June 2, 1925. 1,540,142

J. O. PIERPOINT

APPARATUS FOR MANIPULATING GLOBES

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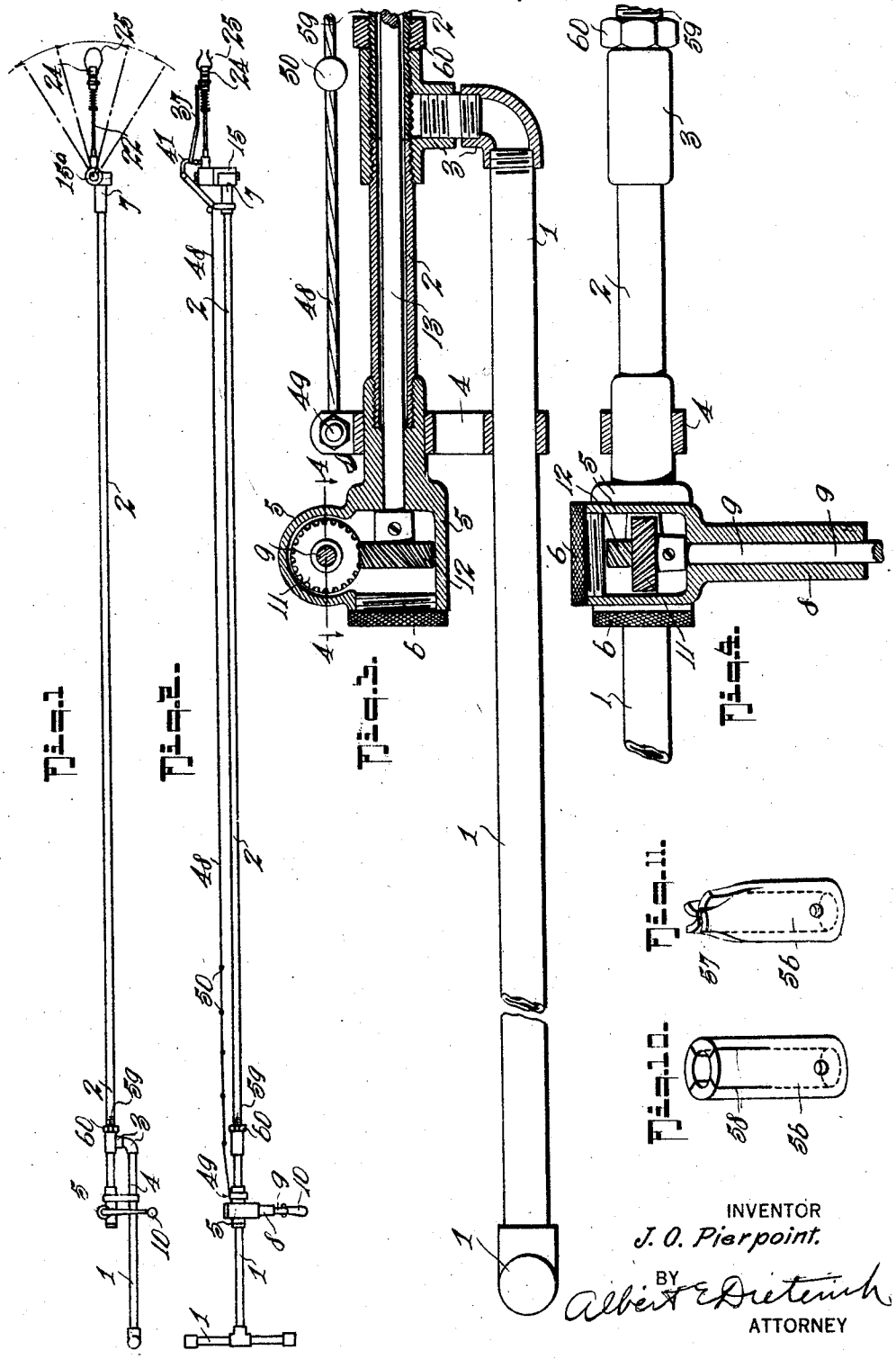


Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 11.

Fig. 10.

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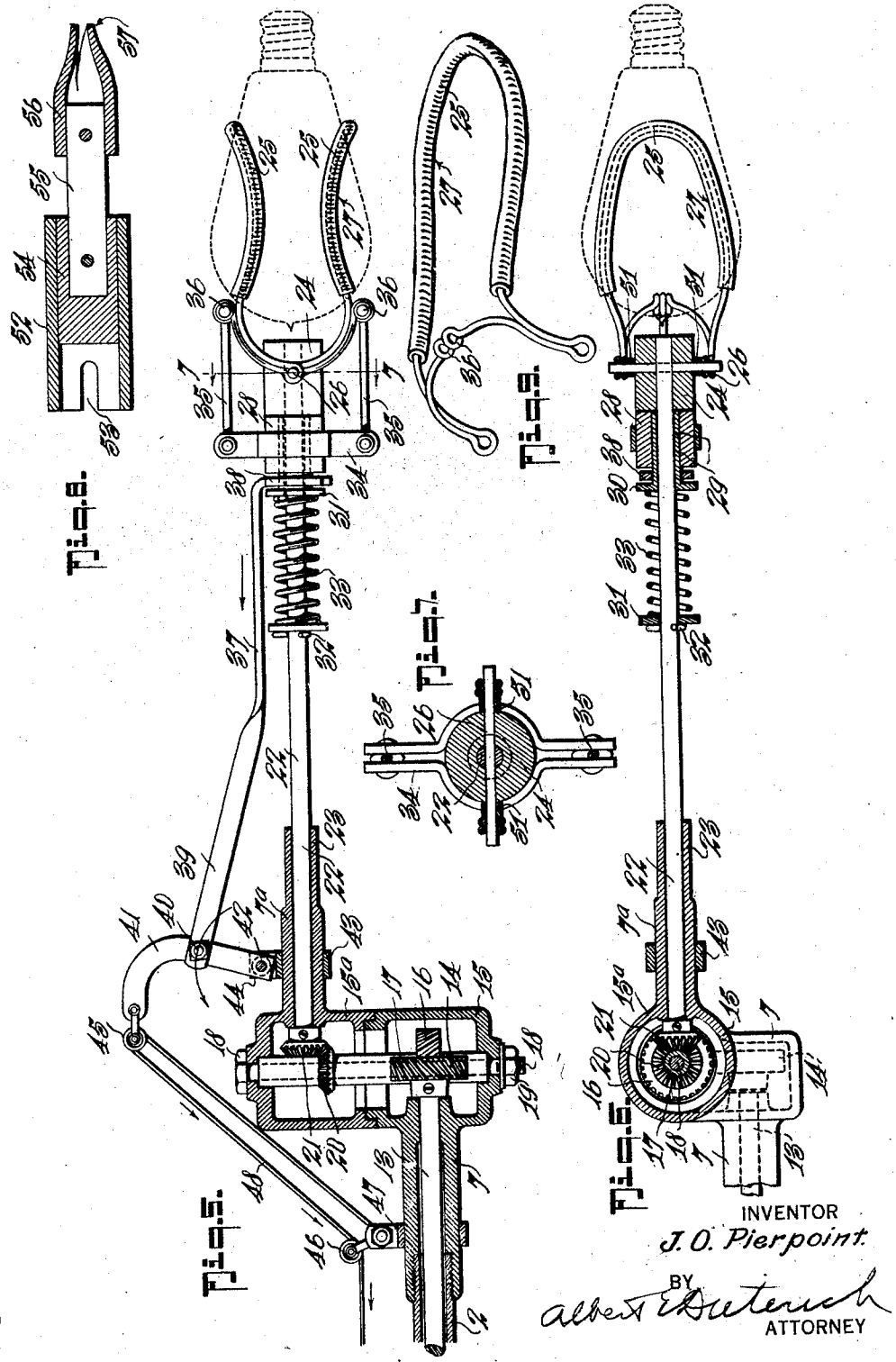


Fig. 8.

Fig. 9.

Fig. 7.

Fig. 5.

Fig. 6.

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# UNITED STATES PATENT OFFICE.

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## APPARATUS FOR MANIPULATING GLOBES.

Application filed March 22, 1924. Serial No. 701,133.

*To all whom it may concern:*

Be it known that I, JOHN ORR PIERPOINT, a citizen of the United States, residing at Pana, in the county of Christian and State of Illinois, have invented a new and useful Apparatus for Manipulating Globes, of which the following is a specification.

The invention relates to apparatus for manipulating electric light bulbs located in inaccessible places or at a distance from the operator with a view of screwing them into or out of their sockets.

With the ever increasing use of large display signs equipped with numerous electric globes, the demand for a practical apparatus whereby the bulbs may be manipulated from a distance, in effecting the removal and replacement thereof, also increases. I am aware that attempts have been made to supply this want but, judging from the fact that while the business of sign tending has grown to the proportions warranting the organization of numerous "public sign service companies," the operatives still employ the "hand, ladder and multiple man" method, with the consequent danger to life and limb and with great loss of time and labor, economically considered.

It therefore appears that the situation is due to the fact that an apparatus such as would entirely suit the desires and demands of these "operatives", in being of neat design, of simple and inexpensive structure, possible of adaptation for and positive in its operation in effecting manipulation of the electric globes regardless of remoteness and inaccessibility of position, and also in effecting removal of broken bulb bases without danger of electric shock, a feature very desirable as it is necessary in order to attain proper results, that the current be permitted to flow through the sign during the operation, has not been produced. Therefore, it is the object of the invention to provide an apparatus of the type stated which embodies such novel structural features and combination and arrangement thereof, as will supply all of the needs herein outlined.

With the above, and other objects in view, the invention further resides in those novel details of construction, combination and arrangement of parts, all of which will be first fully described, then be particularly pointed out in the appended claims, reference being had to the accompanying drawing, in which:

Figure 1 is a diagrammatic plan view, the adjustable feature of the invention being illustrated.

Figure 2 is a diagrammatic side elevation of the invention.

Figure 3 is an enlarged vertical section of the two-way casting and connections.

Figure 4 is an enlarged horizontal section taken on the line 4—4 on Figure 3.

Figure 5 is an enlarged vertical section of the adjustable bearing heads and the gripping finger connections.

Figure 6 is an enlarged horizontal section of the parts shown in Figure 5.

Figure 7 is an enlarged cross section taken on the line 7—7 on Figure 5.

Figure 8 is a central longitudinal section of the broken globe base removing attachment.

Figure 9 is a perspective view showing one of the gripper finger structures.

Figures 10 and 11 are diagrammatic details illustrating the manner of forming the base engaging member of the attachment shown in Figure 8.

In the drawings, 1 represents an angled handle structure which includes a T-head adapted to act as a rest for the apparatus, such as will greatly aid in holding the same while rotation of the rotating parts is effected for manipulating electric globes at inaccessible and remote points. The handle structure is secured to the main drive shaft casing 2, as at 3, which casing consists of a long hollow tube constructed of suitable light weight material, and is suitably braced therewith as at 4.

A two-way bearing casting 5 is provided having end caps by which access may be had to the interior portions of the said casting which provide bearings for the power transmission connections later to be had. The two-way bearing casting 5 is secured upon one end of the shaft casing 2 and a suitable bearing head 7 is secured upon the other end thereof.

A lateral extension 8 of the two-way casting 5 accommodates a crank shaft 9, which is provided with a crank 10 at one end

thereof, and whereby rotation may be manually imparted to the drive transmissions later to be described.

The crank shaft 9 has secured to the end thereof opposite the crank 10 a worm gear 11 adapted to mesh with a worm gear 12 mounted on the adjacent end of the main drive shaft 13 for which the casing 2 forms a housing and a rigid supporting medium. A worm gear 14 is mounted on the other end of the drive shaft 13 and is suitably housed within the bearing head 7. From the description thus far, it will be observed that the structure 1 provides a suitable supporting medium whereby the relatively long shaft casing 2, and the operative structures cooperative therewith, may be securely held or supported for effecting the desired manipulation of electric globes at remote and inaccessible points, and that by rotation of the crank shaft 9 by the crank 10 rotary motion will be imparted to the main drive shaft 13 and, of course, to the said worm gear 14 at the remote end thereof.

The bearing head 7 includes an extension in the nature of a hub 15 which is suitably hollowed to accommodate the worm gear 16 mounted upon or formed integral with the shaft sleeve 17 having rotative bearing in the said hub, and the similarly constructed hub bearing $15^a$ of the bearing head $7^a$ cooperative with the said hub and bearing head 15 and 7 in a manner later to be described.

The shaft sleeve 17 is fitted over, to surround and be rotatively mounted upon, a pivot and securing bolt and nut connection 18—19 which pass through the hubs 15—$15^a$ in a manner whereby a pivotal connection thereof is provided which, upon loosening of the securing nut 19, may be moved so as to vary the angular relation of the said bearing heads and the shaft sections having bearing therein and, by the securing of the said nut, effecting the desired securing of the parts to the adjusted positions.

The shaft sleeve 17 is also provided with a bevel gear 20 mounted thereupon or formed integral so as to rotate therewith, and the said bevel gear is adapted to mesh with a bevel gear 21 on the supplemental or driven shaft 22 having bearing in the extension 23 of the bearing head $7^a$ hereinbefore mentioned.

A cylindrical wooden head 24 is fixed upon the end of the driven shaft 22 to rotate therewith and to the said head the gripper fingers 25 are pivotally connected, as at 26. The pivotal connection 26 is preferably in the nature of a pin which passes through the wooden block and the shaft end in a manner for projecting from the block to provide the pivots and also to aid in securing the said block upon the shaft end. It will be observed from the drawings the gripper fingers are preferably constructed of heavy wire shaped to provide an effective contact with the globes to be manipulated and suitably covered with soft material, such as leather or rubber, to prevent fracture of the said globes, and also to provide a better gripping surface for the purpose of facilitating such globe manipulation. The covering of the fingers is indicated by the numeral 27.

Another cylindrical wooden head 28 is slidably mounted on the said driven shaft and is provided with an axial sleeve 29 to which the said head is secured, in a manner for providing a suitable sliding bearing for the said head upon the said shaft. The sleeve includes an enlarged head portion 30 so positioned as to provide a space between the said head and the wooden head 28.

An abutment washer 31 is pin-connected to the driven shaft, as at 32, and a coil spring 33 is interposed between the said washer and the head 30 in a manner for normally forcing the wooden head 28 toward the fixed head 24 for a purpose soon to be described.

A two-part clamp member 34, in the nature of a pair of opposing metal strips is secured upon to move with the head 28 and the means for securing the clamp member upon the head 28 also provides for pivotally securing to the said clamp a pair of rigid arms 35 which are in turn pivotally connected as at 36 to the gripper fingers 25. By reason of the connection just described, it will be apparent that movement longitudinally of the slidable head 28 will effect an opening or closing of the gripper fingers. The action of the coil spring 33 being to normally force the gripper fingers closed, as in tight clamping relation with the globe to be manipulated, it is obvious that movement of the head 28 against the spring action will effect a temporary opening of the said fingers, the fingers again resuming their clamping relation when the force applied to effect the moving of the said head against the spring action is removed from action.

For providing for movement of the slidable head 28 in a manner for effecting the temporary opening of the gripper fingers to permit positioning the same over the globe to be manipulated, so that when the parts are allowed to resume their normal position the globe will be gripped thereby to be readily manipulated, I provide a spring compressing finger opening bar 37.

The bar 37 may be constructed of a flat piece of stout strap iron shaped that it may parallel the driven shaft adjacent the spring 33 and include a right angled portion 38 adapted to freely fit over the sleeve 29 in the space provided between the heads 30 and 28, and an up bent portion 39 pivot-

ally secured as at 40 to the actuating lever 41 which is in turn pivoted at 42 to the bracket 43 securely clamped as at 44 to the bearing head 7a. It will be obvious that rocking of the lever 41 will effect longitudinal movement of the bar 37 for moving the head 28 against the action of the spring 33 and for the purpose above stated.

In order to provide for a desired rocking of the lever 41 in its position remote from the supporting handle structure 1, I provide pulley and cable devices extending from the lever down to the handle structure in position for being conveniently actuated by the operator of the apparatus.

The devices mentioned include a small pulley 45 secured to the top end of the lever 41, a similar pulley 46 secured to the bracket 47 clamped on the bearing portion 7 and a suitable pull cord or cable 48, one end of which is secured at 49 to the casting 5 so as to be in position for convenient reach of the operator, and which takes over the pulleys 45 and 46, and has the other end thereof secured to the clamp bracket 47, as shown. Pull knobs 50 may be secured upon the cable 48 to facilitate pulling thereof if so desired.

It is also a purpose of the invention to provide a suitable attachment which may be readily applied to the apparatus and operative for the purpose of removing the bases of such electric globes as have been broken. The attachment is so constructed that it may be readily mounted upon the apparatus thus far described without any alteration thereof whatever. It is also a purpose, in view of the fact that to obtain the best results in manipulating the globes of a display sign, that the current be flowing through the sign during the operation, to provide a means of mounting and a structure of such an attachment that will make it impossible for current from the sign sockets to be conducted through the apparatus and effect a shocking of the operator thereof.

In carrying out the feature of my invention just described, I provide the pivot pins 26 of the head 24 with spacer sleeves 51 which fit over the said pins between the said head and the portions of the gripper finger structures which engage the pins in a manner for providing a substantial space between the said finger structure portions and the said head.

The attachment comprises a hollow pipe section 52 of a diameter such as will permit a close but free fitting of the same over the head 24, the thickness of the pipe being very slightly less than the width of the spaces provided by the spacer sleeve 51. The pipe section 52 is suitably slotted, as at 53, to straddle the pivot pins and spacer sleeves 26 and 51 and thus permit the desired fitting of the said pipe section over the said head and also for providing for imparting rotation of the said pipe section by the said head when the same is rotated by the transmission devices hereinbefore described.

The pipe section 52 is fitted with a core filler or plug 54 of wood or other suitable electricity non-conducting material. A shaft extension section 55 is secured in and extends axially of the plug 54 and is provided either with an integral enlargement or with another pipe section 56 secured thereupon to rotate therewith. The section 56 is formed at its end in a manner for providing a removing bit 57 shaped so that when brought into contact with the base of a broken electric globe and the apparatus set into motion it will engage the said base in a manner for removing it from its socket. For this purpose, the bit portions are constructed to cut or grip only when rotation to the left is imparted, such being the direction of the rotation obviously necessary in removing a broken globe base from its socket.

While, as before stated, it may be desirable to form the section 56 as an integral part of the shaft section 55, it is also possible to form the same from a pipe section which may be secured upon the end of the shaft section in the manner illustrated in the drawings. When the said element is formed from a pipe section, it is constructed in the manner diagrammatically illustrated in Figures 10 and 11 of the drawings, from which it will be observed that the original pipe section is slitted in four places, as at 58, and the individual portions thus formed between the slits bent in the manner illustrated for forming the desired bit structure.

By reason of providing the electricity non-conducting plug 54, it is impossible for electric current to be conducted through the attachment and therefrom through the apparatus.

In operation, the operator will first observe the position of the sign and consider the position of the driven shaft which will present the gripping fingers to the globes to be manipulated in the most effective manner. He will then utilize the bolt and nut connections 18—19 in effecting the desired adjustment of the driven shaft. The parts are now in condition for being effectively operated for the desired purpose.

The operator now taking the apparatus by the lower end of the casing 2, and the handle structure 1, using the latter as a supporting and balancing medium, pulls upon the cable 48 in a manner for acting upon the lever 41 and effecting a longitudinal movement of the slidable head 28 against the action of the spring 33, such as

will cause an opening of the gripping fingers and permit the application thereof over the globe to be manipulated. Then, by releasing the pull on the cord 48, the spring 33 will come into action and force the fingers into contact with the globe when, upon rotation of the driven shaft by the crank and power transmission connections, the globe may be readily removed from or secured into its socket, as the case may be, in accordance with the direction of rotation imparted to the crank 10.

While the single pivoted adjustment feature, made possible by the parts 15—19 inclusive, will suffice for all ordinary globe manipulation, it may be desired to provide an axial adjustment to cooperate therewith and thus make possible pivotal adjustments at any plane of movement.

For this purpose, the pipe 2 is provided with a relatively long threaded end portion 59 adapted to be relatively loosely threaded into the T-head 3, thereby making it possible to move the main portion of the pipe 2, axially, with relation to the supporting handle structure 1 and thus cooperating with the pivoted connections 15—19 in providing any adjustment, axially and pivotally. A jam nut 60 may be provided which, when screwed tightly against the T-head 3, will rigidly secure the main portion of the pipe 2 to its particular axial adjustment with relation to the position of the handle structure 1, see Figures 1, 2, 3 and 4. While I have shown and described a novel mechanism for removing the bases of broken bulbs, I do not now claim the same in this application, claims thereto having been eliminated from this application for purposes of division.

From the foregoing description, taken in connection with the accompanying drawings, it is thought the novel details of construction, the manner of operation and the advantages of my invention, will be readily apparent to those skilled in the art to which it relates.

What I claim is:

1. In apparatus of the class described, a main driving shaft, a driven shaft adapted to have rotation imparted thereto from said driving shaft, means for rotating the driving shaft, gripper fingers mounted to rotate with said driven shaft, power transmission devices for imparting rotation from driving shaft to driven shaft, said devices providing a pivotal connection whereby the driven shaft may be moved to angular relation with the driving shaft, and including freely movable parts and bolt and nut connections forming a pivot for said parts and adapted to be actuated to permit angular movement to provide adjustment or to secure such adjustment.

2. In apparatus of the class described, a main driving shaft, a driven shaft adapted to have rotation imparted thereto from said driving shaft, means for rotating the driving shaft, gripper fingers mounted to rotate with said driven shaft, power transmission devices for imparting rotation from driving shaft to driven shaft, a two-part housing for receiving the adjacent parts of the driving and driven shafts and the power transmission devices, and bolt and nut connections passing through the housing parts to provide an adjustable pivot and adapted to be actuated to permit and secure adjustments of relation between driving and driven shafts.

3. In apparatus of the class described, a main driving shaft, a driven shaft adapted to have rotation imparted thereto from said driving shaft, means for rotating the driving shaft, gripper fingers mounted to rotate with said driven shaft, power transmission devices for imparting rotation from driving shaft to driven shaft, a two-part housing for receiving the adjacent parts of the driving and driven shafts and the power transmission devices, and bolt and nut connections passing through the housing parts and through the power transmission devices to provide an adjustable pivot and adapted to be actuated to permit and secure adjustments of relation between driving and driven shafts.

4. In apparatus of the class described, a main driving shaft, a driven shaft adapted to have rotation imparted thereto from said driving shaft, means for rotating the driving shaft, gripper fingers mounted to rotate with said driven shaft, power transmission devices for imparting rotation from driving shaft to driven shaft, said devices providing a pivoted connection whereby the driven shaft may be moved to angular relation with the driving shaft, means for tightening the said devices to secure the parts to adjusted position, a relatively long supporting and carrying means for the driven shaft, and an angled extension secured thereto to provide a supporting rest.

5. In apparatus of the class described, a main driving shaft, a driven shaft adapted to have rotation imparted thereto from said driving shaft, means for rotating the driving shaft, gripper fingers mounted to rotate with said driven shaft, power transmission devices for imparting rotation from driving shaft to driven shaft, a two-part housing for receiving the adjacent parts of the driving and driven shafts and the power transmission devices, bolt and nut connections passing through the housing parts and through the power transmission devices to provide an adjustable pivot and adapted to be actuated to permit and secure adjustments of relation between driving and driven shaft, a relatively long supporting

and carrying means for the driven shaft, and an angled extension secured thereto to provide a supporting rest.

6. In apparatus of the class described, a main driving shaft, a driven shaft adapted to have rotation imparted thereto from said driving shaft, gripper fingers mounted to rotate with said driven shaft, power transmission devices for imparting rotation from said driving shaft to driven shaft, said devices providing a pivotal connection whereby the driven shaft may be moved to angular relation with the driving shaft, means for tightening the said devices to secure the parts to adjusted position, a relatively long supporting and carrying means for the driven shaft, and angled extension secured thereto to provide a supporting rest, and means for imparting rotation to the driven shaft disposed in lateral relation thereto at a point above the end of said angled extension.

7. In apparatus of the class described, a main driving shaft, a driven shaft adapted to have rotation imparted thereto from said driving shaft, gripper fingers mounted to rotate with said driven shaft, power transmission devices for imparting rotation from driving shaft to driven shaft, a two-part housing for receiving the adjacent parts of the driving and driven shafts and the power transmission devices, bolt and nut connections passing through the housing parts and through the power transmission devices to provide an adjustable pivot and adapted to be actuated to permit and secure adjustments of relation between driving and driven shafts, a relatively long supporting and carrying means for the driven shaft, an angled extension secured thereto to provide a supporting rest, and means for imparting rotation to the driven shafts disposed in lateral relation thereto at a point above the end of said angled extension.

8. In apparatus of the class described, a main driving shaft, a driven shaft adapted to have rotation imparted thereto from said driving shaft, means for rotating the driving shaft, power transmission devices for imparting rotation from driving to driven shaft, said devices providing a pivoted connection whereby the driven shaft may be moved to angular relation with the driving shaft, a head fixed to the end of the driven shaft, gripping fingers pivoted to said head, a second head slidable on said driven shaft, connections between the slidable head and the fingers whereby the latter will be moved in accordance with movement of the former, means normally tending to move the slidable head outward to close the fingers, and means for moving the slidable head against said outward moving tendency.

9. In apparatus of the class described, a main driving shaft, a driven shaft adapted to have rotation imparted thereto from said driving shaft, means for rotating the driving shaft, power transmission devices for imparting rotation from driving to driven shaft, said devices providing a pivoted connection whereby the driven shaft may be moved to angular relation with the driving shaft, a head fixed to the end of the driven shaft, gripping fingers pivoted to said head, a second head slidable on said driven shaft, connections between the slidable head and the fingers whereby the latter will be moved in accordance with movement of the former, a sleeve in and extending from the slidable head and itself having a head positioned to provide a space between the same and the slidable head, means normally tending to move the slidable head outward to close the fingers, and means extending into the space between the heads and freely surrounding the sleeve and whereby movement of the slidable head may be effected against the said outward moving tendency.

10. In apparatus of the class described, a main driving shaft, a driven shaft adapted to have rotation imparted thereto from said driving shaft, means for rotating the driving shaft, power transmission devices for imparting rotation from driving to driven shaft, said devices providing a pivoted connection whereby the driven shaft may be moved to angular relation with the driving shaft, a head fixed to the end of the driven shaft, gripping fingers pivoted to said head, a second head slidable on said driven shaft, connections between the slidable head and the fingers whereby the latter will be moved in accordance with movement of the former, a sleeve in and extending from the slidable head and itself having a head positioned to provide a space between the same and the slidable head, a spring acting against the sleeve carried head and normally tending to move the slidable head outwardly to close the fingers, an angled member extending into the space between the heads and freely surrounding the sleeve and substantially paralleling the driven shaft, and lever and cable devices whereby the angled member may be moved to cause movement of the slidable head against the spring action.

11. In apparatus of the class described, a main driving shaft, a driven shaft adapted to have rotation imparted thereto from said driving shaft, means for rotating the driving shaft, power transmission devices for imparting rotation from driving to driven shaft, a two-part housing for receiving the adjacent parts of the driving and driven shafts and the power transmission devices, bolt and nut connections passing through the housing parts and through the power transmission devices to provide an adjustable pivot and adapted to be actuated to permit and secure adjustments of relation

between driving and driven shafts, a head fixed to the end of the driven shaft, gripping fingers pivoted to said head, a second head slidable on said driven shaft, connections between the slidable head and the fingers whereby the latter will be moved in accordance with movement of the former, means normally tending to move the slidable head outward to close the fingers, and means for moving the slidable head against said outward moving tendency.

12. In apparatus of the class described, a main driving shaft, a driven shaft adapted to have rotation imparted thereto from said driving shaft, means for rotating the driving shaft, power transmission devices for imparting rotation from driving to driven shaft, a two-part housing for receiving the adjacent parts of the driving and driven shafts and the power transmission devices, bolt and nut connections passing through the housing parts and through the power transmission devices to provide an adjustable pivot and adapted to be actuated to permit and secure adjustments of relation between driving and driven shafts, a head fixed to the end of the driven shaft, gripping fingers pivoted to said head, a second head slidable on said driven shaft, connections between the slidable head and the fingers whereby the latter will be moved in accordance with movement of the former, means normally tending to move the slidable head outward to close the finger, means for moving the slidable head against the outward moving tendency, a relatively long supporting and carrying means for the driven shaft, and an angled extension secured thereto to provide a supporting rest.

13. In apparatus of the class described, a main driving shaft, a driven shaft adapted to have rotation imparted thereto from said driving shaft, power transmission devices for imparting rotation from driving to driven shaft, a two-part housing for receiving the adjacent parts of the driving and driven shafts and the power transmission devices, bolt and nut connections passing through the housing parts and through the power transmission devices to provide an adjustable pivot and adapted to be actuated to permit and secure adjustments of relation between driving and driven shaft, a head fixed to the end of the driven shaft, gripping fingers pivoted to said head, a second head slidable on said driven shaft, connections between the slidable head and the fingers whereby the latter will be moved in accordance with movement of the former, means normally tending to move the slidable head outward to close the fingers, means for moving the slidable head against said outward moving tendency, a relatively long supporting and carrying means for the driven shaft, an angled extension secured thereto to provide a supporting rest, means for imparting rotation to the driven shaft disposed in lateral relation thereto at a point above the end of said angled extension.

14. In apparatus of the class described, a main driving shaft, a driven shaft adapted to have rotation imparted thereto from said driving shaft, means for rotating the driving shaft, power transmission devices for imparting rotation from driving to driven shaft, a two-part housing for receiving the adjacent parts of the driving and driven shafts and the power transmission devices, bolt and nut connections passing through the housing parts and through the power transmission devices to provide an adjustable pivot and adapted to be acuated to permit and secure adjustments of relation between driving and driven shafts, a head fixed to the end of the driven shaft, gripping fingers pivoted to said head, a second head slidable on said driven shaft, connections between the slidable head and the fingers whereby the latter will be moved in accordance with movement of the former, a sleeve in and extending from the slidable head and itself having a head positioned to provide a space between the same and the slidable head, means normally tending to move the slidable head outward to close the fingers, and means extending into the space between the heads and freely surrounding the sleeve and whereby movement of the slidable head may be effected against the said outward moving tendency.

15. In apparatus of the class described, a main driving shaft, a driven shaft adapted to have rotation imparted thereto from said driving shaft, means for rotating the driving shaft, power transmission devices for imparting rotation from driving to driven shaft, a two-part housing for receiving the adjacent parts of the driving and driven shafts and the power transmission devices, bolt and nut connections passing through the housing parts and through the power transmission devices to provide an adjustable pivot and adapted to be actuated to permit and secure adjustments of relation between driving and driven shafts, a head fixed to the end of the driven shaft, gripping fingers pivoted to said head, a second head slidable on said driven shaft, connections between the slidable head and the fingers whereby the latter will be moved in accordance with movement of the former, a sleeve in and extending from the slidable head and itself having a head positioned to provide a space between the same and the slidable sleeve, a spring acting against the sleeve carried head and normally tending to move the fingers, an angled member extending into the space between the heads and freely surrounding the sleeve and substantially paralleling the driven shaft, and lever

and cable devices whereby the angled member may be moved to cause movement of the slidable head against the spring action.

16. In apparatus of the class described, a main driving shaft, a driven shaft adapted to have rotation imparted thereto from said driving shaft, means for rotating the driving shaft, power transmission devices for imparting rotation from driving to driven shaft, a two-part housing for receiving the adjacent parts of the driving and driven shafts and the power transmission devices, bolt and nut connections passing through the housing parts and through the power transmission devices to provide an adjustable pivot and adapted to be actuated to permit and secure adjustments of relation between driving and driven shafts, a head fixed to the end of the driven shaft, gripping fingers pivoted to said head, a second head slidable on said driven shaft, connections between the slidable head and the fingers whereby the latter will be moved in accordance with movement of the former, a sleeve in and extending from the slidable head and itself having a head positioned to provide a space between the same and the slidable sleeve, a spring acting against the sleeve carried head and normally tending to move the fingers, an angled member extending into the space between the heads and freely surrounding the sleeve and substantially paralleling the driven shaft, lever and cable devices whereby the angled member may be moved to cause movement of the slidable head against the spring action, a relatively long supporting and carrying means for the driven shaft, and an angled extension secured thereto to provide a supporting rest.

17. In apparatus of the class described, a main driving shaft, a driven shaft adapted to have rotation imparted thereto from said driving shaft, power transmission devices for imparting rotation from driving to driven shaft, a two-part housing for receiving the adjacent parts of the driving and driven shafts and the power transmission devices, bolt and nut connections passing through the housing parts and through the power transmission devices to provide an adjustable pivot and adapted to be actuated to permit and secure adjustments of relation between driving and driven shafts, a head fixed to the end of the driven shaft, gripping fingers pivoted to said head, a second head slidable on said driven shaft, connections between the slidable head and the fingers whereby the latter will be moved in accordance with movement of the former, a sleeve in and extending from the slidable head and itself having a head positioned to provide a space between the same and the slidable sleeve, a spring acting against the sleeve carried head and normally tending to move the fingers, an angled member extending into the space between the heads and freely surrounding the sleeve and substantially paralleling the driven shaft, lever and cable devices whereby the angled member may be moved to cause movement of the slidable head against the spring action, means for imparting rotation to the driven shaft disposed in lateral relation thereto at a point above the end of said angled extension.

18. In apparatus of the class described including a driven shaft and means for imparting rotary motion thereto, a head fixed to the end of the driven shaft, gripping fingers pivoted to said head, a second head slidable on said driven shaft, connections between the slidable head and the fingers whereby the latter will be moved in accordance with movement of the former, a sleeve in and extending from the slidable head and itself having a head positioned to provide a space between the same and the slidable head, means normally tending to move the slidable head outward to close the fingers, and means extending into the space between the heads and freely surrounding the sleeve and whereby movement of the slidable head may be effected against the said outward moving tendency.

19. In apparatus of the class described including a driven shaft and means for imparting rotary motion thereto, a head fixed to the end of the driven shaft, gripping fingers pivoted to said head, a second head slidable on said driven shaft, connections between the slidable head and the fingers whereby the latter will be moved in accordance with movement of the former, a sleeve in and extending from the slidable head and itself having a head positioned to provide a space between the same and the slidable head, means extending into the space between the heads and freely surrounding the sleeve and whereby movement of the slidable head may be effected against the said outward moving tendency, a spring acting against the sleeve carried head and normally tending to move the slidable head outwardly to close the fingers, an angled member extending into the space between the heads and freely surrounding the sleeve and substantially paralleling the driven shaft, and lever and cable devices whereby the angled member may be moved to cause movement of the slidable head against the spring action.

20. In apparatus of the class described, a main driving shaft, a driven shaft adapted to have rotation imparted thereto from said driving shaft, means for rotating the driving shaft, gripper fingers mounted to rotate with said driven shaft, power transmission devices for imparting rotation from driving shaft to driven shaft, said devices

providing a pivotal connection whereby the driven shaft may be moved to angular relation with the driving shaft, means for tightening the said devices to secure the parts to adjusted position, and coupling devices permitting axial adjustment of the devices providing the pivotal connection.

21. In apparatus of the class described, a main driving shaft, a driven shaft adapted to have rotation imparted thereto from said driving shaft, means for rotating the driving shaft, gripper fingers mounted to rotate with said driven shaft, power transmission devices for imparting rotation from driving shaft to driven shaft, said devices providing a pivoted connection whereby the driven shaft may be moved to angular relation with the driving shaft, means for tightening the said devices to secure the parts to adjusted position, a relatively long supporting and carrying means for the driven shaft, an angled extension secured thereto to provide a supporting rest, and coupling devices associated with said supporting means whereby axial adjustment of the supporting means with relation to the angled extension is made possible.

22. In apparatus of the class described, a main driving shaft, a driven shaft, a swivel joint with transmission gearing between said driving and said driven shaft adapted to swing the driven shaft on an axis in a plane normal to that of the driving shaft, gripper fingers mounted to rotate with said driven shaft, means for securing said swivel joint against swiveling movement, and means for effecting rotational adjustment of said swivel joint around the axis of the driving shaft.

23. In apparatus of the class described, a driven shaft, a fixed head on the driven shaft, a slidable head on the driven shaft, means normally forcing the slidable head against the fixed head, arms pivoted to the fixed head and link-connected to the slidable head, a stirrup for moving the slidable head abnormally, a cable for moving the stirrup, and gripping elements carried by the pivoted arms.

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