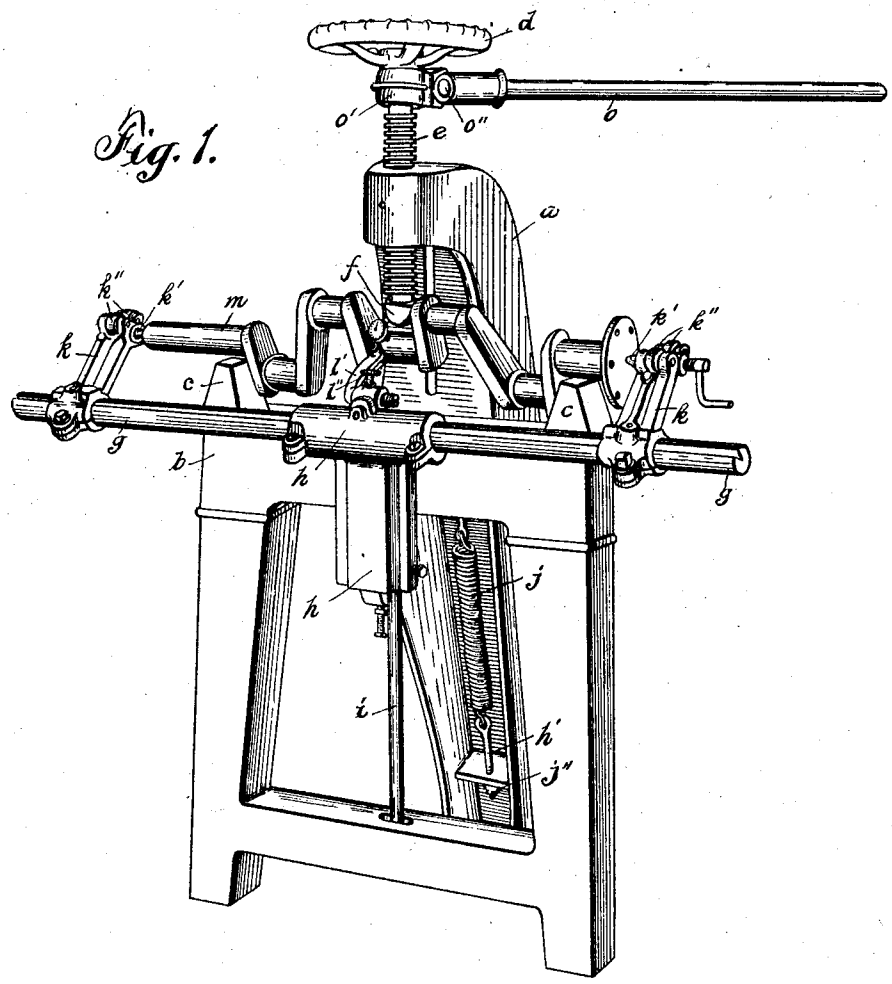
Oct. 18, 1927. 1,646,260

B. P. SCHILTZ

STRAIGHTENING PRESS AND METHOD OF STRAIGHTENING

Filed April 8, 1922 3 Sheets-Sheet 1

Fig. 1.



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STRAIGHTENING PRESS AND METHOD OF STRAIGHTENING

Filed April 8, 1922 3 Sheets-Sheet 2

Fig. 2.

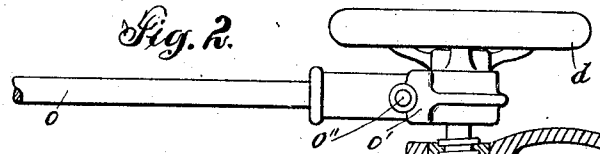
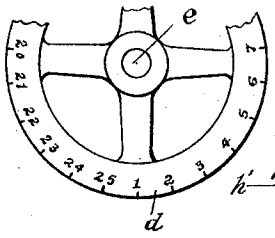
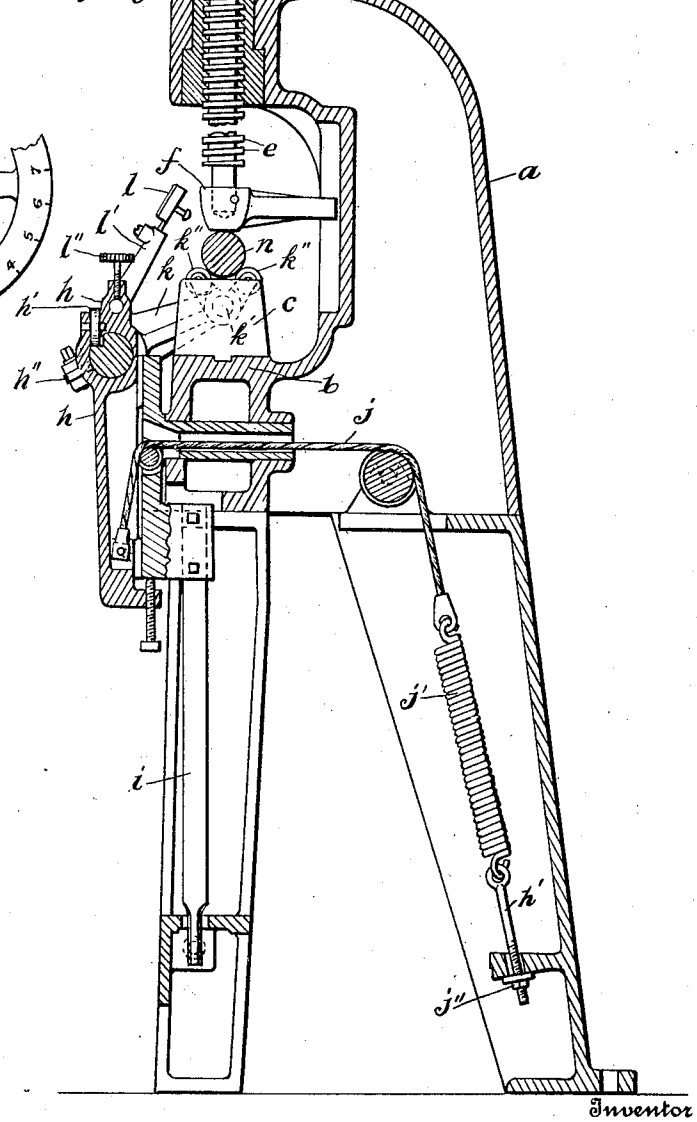


Fig. 3.





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STRAIGHTENING PRESS AND METHOD OF STRAIGHTENING

Filed April 8, 1922 3 Sheets-Sheet 3

Fig. 4.

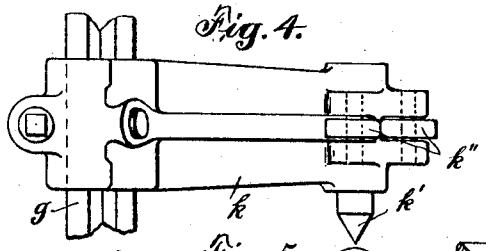


Fig. 5.

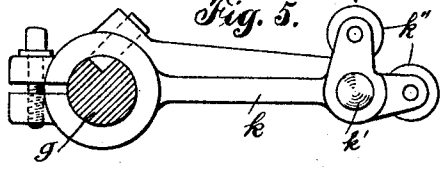


Fig. 7.

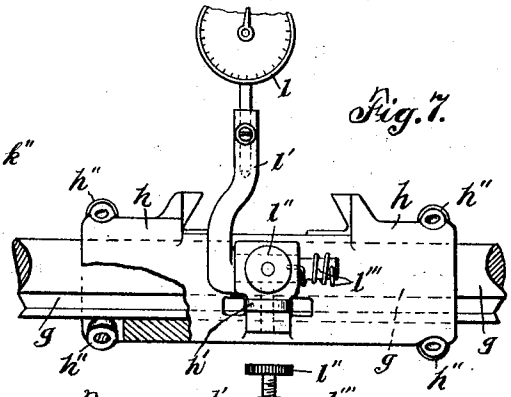


Fig. 6.

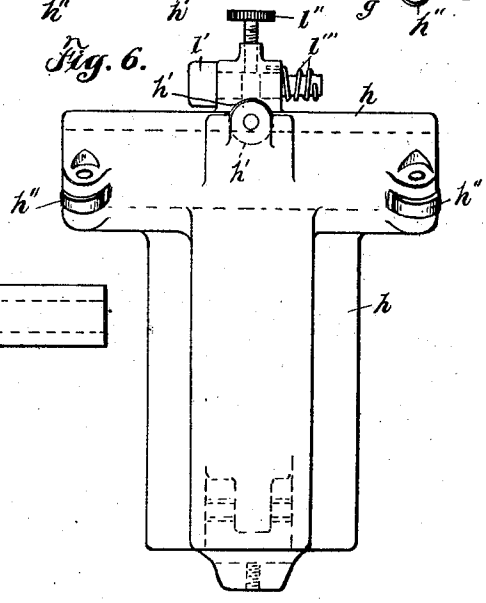


Fig. 9.

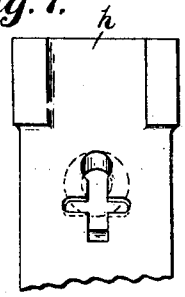


Fig. 8.

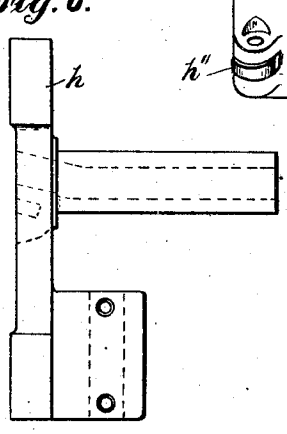
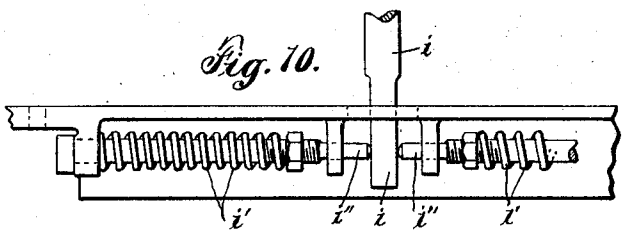


Fig. 10.



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Patented Oct. 18, 1927. 1,646,260

UNITED STATES PATENT OFFICE.

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STRAIGHTENING PRESS AND METHOD OF STRAIGHTENING.

Application filed April 8, 1922. Serial No. 550,565.

My invention relates to improvements in straightening presses, and has for its object the provision of a straightening press affording the marked advantages of permitting the work to be done without removing it from its centers or supports while insuring more rapid work and more expeditious and rapid gauging of inaccuracies than are obtainable in similar structures of the prior art which lack my improvements.

It is necessary in the use of all straightening presses of such prior art with which I am acquainted, to support the shaft or part operated upon, preferably from its terminal centers, gauge its deflection, take it from its supports, place it in the straightening press for preliminary treatment, and repeat these successive steps several times. It is obvious that the constant handling of the shaft entailed, as above described, by the well known appliances of the art, is productive of delay, expense and inaccuracy.

Accordingly, it has been my thought to provide a press wherein the several operations of gauging and straightening may be rapidly accomplished in the simplest and most accurate manner. The features of my improvements may best be explained by making reference to the accompanying drawings:

Fig. 1 thereof showing in perspective a straightening press embodying my invention.

Fig. 2 of said drawings is a vertical sectional view of the same press upon a slightly larger scale.

Fig. 3 is a fragmentary plan view of the gauge wheel.

Fig. 4 is a detail of one of the end supports for the shaft in front elevation.

Fig. 5 is a side elevation thereof.

Fig. 6 is a detail of the gauge support in front elevation, showing said gauge depressed, together with the adjustable standard.

Fig. 7 is a plan view thereof.

Fig. 8 is a fragmentary side view of a portion of the adjustable standard support.

Fig. 9 is a fragmentary face view thereof.

Fig. 10 is a fragmentary detail, partly in section, showing the centering means.

Throughout the several figures of the drawings I have employed the same character of reference to indicate similar parts.

Those familiar with the ordinary straightening press will at once observe in the drawings certain unfamiliar features which constitute improvements requiring specific explanation as to structure and operation. However, the general features of a typical straightening press will be noted, comprising the frame a, the bed b, adjustable supporting blocks c, hand-wheel d, screw e, and the thrust-block f actuated thereby.

In front of the bed a grooved shaft g is adjustably supported as to height as well as to slight inclination by the bracket h and its centering rod i which is terminally supported by opposing springs and plungers i', i'', in its intermediate position, as shown in Figs. 2 and 10.

The bracket h and shaft g, which has longitudinal adjustment within said bracket, both are resiliently supported by means of the cable j and spring j', while the height of said bracket is regulated by means of the adjusting screw h'.

Two supporting arms k are adjustably mounted upon the shaft g, between which the work or part undergoing the straightening operation is supported above the bed b and blocks c of the straightening press. One of these arms k is shown in Figs. 4 and 5 with some detail; each of which is equipped with a centering pin k' and supporting rollers k'' in paired relation. The opposing pins k' or the paired sets of rollers k'' are provided for alternatively supporting the work accurately in the straightening press; the latter preferably being used for rapid insertion and removal of the work or for shafts which are too long to be supported between the centering pins, or are not provided with their own recessed centers.

A gage l, calibrated for measurements to the thousandths of an inch, and of well-known type, is pivotally mounted on the gage-stem l' intermediately of bracket h, and is adapted to be depressed with its stem resting in engagement with the work, as shown in Fig. 1, or, when released by its set screw l'', the stem and gage will be swung clear of the work and thrust-block f, as shown in Fig. 2. Enlarged details of the gage mounting may be considered by referring to Figs. 6 and 7.

With the foregoing structural features borne in mind, an explanation of the advan-

tages and operation of my improved straightening press may be readily understood. In Fig. 1, for example, I have shown a four-cylinder crank shaft m in position upon the press and held between the centering pins in the well-known manner, for the purpose of accurately straightening this somewhat unwieldy member. Obviously, a shaft or other part of proper length might be held in working position by the same means; the limits as to length being defined by the adjustment permitted the arms k upon the shaft g.

However, it is frequently found necessary in shop practice to straighten much longer shafts or parts, and for this purpose particularly I have equipped each arm k with the paired and accurately trued supporting rollers k''. A shaft n of workable length materially exceeding the length of the grooved shaft g may be supported for the purpose of straightening it by resting said shaft upon the rollers k'', as shown in Fig. 2. This permits the most expeditious positioning and removal of the work with respect to the straightening press.

Returning to a consideration of the showing of Fig. 1, the operation of straightening the crank shaft after positioning it between the centering pins may now be briefly explained. The bracket h is adjusted as to height so that the ends of the crank shaft will clear the blocks c and permit the rotation of said shaft, whereupon the stem of gage l is depressed into engagement with the flexed intermediate portion of shaft m where it is held by set-screw l''. The shaft is then slowly turned over by the operative who will note the deflection of the gage needle or pointer and place a chalk mark on the high spot or flexed area of the shaft. The set screw is then released and the spring l''' immediately frees the gage from the work sufficiently to clear the thrust-block for the straightening operation.

Screw e is then rotated by the graduated gage-wheel d sufficiently to engage the thrust-block f with shaft m at its chalked position. The operative may then use the lever o which is equipped with a clutch o' and release o'' for flexing the shaft sufficiently to straighten it. This operation is dependent to a considerable extent upon the judgment and experience of the operative, guided, as he is, by the reading of gage l.

When he has flexed the shaft m, which is brought into supporting engagement with the blocks c upon the initial depression of the thrust-block f, the operative will note the gaging figure, as 1–25, upon hand-wheel d (Fig. 3) which is turned to the forward position, and thereupon he will release the clutch and actuate the thrust-block upwardly by its screw in order to free shaft m.

The resilient mounting of bracket h will serve slightly to elevate the work above the supporting blocks c; spring j' being adjustably tensioned for this purpose in order to counterbalance the supported weight by means of the nut j'', Fig. 2. Gage l is then adjusted with its stem engaging shaft m and the deflection, if any, is determined once more, as above explained, and the straightening operation is repeated as often as required to bring the shaft into accurate alinement at the area or location acted upon by the press.

However, it is the common experience with shaft of any length to find that they are flexed in various portions of their length and thereby unfitted for running true. Accordingly, another important feature of my improvement, and one that is quite essential to the operation of a straightening press and associated apparatus of this type, is the provision of means for permitting the shaft to be operated upon throughout its length and without removing it from the device.

It will be observed that shaft g is mounted within the bracket h by means of rollers h', h''; the former preferably engaging the groove in said shaft for preventing its rotation, while rendering it freely movable in a longitudinal direction. Thus the shaft m under treatment may be moved to the left or right and carefully gaged and straightened as before, until the entire crank shaft is alined within the desired limits of accuracy. It is apparent that a straight shaft, countershaft or other member may be subjected to the straightening operation, as just explained, and if such member has no accurately defined centers, or is too long to be supported between the centering pins, such shaft may be accurately positioned between the opposing rolls k'', as indicated in Fig. 2.

Another feature present in the improved apparatus of my invention is the resiliently held centering rod i which, being terminally positioned between the opposing spring-pressed plungers i'' (Fig. 10), serves the purpose of permitting the work to tilt slightly from the horizontal in being brought to place upon the supporting-blocks of the press, whereby a shaft having unequal terminals or of varying diameters at its ends may be readily straightened without adjusting blocks of different heights upon the bed of the press.

In making the successive flexures of the straightened shaft the circumferentially gaged hand-wheel is of extreme advantage in that the position of the thrust-block may be accurately determined at the beginning and conclusion of each successive step of the straightening operation, so that the operative may determine roughly how much the

shaft is flexed each time, merely by sighting the forward figure or intermediate spacing with the axis of the screw. The pitch of said screw being known, of course, it is easy to determine the depression of the thrust-block at each successive step.

The operating lever *o* preferably is provided with a reversible clutch *o'* actuated by the plunger *o''*, whereby the screw *e* may be powerfully turned in either direction for straightening or releasing the work in hand upon the bed of the press, and while carried by the work-supporting unit into its various positions required for perfecting the straightening operation. Accordingly, the work is most expeditiously and accurately handled without removal from the press and within limits defined by the thousandth of an inch.

Having now described an embodiment of my invention and the novel method of straightening shafts and the like, I desire to claim and secure by Letters Patent, together with such modifications in method and means as may be suggested by ordinary skill in the art, the following:

1. A work-holding appliance and gage for straightening presses and the like, comprising an adjustable support for the member to be operated upon by the press, means for accurately gaging the work, and a depressible resilient support adapted normally to permit the ready rotation of said member, substantially as set forth.

2. In combination with a straightening press, an associated work-holding appliance, comprising an adjustable support adapted accurately to position the work, a resilient supporting means therefor permitting the ready rotation of the work, a finely-calibrated gage, and an adjustable mounting therefor permitting said gage to be actuated into and out of operative relation with the work, substantially as set forth.

3. In a work-holding appliance for presses and the like, the combination with a bracket, of a mounting resiliently positioning it with respect to the press, a work-holding support, a longitudinally adjustable mounting therefor upon the bracket, and gaging means associated with said bracket, whereby the work may be intermittently tested without removing it from the working position upon the press, substantially as set forth.

4. In a work-holding appliance for presses and the like, a unitary attachment for association with the press, comprising a resiliently mounted bracket, a shaft sliding longitudinally therein, spaced supporting arms mounted upon the shaft, means upon said arms for accurately positioning the work and permitting its rotation, and a gaging appliance for testing the work from time to time, substantially as set forth.

5. In combination with a straightening press, an associated work-holding appliance and gage, comprising a longitudinally adjustable support for the work, spaced supporting arms adapted to receive and accurately position the work while permitting its rotation, depressible resilient supporting means, and gaging means adapted to test the work intermittently without removing it from the press or support, substantially as set forth.

6. In combination with a straightening press provided with a gaged actuating hand-wheel and opposed supporting-blocks, an associated work-holding support adapted to position the work normally adjacent to the supporting-blocks of the press, a resilient connection between the press and said support, and a gage adapted to be intermittently associated with the work without removing it from the press, substantially as set forth.

7. In a work-holding appliance for straightening presses and the like, the combination with supporting mechanism for the work adapted to position it above the bed of the press, of a resilient mounting for said mechanism, and centering means resiliently positioning said mechanism with respect to the horizontal plane of the press, substantially as set forth.

8. The herein described method of operating a straightening press, comprising the resilient support of the work slightly above the blocks of said press in position for ready rotation, the repeated gaging of the work while mounted in position for straightening by the press without removal of the work, and the repeated treatment of said work in depressed position upon the blocks in accordance with the indications of the gage, substantially as set forth.

9. In a straightening means for shafts and the like, a carriage for rotatably supporting the shaft, a plunger, and a pair of anvils normally located on opposite sides of the shaft and out of contact therewith, the plunger operating to lower the carriage and force the shaft against the anvils.

10. In a straightening means for shafts and the like, a carriage for rotatively supporting the shaft, a plunger, and a pair of anvils normally located on opposite sides of the shaft and out of contact therewith, the plunger operating to lower the carriage and force the shaft against the anvils, and a micrometric indicator for indicating the eccentricity of the shaft.

11. In a straightening means for shafts and the like, a carriage for rotatively supporting the shaft, an adjustable plunger, and a pair of anvils normally located on opposite sides of the shaft and out of contact therewith, the plunger operating to lower the carriage and force the shaft against the anvils.

12. In a straightening means for shafts

and the like, a carriage for rotatively supporting the shaft, an adjustable plunger, and a pair of anvils normally located on opposite sides of the shaft and out of contact therewith, the plunger operating to lower the carriage and force the shaft against the anvils, and a shock absorbing means connected to the carriage.

13. In a straightening means for shafts and the like, a carriage for rotatively supporting the shaft, an adjustable plunger, and a pair of anvils normally located on opposite sides of the shaft and out of contact therewith, the plunger operating to lower the carriage and force the shaft against the anvils, and a shock-absorbing means connected to the carriage and actuated on the movement of the plunger towards and on the movement of the plunger in the direction away from the shaft.

14. In combination with a straightening press, an associated work-holding appliance, comprising a supporting member, means for permitting its longitudinal adjustment, two spaced supporting arms carried by said member, and paired opposing rollers freely rotatable upon each arm and adapted accurately to position and rotatably hold the work, substantially as set forth.

In testimony whereof I do now affix my signature.

BERNARD P. SCHILTZ.