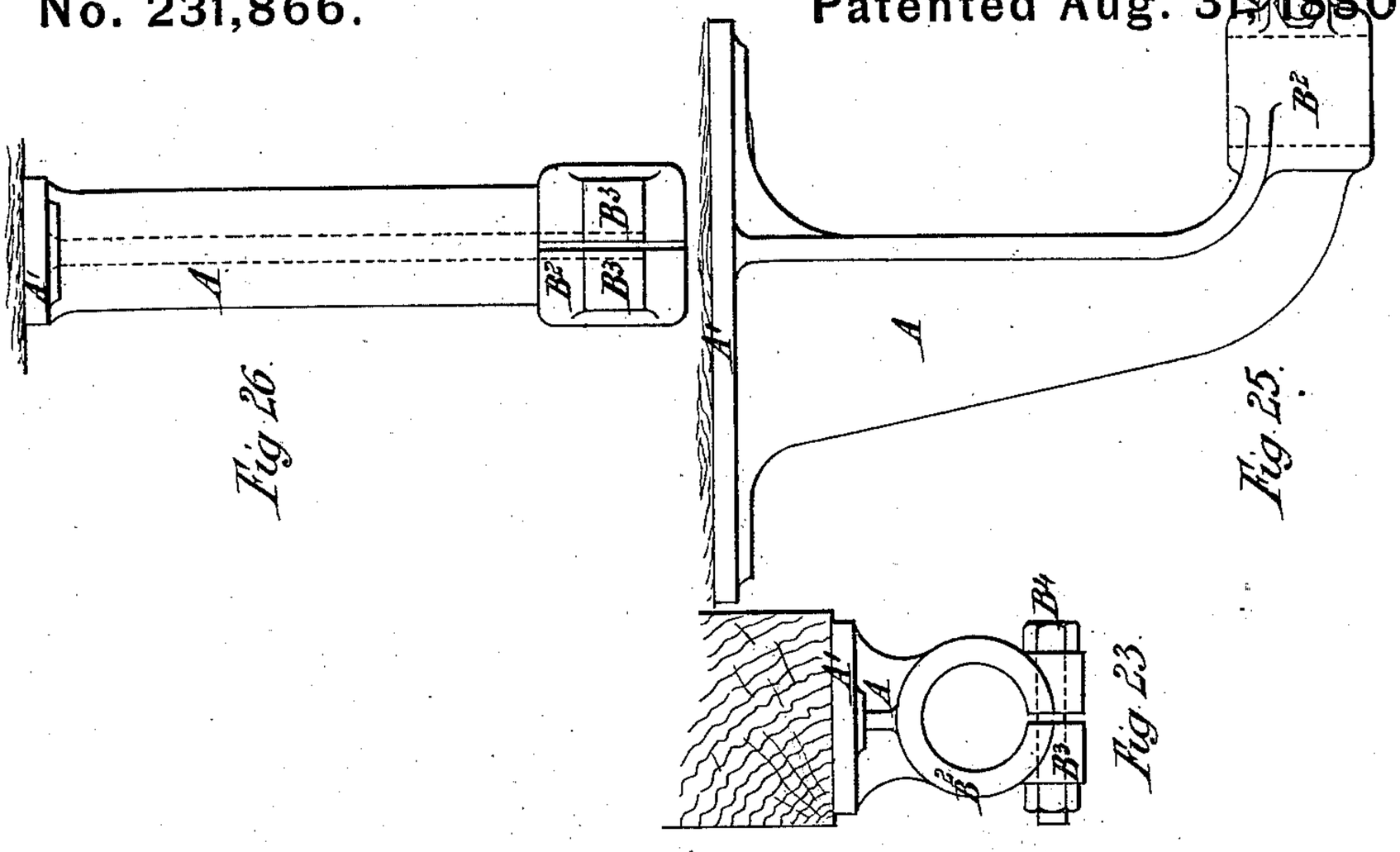
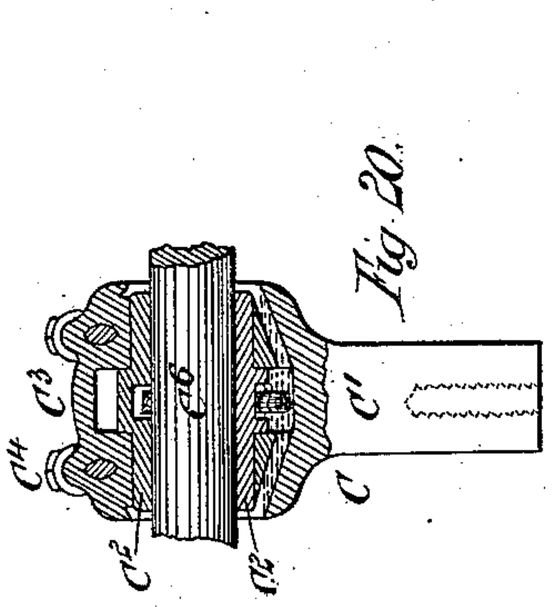


Fig. 26.

Fig. 25.

Fig. 23.



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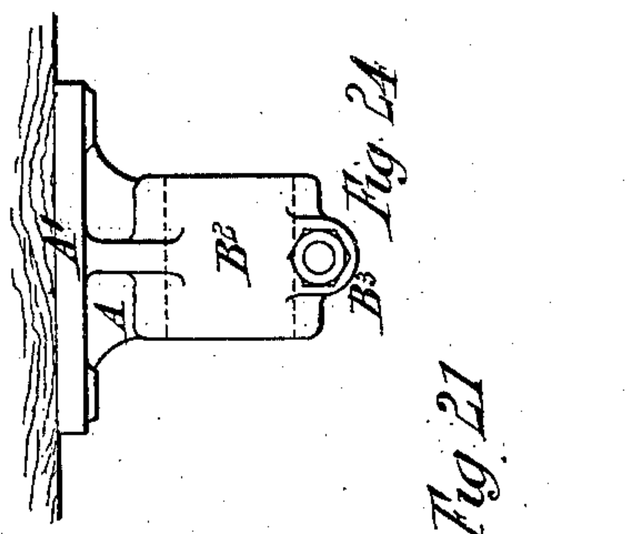
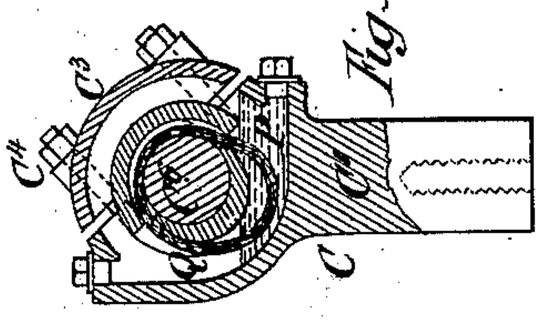


Fig. 24



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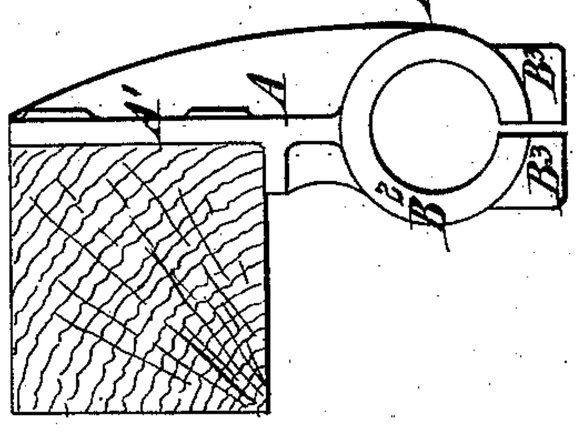

Fig. 21

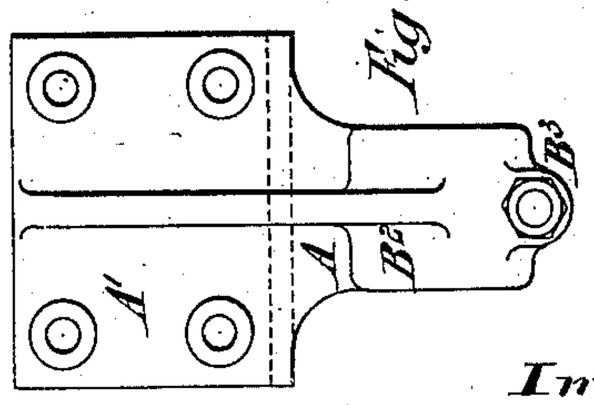

Fig. 22

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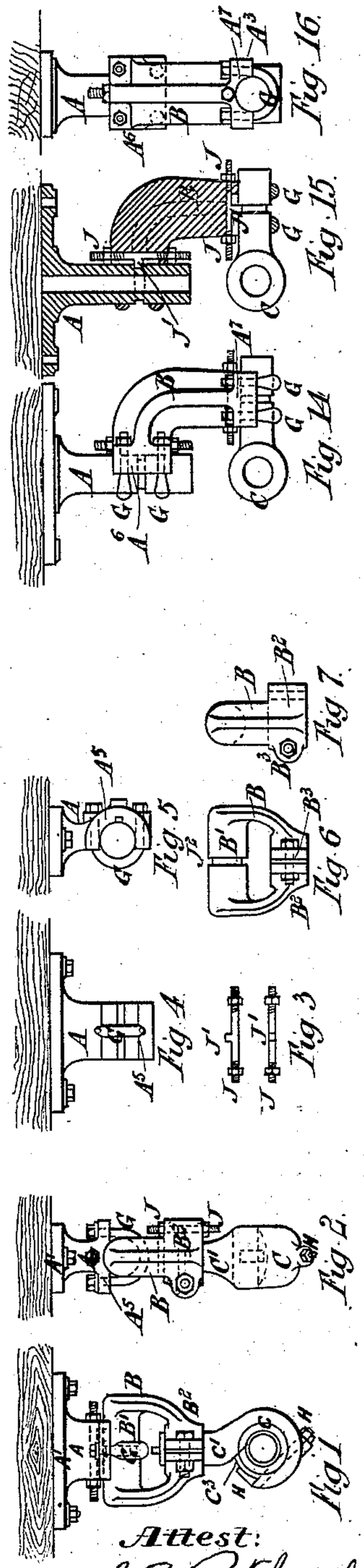
J. S. TAYLOR & S. W. CHALLEN.

Brackets and Bearings for Shafting and Shafts.

No. 231,866. **Patented Aug. 31, 1880.**



Attest:

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Stephen W Challen

By James L. Norris.

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Brackets and Bearings for Shafting and Shafts.

No. 231,866. **Patented Aug. 31, 1880.**

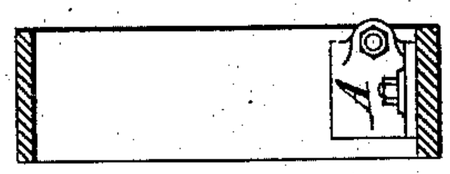
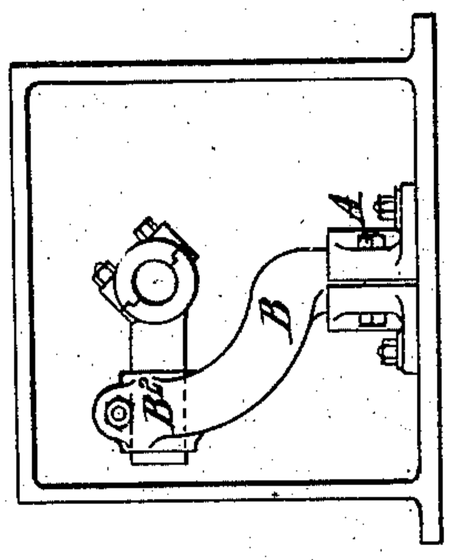


Fig. 30.



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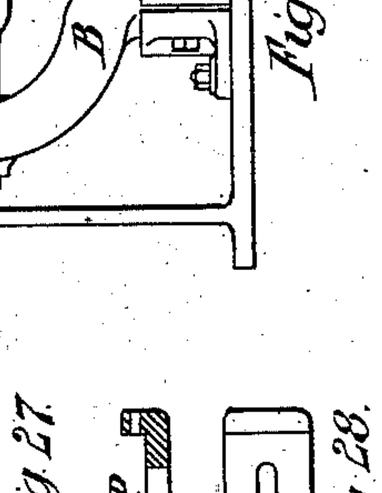
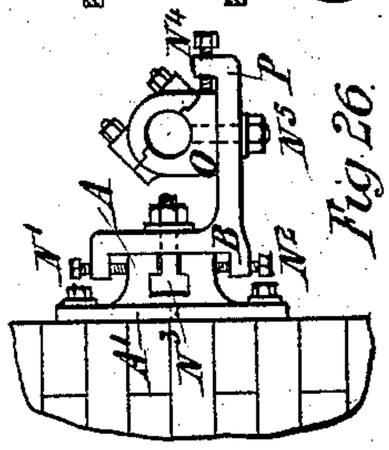


Fig. 27.

Fig. 28.



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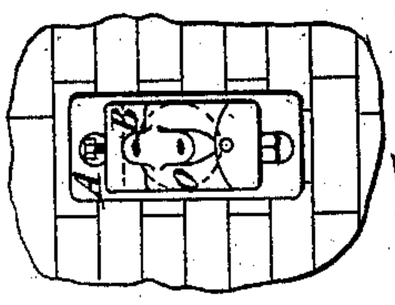

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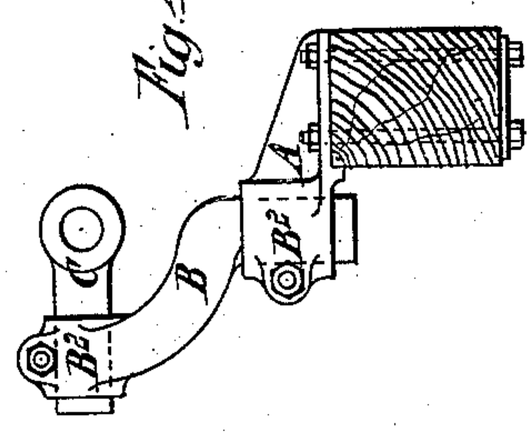

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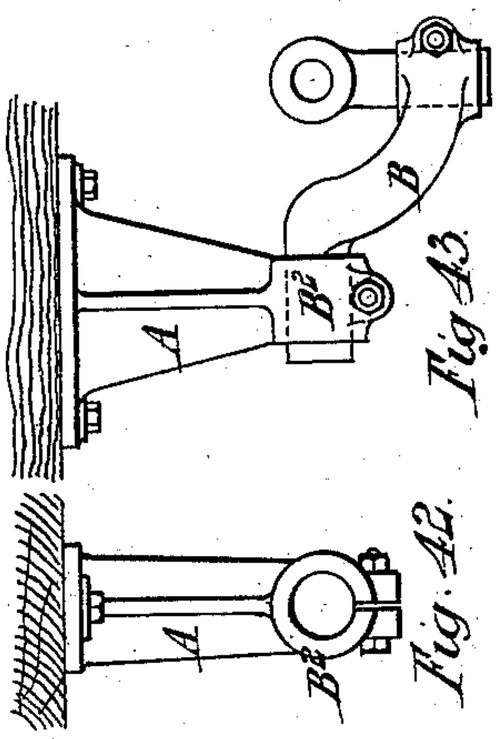

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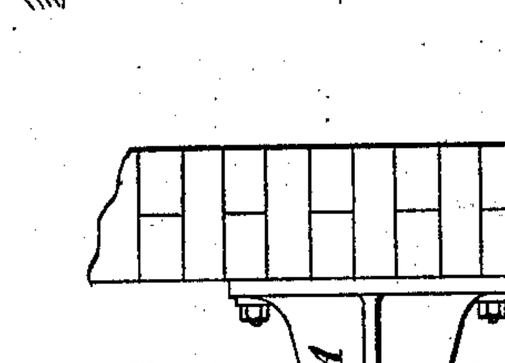

Fig. 42.

Fig. 44.

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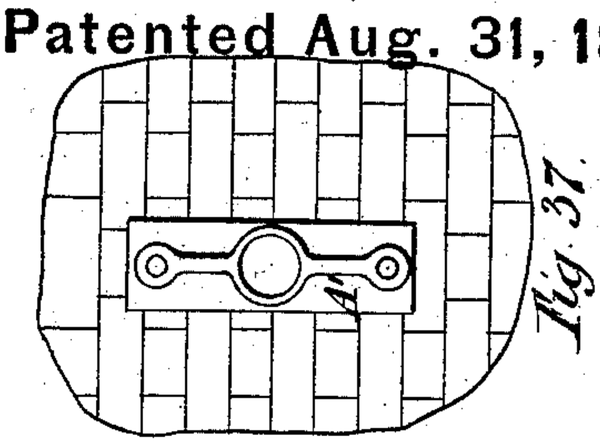
J. S. TAYLOR & S. W. CHALLEN.

Brackets and Bearings for Shafting and Shafts.

No. 231,866. **Patented Aug. 31, 1880.**



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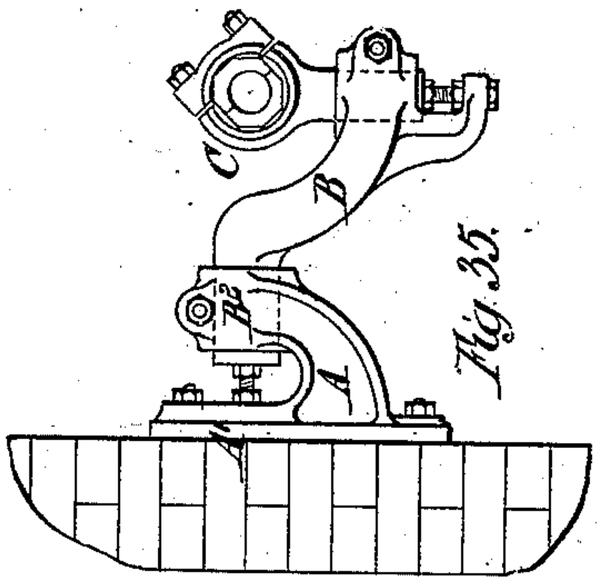

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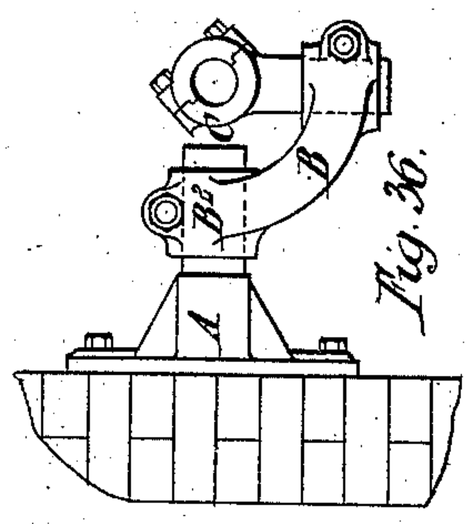

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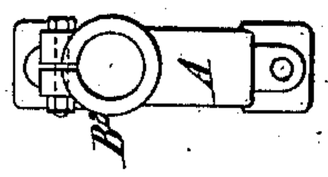
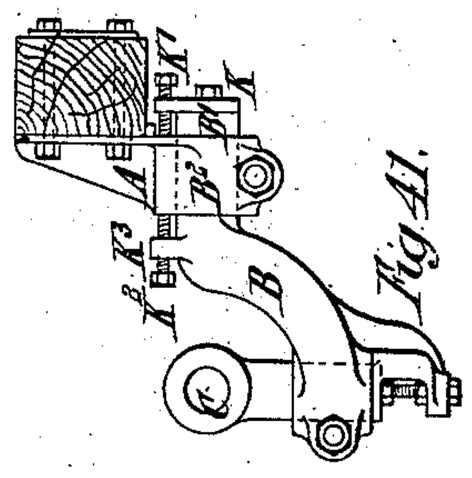


Fig. 34.



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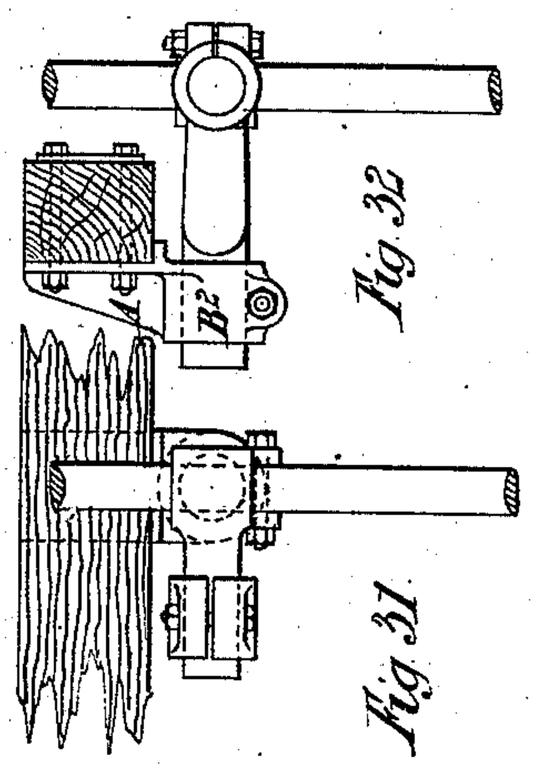

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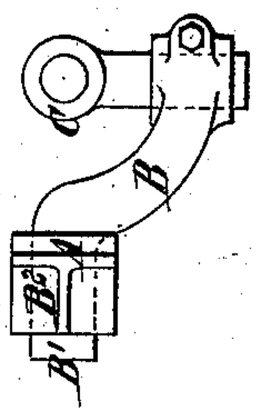

Fig. 33.

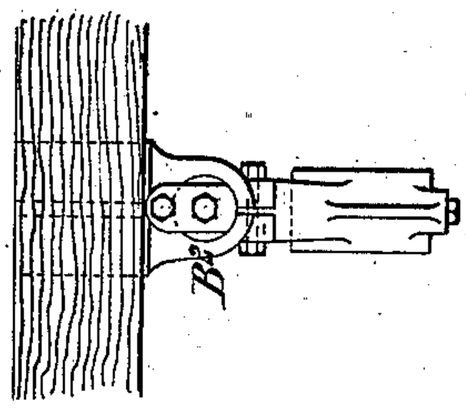

Fig. 40.

Fig. 31.

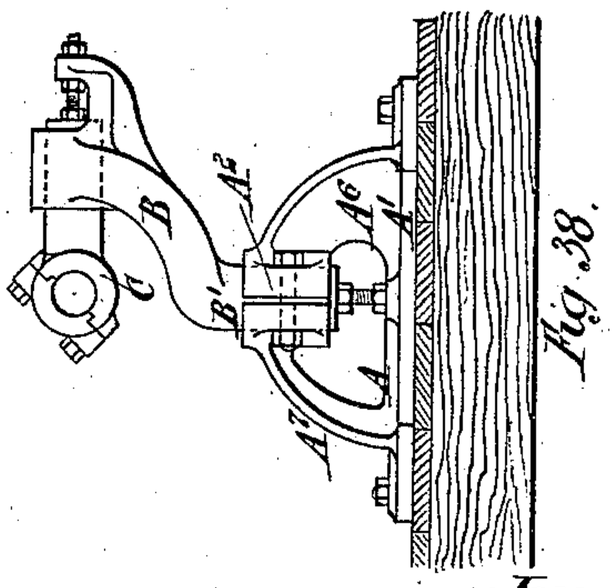

Fig. 38.

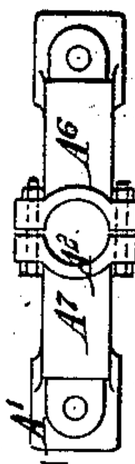

Fig. 39.

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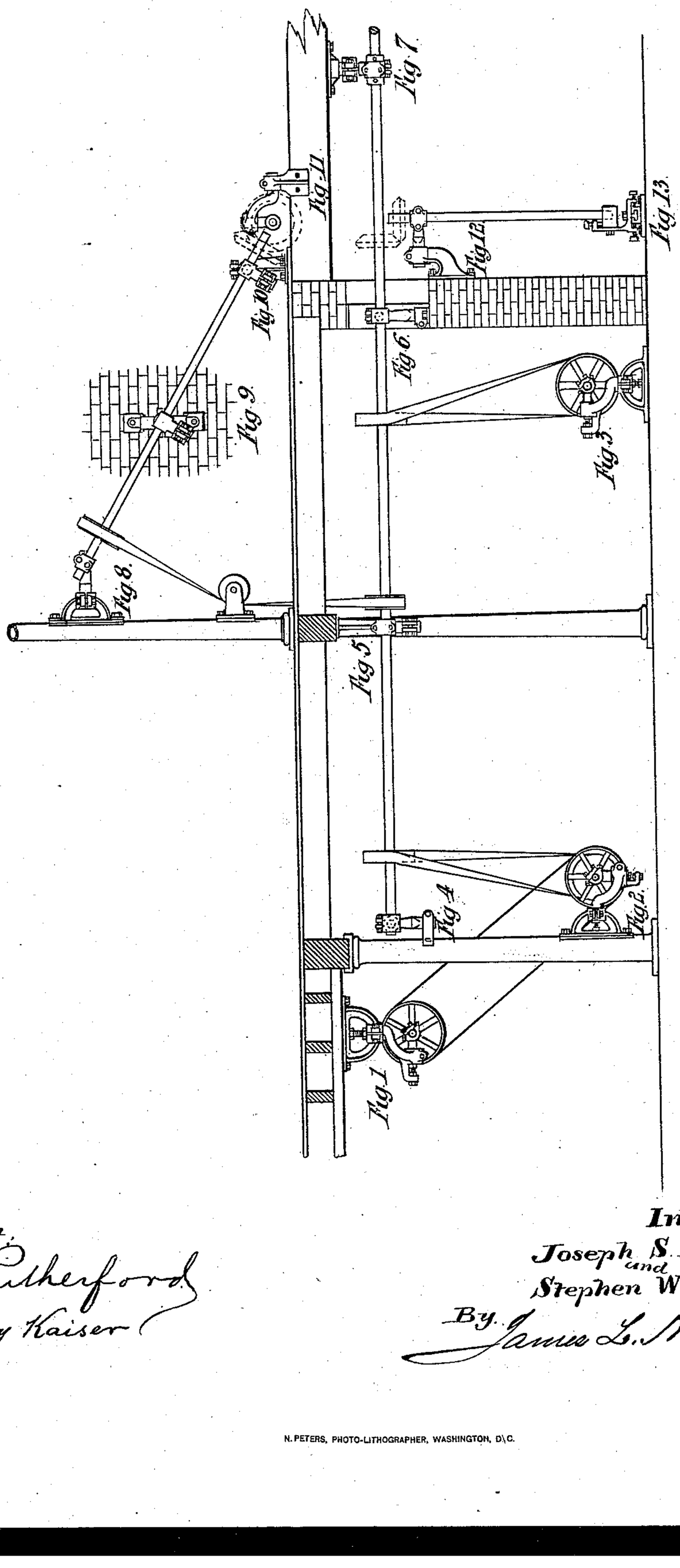
By James L. Norris,
Atty.

(No Model.) 7 Sheets—Sheet 7.

J. S. TAYLOR & S. W. CHALLEN.

Brackets and Bearings for Shafting and Shafts.

No. 231,866. **Patented Aug. 31, 1880.**



Attest:
J. A. Rutherford
J. Henry Kaiser

Inventors:
Joseph S. Taylor
and
Stephen W. Challen
By. James L. Norris.
Atty.

UNITED STATES PATENT OFFICE.

JOSEPH S. TAYLOR AND STEPHEN W. CHALLEN, OF BIRMINGHAM, ENGLAND.

BRACKET AND BEARING FOR SHAFTING AND SHAFTS.

SPECIFICATION forming part of Letters Patent No. 231,866, dated August 31, 1880.

Application filed July 29, 1880. (No model.) Patented in England February 16, 1880.

To all whom it may concern:

Be it known that we, JOSEPH SAMUEL TAYLOR and STEPHEN WILLIAM CHALLEN, of the Derwent Foundry, Birmingham, in the county of Warwick, in that part of the United Kingdom called England, engineers, have jointly invented an Improved Combination Shaft-Bracket, with bearing adjustable and self-adjusting, applicable as hangers and wall-brackets, pedestals, and bearing-blocks, and designed for carrying line, single, and other rotating shafting or shafts, (for which we have obtained a patent in Great Britain, No. 676, bearing date February 16, 1880,) of which the following is a specification.

The nature of our invention, relating to the construction of brackets and bearings for line and other rotating shafting and shafts, consists in their capability of adjustment, after the sole or foot plates of such brackets have respectively been permanently fixed in a line or otherwise, without much regard to precision, either to the side or under side of beams or of floors in the position of hangers, to walls, pillars, or columns as projecting brackets, upon floors as pedestals, and in other positions and places, the bearings of such brackets having sometimes formed within them, in the usual way, a cavity to contain a liquid lubricant, which, by well-known means, is supplied to the frictional surfaces both mechanically and by capillary attraction.

Our object is to provide, in combination with such brackets, a shaft-bearing, either furnished with soft-metal coupled linings and self-lubricating when required, or a plain bored bearing the true lineal arrangement whereof does not so much depend as heretofore upon the accuracy with which the sole or foot plate of the bracket is permanently fixed to or upon its seat or bed. The necessary adjustment being afterward accomplished by the adjustability of the bearing, we are enabled to save nearly all the expense for skilled labor and valuable time of the workmen which the tedious operation of fixing, leveling, and setting in the ordinary manner line and other shafting always entails. The true lineal position of a series of our bearings is with the utmost precision capable of being regulated subsequently by adjusting-screws, assisted by a tendency in each bearing to adjust or bed itself to the true axial line of the shaft; and, what is very important, after adjustment the parts of the bracket are, by means of cramping-bolts, so secured in their adjusted position as to be made quite as immovable and rigid as they would be if the separate parts of the bracket and bearing were all cast in one piece.

Some of the many advantages derivable from the use of our combination-bracket bearing embrace the expeditious fixing of the foot-plates of the bracket base-piece, which, as no special exactness is required, is very quickly accomplished, and consequently the saving in the cost of skilled labor is very considerable, besides the avoidance of all slack bolts or necessity for the use of packing; also, a uniform pressure always existing between that portion of the shaft which rests on the bearing throughout the length of the latter in consequence of its ability to adjust itself results in less wear, less oil consumed, and smooth running with less power, particularly in the case of those bearings which are provided with a self-lubricating appliance.

Another great advantage consists in being able at any future time, without disturbing any of the base-plates or the screws whereby they are held, to readjust the level or lineal truth of a shaft or a line of shafting if, in consequence of the subsidence of foundations, the overloading of floors, or from other causes, it has suffered derangement.

Our invention may be advantageously employed in all mills, factories, workshops, and places where line-shafting and single or other shafts, whether horizontal, vertical, or diagonal, are required; also, where power is used in mining and engineering operations, for contractors' work generally, and in all cases where the frequent shifting of bracket-beds, blocks, and beams is indispensable and new adjustments are constantly required, according to the rate of progress of the work.

Our new combination bracket and bearing consists of three principal parts—viz., the base or bracket piece, which carries the foot or sole plate; the bearing proper, which receives and supports the shaft; the adjustable extension swiveling piece, which is interposed and connected at one end to the bracket base-piece

and at the other end to the bearing. These parts, in collective relation to each other, are capable of being adjusted by two suitable or special adjusting-screws, and by means of cramping-bolts subsequently they can be fixed in a variety of positions, respectively suited to carry either horizontal, vertical, or diagonal shafting, although the foot or sole plates of the brackets be fixed, as may be most convenient, either to an overhead beam, the surface of a wall, to a pillar or column, or upon a floor, and it is this general power of adaptation, in addition to its many other advantages, that we believe gives to our invention a pre-eminence that will soon become established.

We will now proceed, in the first place, to describe and show the construction of our adjustable combination bracket-bearing according to our primary arrangement and configuration of the several parts. In the second place we will describe and show divers arrangements of our bracket-bearing wherein, respectively, one or more of the parts are modified in configuration, the adjusting-screws in some cases being also modified in form and variously applied; and, in the third place, we will describe and show some of the various positions and adaptations to which our invention can be advantageously applied. In each case we make reference to the one or other of the figures on the drawings hereto annexed, and the letters and digits used in our description to distinguish the several parts and details will be found to agree with the letters and digits marked on the corresponding parts and details, as shown on the drawings by the several figures thereon—that is to say, referring to Sheets Nos. 1, 2, and 3:

The primary arrangement of our bracket-bearing is exhibited on Sheet 1, Figure 1 being a front view of the several parts in combination; Fig. 2, a side view of the bracket affixed to a wall; and Fig. 3 is a plan view of the same.

The sole or foot plate A′ of the bracket base-piece A is, as usual, furnished with holes for the reception of the bolts employed to affix it firmly to beams, walls, pillars, or floors, it being shown in this case as a bracket affixed to a wall. Two strong curved spurs, forming a part of the bracket base-piece A, are cast upon the upper surface of the sole-plate A′. They spring from the face of the plate, respectively, at or about a right angle near the ends, and, thence inclining one toward the other in the form of an arch, meet exactly over the center of the base-plate. The free or meeting end of each spur has the form internally of a semi-circular groove, so that the two ends (which do not unite) form a cramping coupling, (marked A^2,) and each is laterally furnished externally with A^3, which marks two projecting lugs that have holes for the reception of two cramping-bolts, (marked A^4.) This coupling in our best brackets is vertically bored out to receive the straight end (marked B′) of the adjustable extension swivel-piece B, which end is turned and finished to a corresponding size, so as to be capable of rotating and sliding endwise in the coupling

The extension-piece B forms the adjustable connection between the bracket base-piece A and the adjustable part A′, that carries C, which marks the shaft-bearing. That portion which adjoins the straight end of the extension-piece B is suddenly bent or cranked to a right angle, and thence it takes the shape more or less of a quadrant. On its extreme outer end it has (cast in one piece with it) a split boss, (marked B^2,) which boss carries B^3, that marks two lugs, one lug being placed on one side and the other on the opposite side of the split part of the boss, and both have corresponding holes to receive a cramping-bolt, (marked B^4.) A small projecting bracket, B^5, is also cast on the outer end of the extension-piece to carry one end of D, which marks the screw that adjusts the projecting shank C′ of the bearing proper, C. The shank C′ of the bearing of our best brackets is also lathe-turned to suit the internal size of the split boss B^2, which is so placed on the extension-piece and bored out that its axial line intersects at a right angle the axial line of its straight end B′. The shaft-bearing proper, C, is, by preference, cast in one piece with its shank C′, and at an angle therewith of about forty-five degrees.

C^2 marks the metallic linings of the bearing; C^3 the cap; C^4, the cap-screws, and C^5 oil-passages.

In Fig. 4, D marks the adjusting-screw that regulates the longitudinal position of the straight end of the extension-piece in the cramping-coupling A^2 of the bracket base-piece. The lower end of this screw is seen to be firmly confined in a hole made in the center through the sole-plate A′, but it has liberty to rotate. The other end of the screw is screw-threaded and furnished with a lock-nut. It is screwed into a threaded hole concentrically made in the straight end of the extension-piece, and, according to the direction in which the screw is turned, will draw the extension-piece either up or down, or inward and outward, as may be required to effect (in the case of a wall-bracket) the lateral adjustment of the bearing C, the vertical adjustment whereof is effected by the screw E, Fig. 5, the plain end of which is firmly secured, with liberty to turn, in a hole made through the small bracket-piece B^5 in the direction of the end of the bearing-shank C′, in which there is a threaded hole made to receive the opposite end of the screw E, which is screw-threaded to correspond, and by this means the shank of the bearing is moved endwise in either direction, and the vertical or leveling adjustment of the bearing is thereby effected. When, however, our combination-bracket is fixed to the under side of an overhead beam, the vertical or leveling adjustment is effected by the screw D, which then moves the extension-piece either up or down, and the lateral adjustment is then ef-

fected by the screw E. After the lineal adjustment of the line of shafting is complete and the several bearings have separately bedded themselves to the shaft, the nuts on the cramping-bolts of the coupling A^2 and of the split boss B^2, respectively, are thoroughly tightened up, so as to cause the cramping-coupling to gripe the end B′ of the extension-piece and the split boss to gripe the shank of the bearing so forcibly that the whole of the parts combined are immovably secured in their adjusted position, and so that they are held as rigidly as if they consisted only of one piece. Knowing, however, that constant dropping will wear away stone, so we believe that the constant jarring and rattling of tooth-wheels might in time alter the adjustment. We therefore, as an additional security in the case of those brackets that are placed contiguous to tooth-gearing, pass steel dowels or keys or steady-screws through the parts held by the cramping-bolts.

The several details and parts of our combination-bracket bearing are shown separately on Sheet 1 by the following figures, viz:

Figs. 6 and 7 exhibit, respectively, a plan and a front view of A, which marks the bracket base-piece, A′ being the sole or foot plate, A^2 the cramping-coupling, and A^3 the lugs for the cramping-bolts.

Figs. 8 and 9 show, respectively, a side view and an end view of B, the extension swivel-piece, B′ marking the straight end, B^2 the split boss, B^3 the cramping-lugs, and B^5 the small bracket-piece.

Figs. 10 and 11 respectively show a side view and a plan of our bracket-bearing C, the body of which is made in one casting with C′, which marks the shank; C^2, the metallic linings; C^3, the cap; C^4, the holes for cap-screws, and C^5 oil-passages.

Figs. 12, 13, and 14 exhibit, respectively, a side view, an underneath view, and an end view of our bracket-bearing adapted as a hanger, secured to the under surface of an overhead beam, and arranged for carrying one end of a counter-shaft, the strap-guide support being attached to the bracket-bearing. This bracket is the same in most respects as that already described with reference to Figs. 1, 2, and 3, excepting that no adjusting-screws are employed. A (as before) marks the bracket base-piece, which is the same in form with sole-plate A′ and cramping-coupling A^2. As before, B marks the extension swivel-piece, B′ its straight end, and B^2 the split boss, the small bracket-piece being dispensed with. C marks the shaft-bearing, which in this bracket is shown to be a plain bored-out boss cast with a shank, C′. The annular clip F is fastened on one end of the bearing by means of a screw-bolt, F′. The outer end of F^2, which marks the projecting arm of the clip, has the form of a chain-link, made so to receive F^3, which marks a small pulley, the axle whereof, F^4, finds a bearing in two plain holes, made respectively coincident in the opposite sides of the link-formed end of the clip, the pulley filling up the space between. A certain length at the end of the axle is screw-threaded externally, and the hole through the center of the pulley is screw-threaded to correspond. The periphery of the pulley is formed with recesses to receive an endless chain, (marked F^5,) which chain hangs from the pulley in the form of a long loop. When the chain is pulled on either side it causes the pulley to rotate, and the pulley, being confined between the sides of the link-formed end of the arm of the clip, by means of its internal screw, effects the necessary longitudinal movement of the axle to which the bar which carries the strap-guides F^6 is welded.

Figs. 15 and 16 respectively show a side view and an end view of the plain shaft-bearing C, with its shank C′; and Figs. 17 and 18 show two views of the extension-piece B minus the small bracket-piece.

Figs. 19 and 20 represent, respectively, a transverse section and a longitudinal section of one of our best-class shaft-bearings, C, cast with a shank, C′, showing the shaft C^6, the oil-cavity P, and the endless cotton-wick feeder Q. This mode of self-lubrication, however, forms no part of our present invention, and all the novelty we shall hereinafter claim in respect thereof consists in casting in one piece or conjoining the body-piece of a self-lubricating shaft-bearing with or to an adjustable shank.

It will now be seen that we make the shaft-bearings of our combination adjustable brackets (in order to meet all requirements) sometimes cylindrical, or of solid metal, being simply bored out to the size of the shaft, (as described with reference to Figs. 12 and 15;) but generally we furnish them internally with bronze or with bell-metal coupled linings, or with metalline plugs, or otherwise mount them according to any or all of the numerous ways known and practiced by mechanics and by engineers, the size and strength of the bracket and parts, the style of the bearing employed, and the manner of fitting it being more or less dependent upon the nature, weight, and intended speed of the rotating shaft and the limit by which we are compelled to regulate the cost.

Figs. 21 and 22 represent two views of a bracket-piece designed for attachment to the side of a beam, and Figs. 23 and 24 two views of another form of bracket-piece designed for attachment to the under side of a beam. Both of these bracket-pieces are furnished with our split bosses B^2, for holding and cramping the adjustable end B′ of the extension-piece B, or, when the latter (for want of room or from any other cause) is omitted, the shank of the bearing C, such forms of bracket-pieces being used occasionally when a line-shaft runs close beneath or alongside a beam; but in case where a shaft or a portion of line of shafting runs a considerable distance from a beam to which we desire to affix a bracket, we employ a long bracket-piece, such as is shown by Figs. 25 and 26, which respectively represent a side and an

edge view. This bracket-piece, it will be seen, is also furnished with our split boss B^2, wherein the straight end of an extension-piece, when the bracket is fixed, may be inserted either at the upper or the under side of the split boss, and by this means any reasonable distance or position of the shaft may be reached.

Sheets 4, 5, and 6: On these sheets of drawings we show, by one or more of the different figures thereon, the several modifications hereinbefore mentioned as relating chiefly to changes in the configuration of two of the principal parts—viz., the bracket-piece A and the adjustable extension swiveling piece B—the bearings C being (with one exception) in all the other modifications furnished with an adjustable shank.

Figs. 1 and 2 show, in a modified form, one of our combination bracket-bearings adapted as a hanger depending from a beam. In this modification the bracket base-piece is solid, and, as usual, is furnished with a sole-plate, A′, and two projecting lugs, (marked A^3,) one being cast at each side of its outer end, A^5, which is made hollow like a half-bearing to receive and form a bed for the adjustable portion B′ of the ⊔-formed extension-piece B, which (see Fig. 2) is held in its place by G, that marks a staple-formed cramping-bolt screw-threaded and furnished with a nut at each end. The extension-piece of this bracket is provided with a split boss, B^2, to receive the shank C′ of the bearing C, which is mounted with coupled linings and capped, the cap and the linings being respectively held in place by one hook-headed bolt, (marked H,) the other end of this bolt being screw-threaded and furnished with a nut for tightening up. The cap C^3 is provided with a transverse recess to receive the hooked head of the bolt H, by which means the cap is kept in position endwise, and, for a similar purpose, the ends of the linings respectively are provided with small projecting nibs, (see Fig. 1,) that prevent them sliding endwise or turning with the shaft. The two adjustments of this bracket—viz., of the extension-piece and of the shank of the bearing, respectively—are made by means of duplex adjusting-screws, (marked J,) both ends of which screws are screw-threaded and provided with nuts. These duplex screws carry, laterally projecting at their mid-length, a small square nib, J′, that is designed for entering an annular recess, J^2, formed in the adjustable part of the extension-piece. The duplex adjusting-screws are disposed in grooved recesses formed, as shown, in the solid or the stationary parts, respectively, of the bracket base-piece and the split boss of the extension-piece, but so contiguous to the parts to be adjusted (see Fig. 15) that the projecting nibs of the screws enter the annular recesses, respectively, of the said parts. These duplex screws may be used in any of the modifications hereinafter to be described, and also in the brackets already described, and exhibited on Sheets 1, 2, and 3.

After adjustment the parts are maintained in permanent position—viz., the extension-piece adjustment, which, in this case, is horizontal—by the thorough tightening up of the nuts on the ends of the staple-formed cramping-bolt G, and the shank of the bearing by the cramping-bolt of the split boss B^2 on the extension-piece.

Figs. 4 and 5 show the half-bearing of the base-piece of this bracket placed in a different position to that shown in Figs. 1 and 2, and which, in some cases, is preferable.

Figs. 6, 7, and 8 show three separate views of the extension-piece of this bracket in its modified form and furnished with a split boss having lugs and a cramping-bolt.

Figs. 9 and 10 represent the second modification of our bracket-bearing, the parts A and B being further changed in configuration, but similarly arranged.

On referring to the drawings it will be seen that the bracket base-piece A is a solid block cast on the sole-plate A′, by which it is affixed to an overhead beam, as shown, but may be disposed otherwise. It carries a split boss placed horizontally, and is furnished with lugs for cramping-bolts, the whole being cast in one piece.

The extension-piece B of this modification will be seen to have another form that enables its adjustable end B′ to enter horizontally the split boss B^2 of the bracket base-piece, so as to bring the center of the split boss which it carries coincident at a right angle with the axial line of its adjustable end. A plain bored-out bearing, C, with shank vertically disposed, is shown combined in this modification; but it will be understood with regard to this, as in most of the other modifications, that any of the shank-bearings that have been or have to be described may be adapted thereto. The adjustments in this bracket-bearing are effected by two of the duplex adjusting-screws already described with reference to Figs. 3 and 15.

Figs. 11, 12, and 13 represent three views of a ⊔-formed extension-piece B, made in two parts, fixed together by a bolt that is seen to pass lengthwise through the adjustable part, and by this means an extension-piece of this form may be employed either with a cramping-coupling or a split boss. The two free ends form a cramping-coupling to receive and secure the shank of a bearing after adjustment, for which latter purpose a duplex screw, J, is shown.

Figs. 14, 15, and 16 represent our third modification, which is presented as a hanging bracket, the base-piece A of which has the form of a truncated tube, one end whereof is centrally cast to its sole-plate A′, and at a right angle projects therefrom, an annular recess being formed round the tube to receive the nib J′ of a duplex adjusting-screw, J. Formed on each of the ends, respectively, of the extension-piece of this modification there is a kind of half-bearing, marked, respectively,

A[6] and A[7], the former being adapted to one side of the truncated tube or base-piece A and the latter to the shank of the bearing, the body part of the extension-piece B being so quadrantally curved that the half-bearings stand relatively one at a right angle to the other, and both of them are furnished with two lugs, one lug on each side, and bored for the reception of the screwed ends of staple-formed cramping-bolts G, there being two of these bolts to each. By means of these half-bearings and cramping-bolts the parts of the bracket are held in position during adjustment, which, as shown in the drawings, is effected by two duplex adjusting-screws respectively disposed in grooves in the half-bearings, and made therein for their reception. The bearing of this bracket may be either one of our best lined or one of the simplest and cheapest kind, as shown in the drawings; but whichever is used its shank must have an annular groove made round it to receive the nib of the duplex adjusting-screw. After the adjustment is complete the nuts on the end of the staple-formed cramping-bolts, respectively, are thoroughly tightened up, and by means of this powerful gripe the parts of the bracket are immovably fixed in the adjusted position.

Fig. 17 shows a simple contrivance for adjusting the round end of the extension-piece in the clamping-coupling of an arch-formed bracket-piece. Fixed crosswise on the end of the extension-piece B is a small carrier, K, having one end projecting, which end has a screw-threaded hole made through it to receive the adjusting-screw K′, the end whereof rests on the end of the clamping-coupling. By turning the screw either to the right or to the left the extension-piece is caused or is free to slide either upward or downward in the coupling, and by this means its adjustment is effected.

Fig. 18 exhibits another mode for adjusting the end of the extension-piece in a clamping-coupling. In this case it is accomplished by means of a long screw-threaded bolt, (marked L,) the T-formed end whereof is shown fixed to the sole-plate of an arch-formed bracket base-piece. The fixed bolt, projecting thence at a right angle, passes concentrically through the cramping-coupling A[2]. A clearing-hole to receive the bolt is drilled or made lengthwise completely through the straight end of the extension-piece. The extreme end of the bolt issuing at that part of the extension-piece where it is suddenly bent is provided with a nut, and there is another nut placed on the bolt near its fixed end. The screw-bolt being immovable, it will be seen that the adjustment is effected by the nuts.

Figs. 19 and 20 show, respectively, a side view and a section of a hanging bracket similar to that already described with reference to Fig. 12 on Sheet 2, excepting that a split boss, B[2], is seen to take the place of the cramping-coupling, and a duplex adjusting-screw is adapted to the split boss for the purpose of effecting the vertical adjustment of the extension-piece.

Fig. 21 represents our fourth modification adapted as a hanging bracket to a beam. The base-piece A of this bracket comprises a round truncated tubular piece cast projecting from the sole-plate and having a triangular support on each side. The body of the extension-piece B has the form of a quadrant, and at both ends it is furnished with a split boss, B[2], respectively disposed on the same plane, and relatively standing one at a right angle to the other. These split bosses are, as usual, fitted with cramping-bolts, and when making up or combining the parts of the bracket one of the split bosses is slid on the tubular part of the bracket-base, and in the other is inserted the shank of the bearing C. In this modification no adjusting-screws are shown; but when required those of the duplex kind are preferable.

Fig. 22 exhibits a dwarf bracket base-piece applied as a hanger to the under side of a beam, and consisting of a split boss furnished with lugs and a cramping-bolt and cast upon a sole-plate. The straight end of an extension-piece is shown in the split boss. Such a bracket base-piece as this at times is found to be very useful in places where, for want of space, one of the larger kind cannot be used.

Figs. 23 and 24 exhibit, respectively, a side view and an end view of the fifth modification of our bracket-bearing fixed as a hanger to an overhead beam. The base-piece A of this bracket will be seen to consist of a truncated tube centrally projecting from its sole-plate at a right angle, and having an adjustable split boss fixed by a cramping-bolt on its outer end, which is reduced to the required size. The plate of the extension-piece B is affixed to the back of the boss by two screws, which pass through slotted holes made in the plate and are screwed into threaded holes made for their reception in the back of the split boss. Also, cast upon the outer end of the extension-piece is a split boss with lugs and furnished with a cramping-bolt for fixing in this boss the shank of the bearing C. The vertical adjustment of the extension-piece is effected by the screw M, and the cramping-bolts, when screwed up, make the parts relatively immovable.

Figs. 25 and 26 exhibit, respectively, a side view and an end view of an adjustable swiveling bracket and bearing, the sole-plate A′ of the bracket-base A being affixed to a wall. The base of this bracket has the form of a circular hub, and the two adjusting-screws, N′ and N[2], as adapted to the extension-piece B, have along with the latter liberty to rotate on the central screw, N[3], for the purpose of adjustment or for bringing the bearing O (which is one of the ordinary kind) into suitable position for receiving the shaft. After adjustment the extension-piece is finally fixed to the base-piece by tightening up the screw N[3]. The projecting part of the extension-piece P, which is shown in section by Fig. 27 and in

plan by Fig. 28, carries a plain coupled bearing, the cap part whereof being separated at an angle of about forty-five degrees. The position of the bearing is adjusted laterally by the screw N^4, and it is afterward fixed by the screw N^5.

Figs. 29 and 30 represent, respectively, a front view and a section of one of our combination-brackets in a modified form, so far as regards the base-piece A, which is dwarfed for the purpose of adapting the bracket to a wall-box, the base-piece consisting of a split boss cast upon a sole-plate similar to that described with reference to Fig. 22. The straight end of the extension-piece B is correspondingly shortened, and the round shank of a plain coupled bearing is shown fixed in a split boss, B^2, that is cast on its upper end. In the above figures no adjusting-screws are shown.

Figs. 31, 32, and 33 exhibit, respectively, an end view, a side view, and a top view of a bracket affixed as a hanger to the side of a beam, the bracket base-piece A carrying a split boss, B^2, for receiving and finally securing the end of the extension-piece B, which is so arranged that, as shown in the drawings, the bearing can be brought into a position suited to receive a vertical shaft, the novelty in this bracket being chiefly confined to the configuration of the base-piece in combination with a split boss.

Figs. 34 and 35 represent, respectively, the plan and side view of a bracket having its sole-plate fastened to a wall. The base-piece A′ of this bracket is modified in form, while the other parts—viz., the screws for adjusting, the extension-piece B and the bearing C—are in all respects the same as previously described with reference to Figs. 1, 2, and 3 on Sheet 1. Instead, however, of casting two curved spurs upon the sole-plate to form the base-piece and the cramping-coupling, as previously shown and described, it will be seen that the foot-plate A′ has only one spur cast thereon; but the substance of this spur is so increased that it possesses strength sufficient to carry all the combined parts of the bracket and bearing; besides it is capable of being furnished with a split boss, B^2, having the necessary lugs and a cramping-bolt for receiving and rigidly securing the end of the extension-piece after its final adjustment.

Figs. 36 and 37 exhibit, respectively, the side view of a bracket secured to a wall and a view of its base-piece. This bracket is, in all respects, the same as that described and shown by Fig. 21, which exhibits a hanger affixed to a beam, excepting that the bearing is coupled. It is therefore unnecessary to repeat the description here.

Figs. 38 and 39 represent, respectively, an elevation and a plan of a bracket having the sole-plate A′ of its base-piece affixed as a pedestal to a floor. Its novelty consists in the peculiar construction of its base-piece A, which is a modification of the arch-formed class, having a cramping-coupling, as described in our primary arrangement. (Shown by Figs. 1, 2, and 3, Sheet 1.) The two segments or side spurs of the arch, it will be seen in Fig. 38, vary in substance, that marked A^6 being inflexible and so much stronger than the other that it is capable of supporting the whole weight and strain of the bracket. The other spur, A^7, is intentionally made weaker, and consequently lighter, in order that it may more readily yield when the bolts of the cramping-coupling A^2 are tightened up to secure the end B′ of the extension-piece B, our object in this arrangement being the avoidance of all reaction against the cramping-bolts when finally tightened up, and which we effect in our arch-shaped bracket base-pieces by modifying their construction, as above described.

Figs. 40 and 41 exhibit, respectively, an end view and a side view of one of our brackets, having a base-piece, A, suited for attachment to the side of a beam, being the same base-piece as we show in Fig. 32. The novelty consists in the means whereby we adjust the end B′ of the extension-piece in the split boss B^2 of the bracket-base. This is effected by two screws, (marked K′ and K^2,) the former being screwed through a threaded hole made in the end of a carrier-piece, K, which is fixed to the extreme end B′ of the extension-piece, at the mid-length whereof is cast a small projecting lug, (marked K^3,) through a threaded hole in which the screw K^2 is placed. In whichever direction the extension-piece may require to be turned to suit the position or line of the shaft the ends of the adjusting-screws can operate against the opposite ends of the split boss, and by slackening one screw and tightening up the other the round end B′ of the extension-piece is caused to slide in the split boss in the direction required. The shank of the plain bearing of this bracket is shown to be adjusted by a tail-screw, as in our primary arrangement; but any of the other means of adjustment herein shown may be applied.

Figs. 42 and 43 exhibit, respectively, an end view and a side view of an elongated bracket base-piece, A, furnished with a split boss, B^2, and adapted as a hanger to a beam. Occasionally we find the use of such a bracket base-piece as this very desirable, as it may be combined with most of the extension-pieces and shanked bearings heretofore described. For adjustment the duplex screws, or the two screws K′ and K^2 mentioned in the last paragraph, would be found very suitable.

Fig. 44 exhibits a bracket-bearing similar to the last, but fixed to the surface of a wall. The bearing is coupled, but not lined, and is placed in a position to receive a horizontal shaft.

Fig. 45 represents a bracket-bearing similar to that shown and described with reference to Fig. 32, excepting that the sole-plate of its base-piece A is fixed to the top of a beam instead of to the side, and its extension-piece and bearing are fixed in a position to receive a horizontal shaft instead of a vertical shaft, as shown by the figure referred to.

Sheet 7: Our object in supplementing our specification by the addition of this sheet of drawings is to show the general adaptability of our combination bracket-bearings and their capability of adjustment according to the various positions in which they are, can, or may be fixed for the purpose of carrying either horizontal, diagonal, or vertical shafting or shafts. For example:

Figs. 1, 2, and 3 represent three brackets constructed according to our primary arrangement, as shown and described with reference to Figs. 1, 2, and 3 on Sheet 1. These three brackets are all alike, and it will be seen are fixed in three different positions for the purpose of carrying horizontal shafts, viz: Fig. 1 is employed as a hanger bolted to an overhead beam, Fig. 2 is disposed in the position of a wall-bracket fixed to a pillar, and Fig. 3 is mounted as a pedestal-bearing and is bolted to a floor.

Figs. 4, 5, 6, and 7 exhibit a range of our bracket-bearings constructed according to some of the modifications described, and shown on Sheet 2, and carrying a line of horizontal shafting under conditions where the means of fixing the sole-plates of the brackets vary considerably. Thus, Fig. 4 is a similar bracket to that shown by Fig. 45 on Sheet 5, excepting that instead of the sole-plate of the bracket-base being shaped for attachment to the top surface of a beam, it is altered in form and made concave for the purpose, as shown, of fixing it to the vertical surface of an upright pillar. Fig. 5 is disposed as a hanging bracket, and in construction is like the modification shown by Fig. 43 on Sheet 6. Fig. 6 is disposed in a wall-box, and is similar to Fig. 29 on Sheet 5. Fig. 7 is seen as a hanging bracket, being the same as the modification described with reference to Fig. 36 on Sheet 6, and which is there shown as a wall-bracket.

Figs. 8, 9, and 10 represent three bracket-bearings disposed for carrying a diagonal shaft, Fig. 8 being a bracket similar to Fig. 12 on Sheet 2, excepting that the sole-plate is made concave for attachment to a pillar. Fig. 9 shows a bracket of the same construction attached to a wall, for which purpose its sole-plate is, as usual in such cases, made flat; and Fig. 10 shows a bracket disposed as a pedestal fixed to a floor. This last bracket is the same as the modification shown by Fig. 43, which is seen on Sheet 5 disposed as a hanger attached to an overhead beam.

Fig. 11 represents a bracket with its base-piece attached to the side instead of to the top of a beam, as is shown and described with reference to a similar bracket exhibited by Fig. 45 on Sheet 5, both of these brackets being arranged for carrying horizontal shafts.

Fig. 12 represents a bracket fixed to a wall and having its extension-piece and bearing arranged for carrying the upper end of a vertical shaft; and Fig. 13 exhibits a bracket fixed as a pedestal upon a floor and having its bearing partly bored out and turned upward to act as a foot-step to receive and support in position the lower end of the vertical shaft mentioned in the last paragraph. This same bracket is shown fixed as a wall-bracket by Fig. 26, Sheet 5, and is there arranged for carrying a horizontal shaft.

Having now fully described the nature, the object, and the advantages derivable from the use of our invention, as shown and described with reference to the figures on Sheets 1, 2, and 3, and also to the several modifications shown and described with reference to the figures on Sheets 4, 5, and 6, we wish it to be understood that we lay no claim to the exclusive construction of brackets with adjustable plumber blocks or bearings, because we have for many years been accustomed to make and use such brackets and bearings and adjust them by means of wedges and slotted holes, and we have occasionally seen and used extension or distancing pieces with such brackets when from necessity they have been so placed that their bearings fell short of a line of shaft, or otherwise did not reach the position required. We also know that other combination bracket-bearings have at times been introduced; but none of such bracket-bearings that we have ever seen have the unlimited power and freedom of adjustment, the adaptability to all conditions, positions, and purposes, and (what is of the utmost importance) the means after adjustment of immovably and rigidly fixing the several parts so completely in their adjusted positions relatively that such position is permanently maintained. Therefore,

What we claim as our invention consists as follows, viz:

1. The bracket base-pieces of the several forms herein described, and shown in the drawings hereto annexed, such base-pieces having severally a sole-plate and either a cramping-coupling, a split boss, or a half-bearing, respectively furnished with lugs for cramping-bolts either straight or staple formed, for the purpose of griping and rigidly holding the adjustable ends of extension-pieces after their final adjustment, in the manner and for the purposes herein described.

2. The bracket extension-pieces having each either of the several forms herein described, and shown in the annexed drawings, such extension-pieces severally having one end suitably fashioned for entering or consorting with either the cramping-coupling, the split boss, or the half-bearing (as the case may be) of the bracket base-piece, and carrying at the other or outer end either a split boss with lugs and cramping-bolt, or a half-bearing with lugs and a staple-formed cramping bolt or bolts, for the purpose of receiving and after adjustment griping and rigidly holding permanently the shank of the bracket-bearing, all after the manner and for the purposes herein described.

3. The shaft and other bearings, when such bearings are severally furnished with a long projecting shank, as herein described, and

shown in most of the figures on the drawings hereto annexed, the shank of such bearings being specially designed to enter the split boss or (as the case may be) engage with the half-bearing formed on the outer end of the extension-piece of the bracket with which it is combined, and after adjustment, by screws or otherwise, to be griped and rigidly held thereby by means of cramping-bolts, in the manner and for the purposes described.

4. The cramping-couplings and split bosses, respectively furnished with lugs and one or more cramping-bolts, also the half-bearings and staple-formed bolts as a means of connecting and, after adjustment, permanently fixing together the principal parts of our combination bracket-bearing—viz., the base-piece, the extension-piece, and the shanked bearing—after the manner described with reference to the several figures shown on the drawings hereto annexed, and for the purposes herein set forth.

5. The within-described modes of adjusting the extension-pieces of our brackets after being adapted and connected to their several base-pieces, and the shanks of our bearings after being adapted and connected to the outer end of extension-pieces by means of adjusting-screws, either single or duplex, and severally constructed and applied after the manner and for the purposes herein described with reference to the figures on the drawings hereto annexed.

6. The mode described, and shown by Figs. 12, 13, and 14 on Sheet 2, of adapting a strap-guide to the end of a bearing—viz., by means of an annular clip—when such bearing is cast with a long shank, for the purposes herein set forth.

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