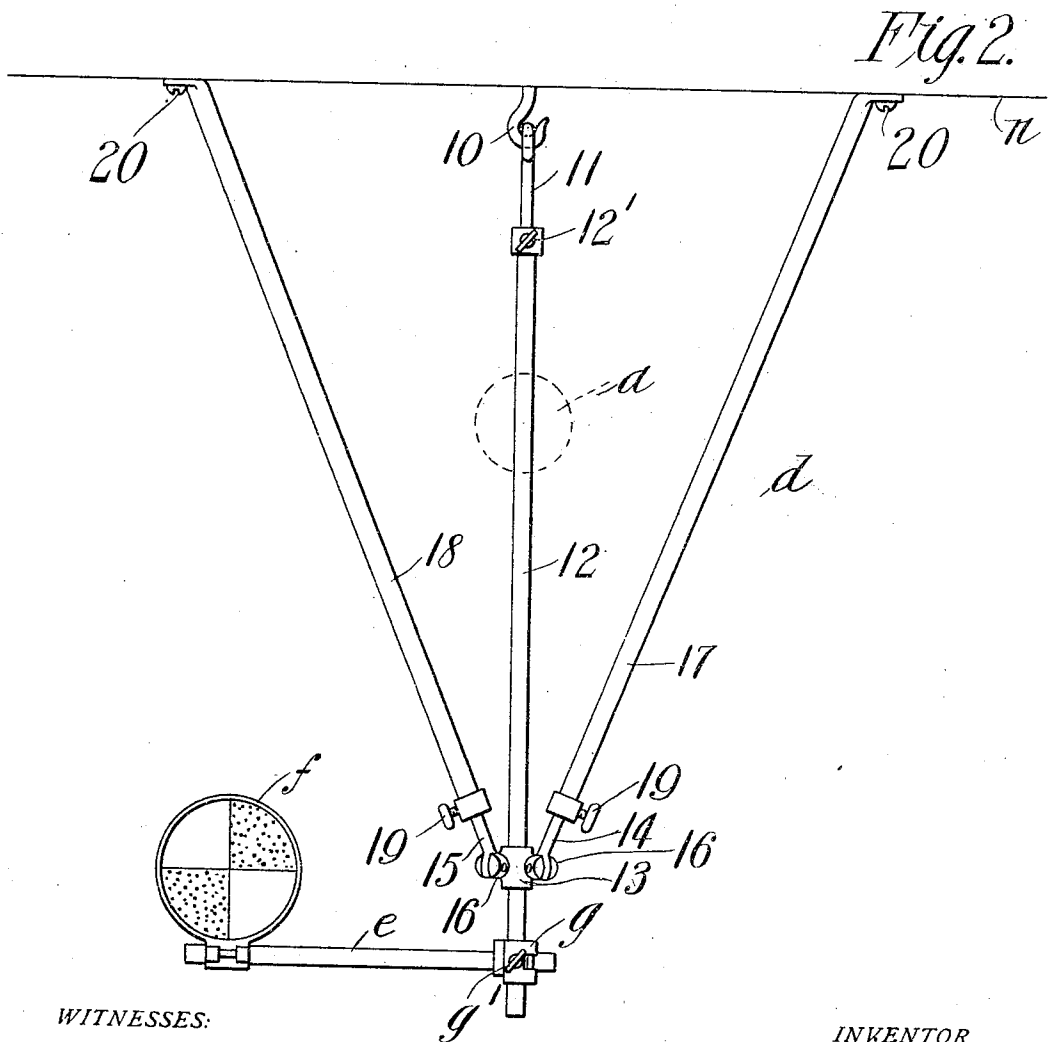
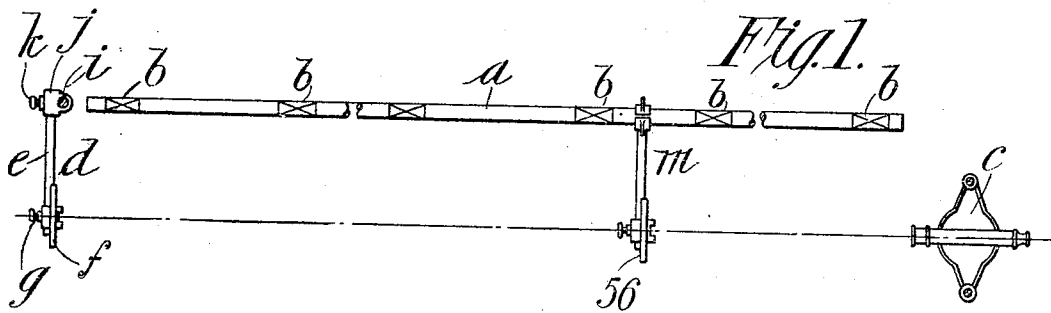


958,736.

3 SHEETS--SHEET 1.



WITNESSES:

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E. S. FERRIS.
SHAFT ALINING DEVICE.
APPLICATION FILED AUG. 26, 1908.

3 SHEETS—SHEET 2.



R. McNewy
Harry W. Bourn.

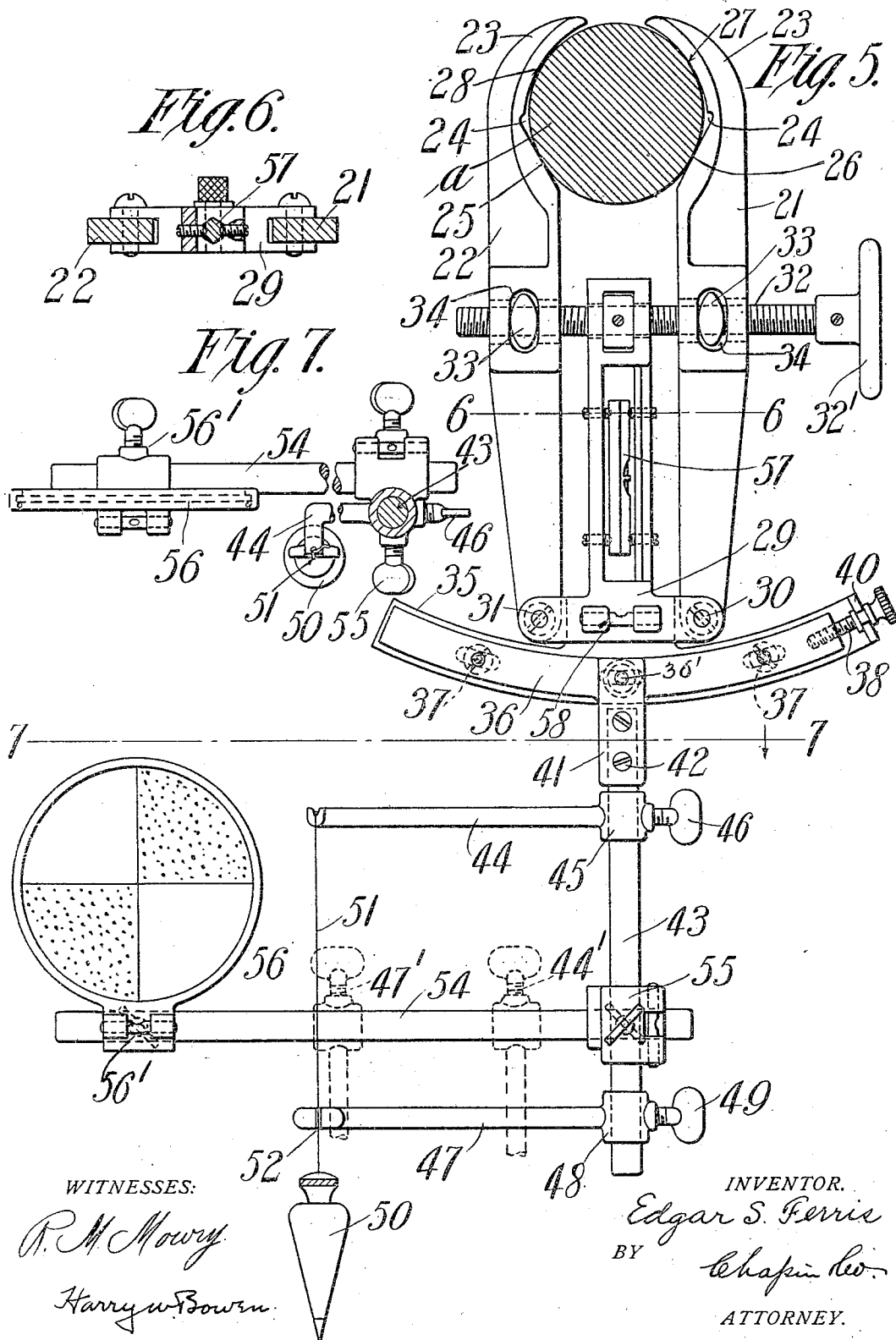
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3 SHEETS—SHEET 3.



WITNESSES:

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EDGAR S. FERRIS, OF HOLYOKE, MASSACHUSETTS.

SHAFT-ALINING DEVICE.

958,736.

Specification of Letters Patent.

Patented May 24, 1910.

Application filed August 26, 1908. Serial No. 450,371.

To all whom it may concern:

Be it known that I, EDGAR S. FERRIS, a citizen of the United States of America, residing at Holyoke, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Shaft-Alining Devices, of which the following is a specification.

My present invention relates to improvements in shaft alining devices, and it has for its object to provide a device that is efficient in operation and one that will not get out of adjustment after being set.

A further object is to provide a device that can be readily adapted to assume various positions with relation to the shaft to be alined.

Broadly stated, the invention consists in securing a fixed target near one end of the shaft to the ceiling of the room or on the floor if desired, and at a constant distance from the center of the shaft, then setting up a transit at the other end of the shaft (or it is preferable to secure the transit from the ceiling), then in temporarily securing to the shafting at various points along the same, a device which is provided with a target, or cross lines, and also with a plumb line and leveling device, whereby when the device carrying the target and cross lines is hung from the shafting at various points thereon and the target thereon brought into the line of sight between the transit and fixed target the shaft will be properly alined.

Referring briefly to the various figures of the drawings; Figure 1 is a plan view of the general scheme of alining a shaft, showing arrangement of the transit, a fixed target, and the movable target on the shaft. Fig. 2 is an enlarged side elevation of the fixed target that is adapted to be secured to the ceiling of the room. Fig. 3 is a plan view of the transit supporting table or platform taken on the sectional line 3—3 of Fig. 4. Fig. 4 is an enlarged detail view of the transit supporting table secured to the ceiling and showing in dotted lines the transit and the end of the shaft to be alined. Fig. 5 shows the hanger device that is adapted to be temporarily clamped to the shaft, and which is provided with a screw adjusting device and the means for supporting the target carrying the cross lines and plumb bob. Fig. 6 is a detail sectional plan view on the line 6—6 of Fig. 5 showing the means of retain-

ing the level in place. Fig. 7 is a detail sectional plan view on the line 7—7 of Fig. 5 looking downward in the direction of the arrows.

Referring to the drawings in detail, *a* designates the shaft to be alined, which is supported in the usual hangers designated at *b*. *C* designates as a whole the transit that is secured to the ceiling of the room as clearly shown in Fig. 4, and *d* indicates a fixture that is also secured to the ceiling (a detail view of a modification of which is shown in Fig. 2), *e* being the arm thereof which carries the target *f* that is secured to the arm *e* which arm is adjustably secured to the block *g* by means of the set nut *g'*.

i is a vertical rod which is secured to the ceiling and on which is adjustably secured the block *j* by means of the set-screw *k*.

m designates as a whole (see Fig. 1) the hanger device that is adapted to be temporarily secured to the shaft which is to be alined, the detail construction of which will be referred to later.

Referring now to the transit supporting means which is shown in detail in Fig. 4 the line *n* is supposed to represent the ceiling in which a hook or other supporting means *o* is secured. Attached to this hook is a rod *p*. This rod is adapted to be clamped to a sleeve *q* by means of the screw *r*. *s* designates a bifurcated member having an integral part *t* that is adapted to be adjustably clamped in the sleeve or tube *q* by means of the screw *u*, the lower end of the arm portion *v* and *w* supports the table or platform *x* on which the transit shown at *y* is supported. *z* are tubes suitably secured to the ceiling and slidably and adjustably mounted in the tubes are the rods 2 and 3 by means of the screws 4. These rods are pivotally connected to the brackets 5 and 6 that are adjustably secured to the arms *v* and *w* by means of the wing nuts 7 and 8. The telescope of the transit is designated at 9 which is provided with the usual cross hairs. The relation of the transit to the shaft *a*, to be alined, is shown in Fig. 4, in dotted lines in end elevation and in plan view in Fig. 1. By loosening the screws 7 and 8 and *u* the platform *x* may be raised and lowered as readily understood.

Referring now to the construction of the fixed target which is shown in detail in Fig. 2, and is somewhat different in construction from that shown in Fig. 1. The ceiling is represented at *n* in which a hook 10 is se-

cured. Attached to this hook is a rod 11 that is adjustably secured in the sleeve 12, the lower end of which is provided with a block 13 to which is pivotally secured the rods 14 and 15 by means of pins passed through the ears 16 of the block 13. The rods are adapted to be adjustably secured in the tubes 17 and 18 by means of the set nuts 19, and the tubes 17 and 18 to the ceiling by any suitable means as the screws 20. A nut 12' permits the target arm *e* to be raised and lowered in the tube 12. It will therefore be seen that I have provided adjustable means for attaching the transit and fixed target to the ceiling of the room and adjacent the shaft *a* which is to be accurately alined. The practice heretofore has been to employ shaft alining devices on the floor of the room, but my improvement is designed to be attached to the ceiling so that there will be absolutely no danger of the transit instrument and target being thrown out of alinement after they have been carefully adjusted.

Coming now to the adjustable hanger device which I consider the important part of my invention, and wherein the same is so constructed that it is always self-centering on the shaft and is provided with leveling and vertically adjusting means. This hanger device comprises two clamping members 21 and 22 having curved jaws 23 for engaging the shaft *a* to be alined; the inner portions of the jaws are notched as shown at 24 whereby the jaws, no matter what the diameter of the shaft *a* may be, will seat themselves on the shaft contacting only at the points, 25, 26, 27, and 28. These jaws are pivotally connected to a common bar 29 at the points 30 and 31. A right and left hand screw 32 is employed to move the clamping jaws 21 and 22 in opposite directions so that shafts of different sizes may be clamped. This screw is adapted to be moved by the wheel 32'. The screw 32 passes through nuts 33 which are arranged in openings 34 of the jaws. The bar 29 it will be observed is made integral with an arc-shaped member 35, and slidably mounted thereon is a second arc-shaped member 36, the same being held in place by means of the pins 37. A screw 38 is rotatably mounted in the upturned end 39 of the member 35, its inner end being threaded into the end of the second arc-shaped member 36, whereby when the screw 38 is rotated the member 36 may be moved on the member 35.

Pivotally connected to the second arc-shaped member 36 at 36' by means of the arm 41 and screws 42 is a depending arm 43. This arm is provided with an arm 44 which is adjustably secured thereto by means of the hub 45 and set-nut 46. A second arm 47 is also adjustably connected to the depending arm 43 by means of the hub 48 and set-screw 49. Attached in the outer end of the arm 44

is a plumb-bob and line 50 and 51, and the lower arm 47 is provided with a notch 52 whereby when the plumb line 51 is in a vertical position the line will register with the notch 52.

Since the line 51 is carried by the shaft *a* to be alined it is absolutely necessary therefore that this line be brought into the line of sight extending from the cross-hairs of the telescope at one end of the shaft to the cross-lines of the fixed target at the other end of the shaft as will be more fully explained at the end of the specification in describing the use of my improvement.

54 designates a target arm adjustably secured to the part 43 by means of the nut and collar 55. The target is shown at 56 which is to be brought into alinement with the target *f* when the improvement is used, and is adapted to be clamped to the arm 54 by means of the nut 56'.

A level is shown at 57 that is necessary when the arms 21 and 22 are placed in a horizontal position, and a level 58 is to be used when the arms are hung vertically as shown. The arms 44 and 47 may be shifted to arm 54 as shown in dotted lines at 44' and 47' when the arms 21 and 22 are shifted to a horizontal position.

The operation of my shaft alining device is as follows: After the fixed target *f* and transit *c* have been carefully adjusted and fixed in position, the clamping jaws 21 and 22 are placed on the shaft and tightened by means of the screw 32. The depending rod 43 is then adjusted so as to hang in a vertical position by means of the thumb-nut 38, which operation brings the plumb-bob so that the line 51 registers with the groove 52. The operator, after this adjustment, then sights through the transit on to target 56. If the line of sight does not fall on the cross lines of the target, then the shaft *a* is moved until this adjustment or alinement of the shaft is effected, as readily understood. If the shaft *a* is out of alinement it is moved in the usual manner until the line of sight falls accurately on to the cross-lines of the target 56. This operation is repeated at various points until the entire shaft is brought into parallel relation with line of sight extending between the transit and the fixed target *f*. It is obvious that the clamping jaws 21 and 22 may be arranged at various positions on the shaft *a*, horizontally or at an angle so as to avoid objects that may obstruct the line of sight.

What I claim, is:

1. A shaft alining device having in combination, a fixed target, a transit, a movable target, means for temporarily attaching the same to the shaft, said means including a pair of jaws having bearing points to engage the shaft, means for moving the jaws toward and away from the shaft, means car-

ried by the jaws for determining the parallel relation between a vertical plane passing through the axis of the shaft and a vertical plane passing through the line extending
5 from the center of the target and the transit, said means including a plumb-line, a horizontal arm for supporting the line, a second arm having a notch therein, an arc-shaped member secured to the jaws, connecting means
10 between the arm and arc-shaped member and a thumb-screw for operating the arc-shaped member, whereby when the thumb-screw is operated the outer end of the arm which supports the line will be raised and
15 lowered and the line brought into registration with the notch in the second arm substantially as described.

2. A shaft-alining device having in com-

bination, a target fixed to a suitable support at one end of the shaft, a transit fixed to a
20 suitable support at the other end of the shaft, a target-supporting device, means for temporarily securing the device to the shaft at various points along its length, said device
25 including two arc-shaped members, and means for moving one in relation to the other for effecting a constant relation between the center of the shaft and the center of the target, an arm, a plumb-line supported there-
30 by, and a second arm for determining the vertical position of the device, as described.

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Witnesses:

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H. W. BOWEN.