No. 709,568. Patented Sept. 23, 1902.

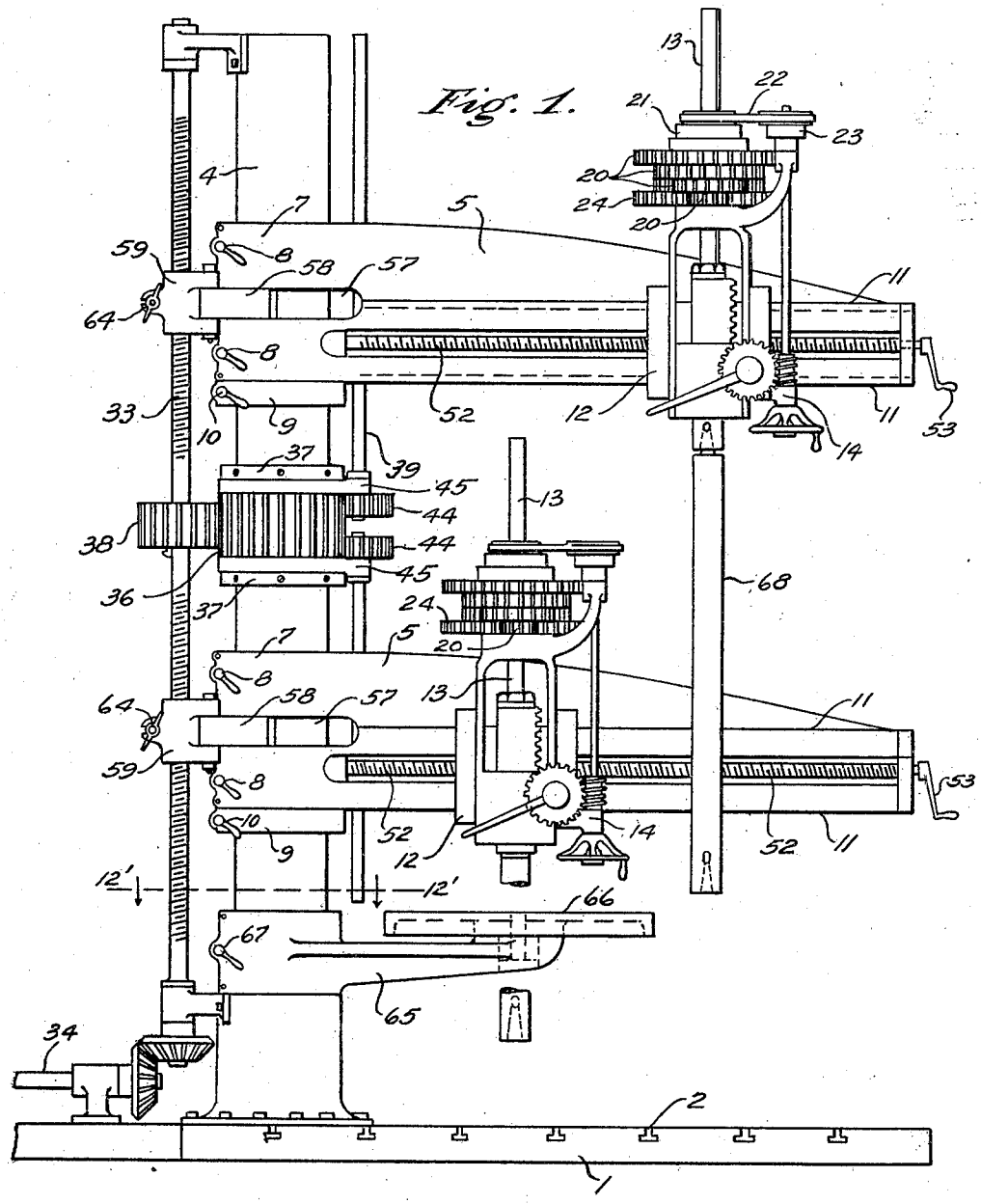
A. VLK.

DRILL PRESS.

(Application filed Apr. 2, 1902.)

(No Model.) 4 Sheets—Sheet 1.

Fig. 1.



Witnesses:
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 709,568. Patented Sept. 23, 1902.

A. VLK.

DRILL PRESS.

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(No Model.) 4 Sheets—Sheet 2.

Fig. 2.

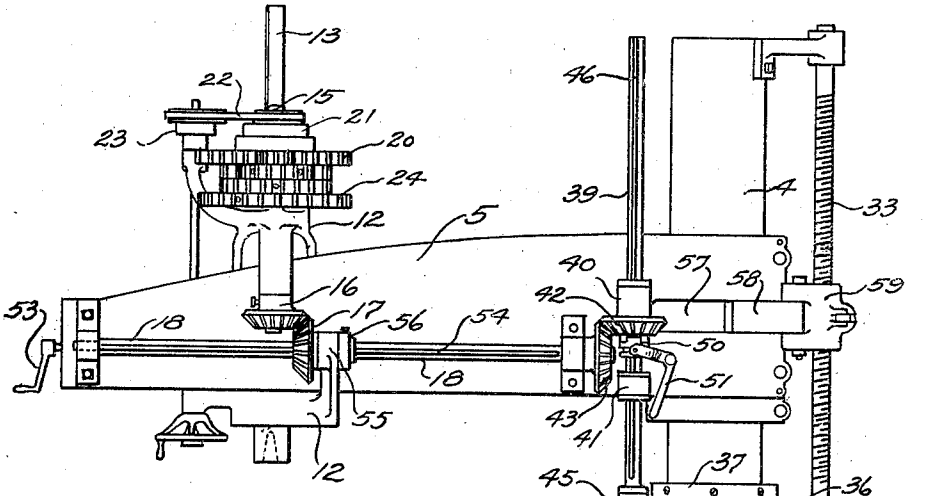
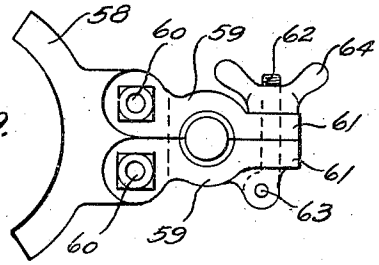


Fig. 9.



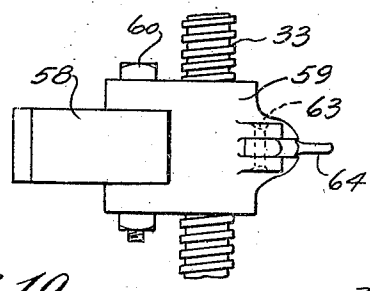


Fig. 10.

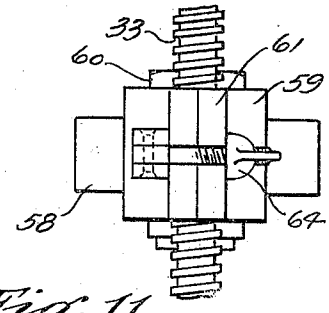


Fig. 11.

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No. 709,568. Patented Sept. 23, 1902.

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DRILL PRESS.

(Application filed Apr. 2, 1902.)

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Fig. 8.

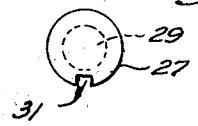


Fig. 3.

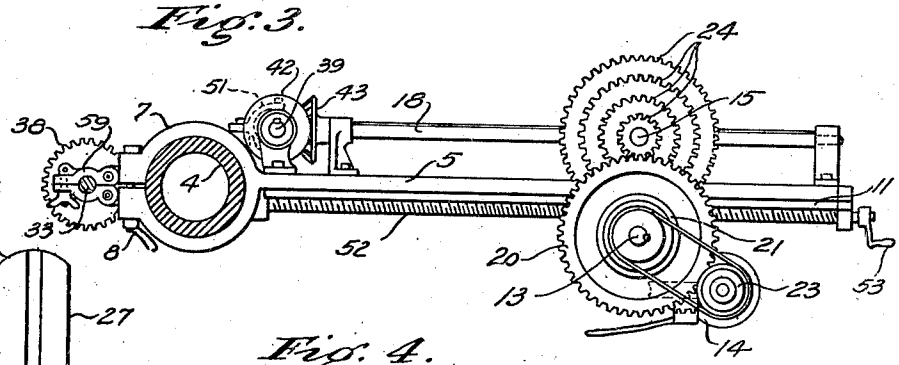


Fig. 4.

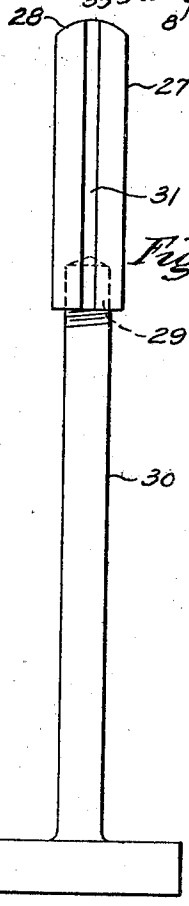
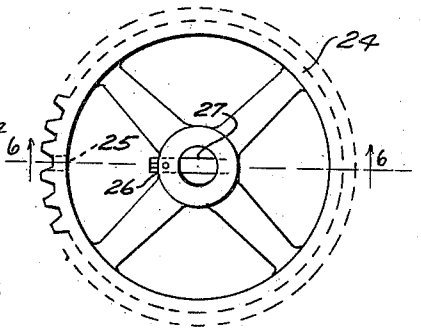


Fig. 7.

Fig. 5.



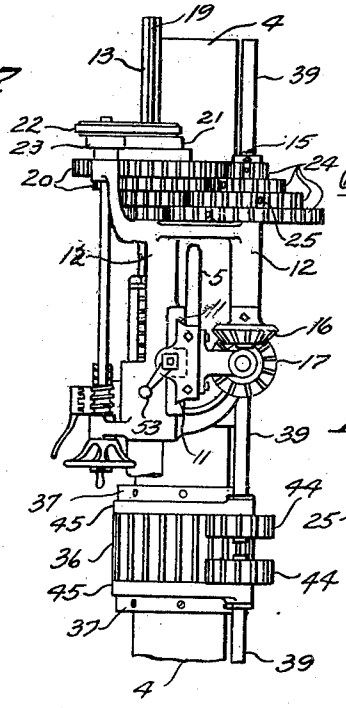
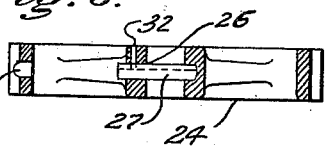


Fig. 6.



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No. 709,568. Patented Sept. 23, 1902.

A. VLK.

DRILL PRESS.

(Application filed Apr. 2, 1902.)

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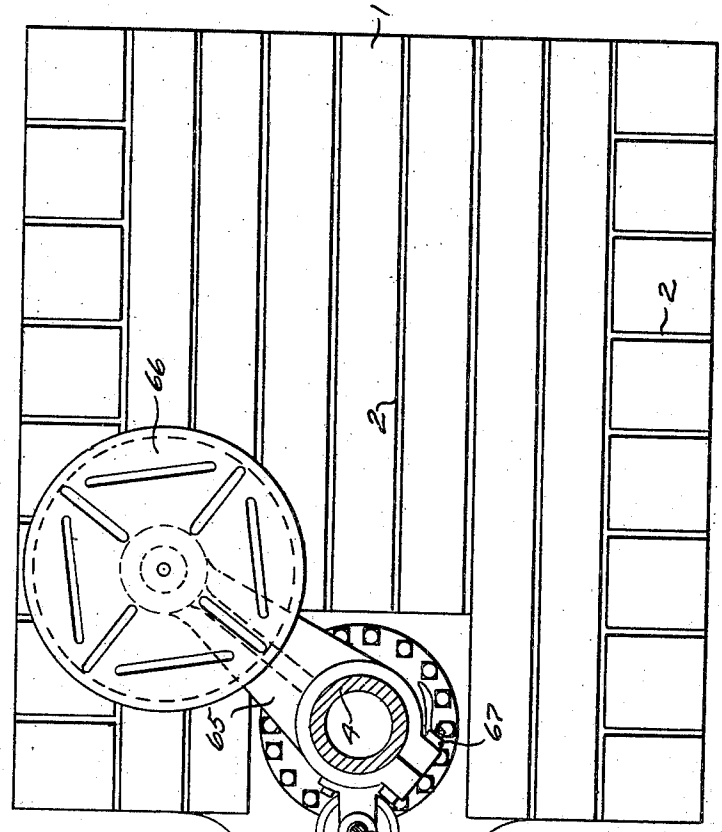


Fig. 12.

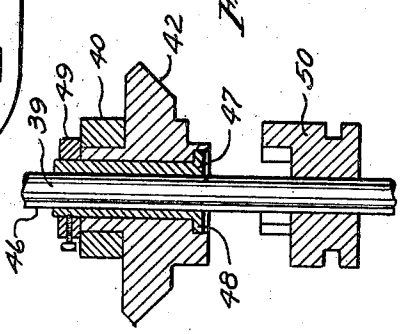


Fig. 13.

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UNITED STATES PATENT OFFICE.

ADOLPH VLK, OF CHICAGO, ILLINOIS.

DRILL-PRESS.

SPECIFICATION forming part of Letters Patent No. 709,568, dated September 23, 1902.

Application filed April 2, 1902. Serial No. 101,047. (No model.)

To all whom it may concern:

Be it known that I, ADOLPH VLK, a citizen of the United States of America, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Drill-Presses, of which the following is a specification.

The main object of my invention is to provide an improved form of drill-press wherein two sets of independent drilling mechanism are mounted upon the same axis and adapted to operate independently of each other upon the same bed-plate, to provide improved means for readily changing each of said mechanisms, so as to operate at a plurality of different speeds, and to provide improved means for changing the elevation of said drilling mechanisms above said bed-plate. I accomplish these objects by the device shown in the accompanying drawings, in which—

Figure 1 is a front elevation of a drill-press constructed according to my invention. Fig. 2 is a rear elevation of one of the arms of same, together with its adjacent mechanism. Fig. 3 is a top plan of the mechanism shown in Fig. 2, partly broken away. Fig. 4 is an end elevation of the mechanism shown in Fig. 2. Fig. 5 is a plan of a gear, showing means for temporarily securing same to its shaft. Fig. 6 is a section along the line 6 6 of Fig. 5. Fig. 7 is a plan of the locking-pin shown in connection with the gear in Fig. 5, together with the tool for inserting and removing same. Fig. 8 is an end elevation of the locking-pin shown in Fig. 7. Fig. 9 is a plan of one of the clamps which are used for connecting the arms with their lifting mechanism. Figs. 10 and 11 are elevations of the same. Fig. 12 is a section on the line 12′ 12′ of Fig. 1. Fig. 13 is a longitudinal section of the bevel-gear and coacting clutch which control the operation of the drilling mechanism of one of the arms.

The construction shown consists of a bed-plate 1, provided with clamping-slots 2, as is usual in devices of this class, and having rigidly secured thereto a vertical cylindrical post 4. The post 4 is accurately turned and has fitted thereon a pair of crane-arms 5. These arms are each provided with a hub 7, which encircles the post 4 and is split and provided with clamps whereby the hub 7 may be caused to grip the post 4 and secure the arm against movement. A collar 9, fitting the post 4, is located below each of the crane-arms and provided with a clamp 10, similar to the clamps 8, whereby said collar may be secured to the post 4 and secure the crane-arm against movement longitudinally of the post 4, when the clamps 8 are released to permit free angular movement of said arm about said post. One face of each crane-arm is provided with horizontal guides 11, upon which is mounted a cross-head 12, which carries a system of drilling mechanism. Mounted within the cross-head 12, so as to be revoluble and vertically slidable therein, is a drill-shaft 13, which is fitted with feeding mechanism 14, such as is common in devices of this class. Also journaled in the cross-head 12 in parallel relation to the drill-shaft 13 is a second shaft 15, which connects, by means of the bevel-gears 16 and 17, with the horizontal shaft 18, which is journaled on the rear side of the crane-arm 5. The shaft 13 connects, by means of a feather 19, to the gears 20, of which four are shown, varying in size. Also mounted on the shaft 13 is a cone 21, which connects, by means of the belt 22, with the cone 23, which drives the vertical feed of the drilling mechanism. The gears 20 and the cone 21 are secured to each other and provided with keyways engaging the feather 19 in such manner as to permit the free vertical movement of the shaft 13.

Meshing with the gears 20 is a corresponding series of gears 24, which are loosely mounted upon the shaft 15 and independent of each other. Each of the gears 24 is provided with an aperture 25, entering its periphery in a radial direction and communicating with a corresponding aperture 26 in its hub. The shaft 15 is bored to correspond with the apertures in each of the gears 24. A pin 27 is provided for the purpose of keying one of the gears 24 to the shaft 15. The end 28 of the pin 27 is rounded or tapered, as shown, and the end 29 is provided with a screw-threaded socket, to which a tool 30 may be secured for the purpose of inserting the pin 27 into the aperture 26. The pin 27 is further provided with a longitudinal slot 31, which is adapted to engage a pin or shoulder 32, projecting from one side of the aperture

26, and prevent said pin from turning while the tool 30 is being inserted or removed from the threaded socket in said pin. Only one pin 27 is provided, so that only one of the gears 24 will be secured to the shaft 15 at one time.

At one side of and parallel with the post 4 is journaled a screw-threaded shaft 33, which connects by means of bevel-gears to the shaft 34, which receives power from a belt engaging the cone 35. An annular gear 36 is loosely mounted on the post 4 at a point midway of the length of said post, being confined in such position by the collars 37. The gear 36 meshes with a gear 38, which is keyed to the shaft 33.

A vertical shaft 39 is journaled at 40 and 41 to each of the crane-arms 5 and connects, by means of the bevel-gears 42 and 43, with the horizontal shaft 18. Each of the shafts 39 carries at its extremity a gear 44, meshing with the annular gear 36. The gears 44 are prevented from springing away from the gears 36 by means of the collars 45, which ride loosely upon the post 4. Each of the shafts 39 is provided with a feather 46, extending throughout its entire length, suitable bushings being provided in the bearings 40 and 41. A detailed sectional view of the bearing 40 will be seen in Fig. 13, from which it will be seen that the bevel-gear 42 is loosely mounted within the bearing 40 and upon the bushing 47. The bushing 47 fits the shaft 39 and the feather 46, revolving with the shaft 39, but permitting the longitudinal movement of said shaft. The bushing 47 is secured against longitudinal movement with respect to the bearing 40 by means of the shoulder 48 and a collar 49. A clutch member 50 is mounted on the shaft 39, revoluble therewith and adapted to be thrown into or out of engagement with the adjacent face of the bevel-gear 42. The forked bell-crank lever 51 controls the position of the clutch member 50.

The screw 52 is journaled horizontally on the crane-arm 5 and engages the cross-head 12, so that turning the crank 53 will cause the cross-head 12 to move horizontally along the crane-arm 5. The shaft 18 is provided with a feather 54, to which the bevel-gear 17 is splined. The bevel-gear 17 is confined against longitudinal movement with respect to its bearing 55 on the cross-head 12 by means of the sleeve 56.

Each of the crane-arms 5 is provided with a groove 57, in which is seated a segment of a collar 58, which is provided with hinged clamp-jaws 59, suitably threaded and adapted to fit the threaded shaft 33. The jaws 59 are pivoted to the segment 58 by means of the bolt 60. Each of the clamp-jaws 59 is provided with a slotted flange 61, adapted to receive a bolt 62, which is pivoted at 63 to one of the jaws 59 and which is provided with a thumb-nut 64, adapted to engage the other of the jaws 59 and draw said jaws together.

An arm 65 is mounted on the post 4 and carries at its extremity the table 66, above which one of the drilling mechanisms may operate when the other drilling mechanism is operating upon a piece of work covering the greater part of the bed-plate 1. The arm 65 is revoluble about the post 4 and provided with a clamp 67 for securing same in any desired position. The drill-shaft 13 of the upper set of drilling mechanisms is provided with a suitable extension 68.

The operation of the device shown is as follows: Power is supplied at the cones 35 and communicated therefrom by the shafts 34, 33, 39, and 18 and the connected gearing to the drilling mechanism. When it is desired to raise or lower one of the crane-arms 5, the jaws 59 of the corresponding clamp are clasped around the shaft 33 and tightly drawn together by means of the thumb-nut 64. The clamps 8 are loosened and power is applied to the shaft 33. Revolution of the shaft 33 in one direction will raise the crane-arm 5, while an opposite rotation will lower it. When the arm has been moved to the desired position, rotation of the shaft 33 is stopped, and the sleeve 9 may be moved into contact with the bottom of the arm 5 and clamped in such position. It will be seen that the arm 5 may be turned around the post 4, while the clamp-jaws 59 are engaging the shaft 33, since the segment 58 is freely movable within the groove 57. After the arm 5 has been brought to its desired position, the clamp-jaws 59 are released from the shaft 33, so that said shaft may be freely revolved without affecting the elevation of the crane-arm 5. The clamp-jaws 59 are only in engagement with the shaft 33 when said shaft is being used to raise or lower one of the crane-arms. When it is desired to operate the drilling mechanism on one of the arms 5, the corresponding clutch 50 is thrown into its engaged position, when power applied at the cone 35 will be transmitted by means of the shafts 34 33 39, &c., to the drilling mechanism. Since the gears 44 and the shafts 39 are independent of each other, the mechanism on either crane-arm may be operated entirely independently of that on the other. It is assumed that one of the gears 24 is keyed to the shaft 15. Four steps are shown on the cone 35, thus admitting of four different speeds of revolution for the shaft 34, and four sets of gears are shown upon the shafts 13 and 15, admitting of four changes of speed of the drilling mechanism for each different speed of the shaft 34, together making sixteen possible changes of speed. To change the speed of the shaft 13, the key 27 is removed from the gear 24 which corresponds to the previous speed and inserted in the gear 24 which corresponds to the desired speed. Relative changes in speed of the drilling mechanism and its vertical feed are effected by shifting the belt 22 along the cones 21 and 23. To remove the pin 27 from one of the gears 24, the tool 30 is inserted in the aperture 25 and

screwed into the socket at 29 of the pin 27. The shoulder 32, engaging the groove 31, will prevent rotation of the pin 27 while said tool is being inserted. The pin 27 may now be readily withdrawn and inserted into one of the other gears 24.

The table 66 is useful when only one of the drills is operating upon a piece of work secured to the bed-plate 1, in which case a second piece of work may be secured to the table 66 and operated upon by the other drill.

It will be seen that the shaft 33 serves both for the purpose of driving the drilling mechanism and for the purpose of changing the elevation of the crane-arm 5. Reversing mechanism for the belt which drives the cone 35 is not shown in the drawings and may be of any ordinary form.

It will be seen that numerous details of the construction shown may be altered without departing from the spirit of my invention. I therefore do not confine myself to such details, except as hereinafter limited in the claims.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a drill-press, the combination of a bed-plate; a vertical post rigidly secured to said bed-plate; a pair of arms independently journaled on said post, and independently slidable longitudinally of same; drilling mechanism mounted on each of said arms; and means for operating said drilling mechanisms independently of each other and of the relative angular or longitudinal position of said arms.

2. In a drill-press, the combination of a bed-plate; a vertical post rigidly secured to said bed-plate; a pair of arms independently journaled on said post and independently slidable longitudinally of same; drilling mechanism mounted on each of said arms; a screw-threaded shaft journaled in said frame in parallel relation to said post; each of said arms having secured to same a suitable clamp, adapted to be thrown into or out of engagement with the thread on said shaft and adapted when in engagement with said thread, to move said arm longitudinally of said post, through the revolution of said shaft; suitable means for securing said arms against movement longitudinally of said post; and means for operating said drilling mechanisms independently of each other or of the relative angular or longitudinal position of said arms.

3. In a drill-press, the combination of a bed-plate; a vertical post rigidly secured to said bed-plate; a pair of arms independently journaled on said post and independently slidable longitudinally of same; drilling mechanism mounted on each of said arms; a gear journaled on said post between said arms; a driven shaft journaled on each of said arms and in parallel relation to said post; a pinion secured to each of said driven shafts and meshing with said gear; suitable mechanism connecting each of said driven shafts to the drilling mechanism on its respective arm; and means for transmitting power to said gear.

4. A drill-press comprising a frame; a vertical post rigidly secured to said frame; an arm journaled on said post and slidable longitudinally of same; drilling mechanism mounted on said arm; a screw-threaded shaft journaled in said frame and disposed in parallel relation with said post; means for rotating said shaft; suitable gearing connecting said shaft with said drilling mechanism whereby said drilling mechanism may be driven by said shaft regardless of the position of said arm along said post; a clutch for disconnecting said shaft from said drilling mechanism; a suitable clamp secured to said arm and adapted to be thrown into or out of engagement with the thread on said shaft, and adapted, when in engagement with said thread, to move said arm longitudinally of said post, through the revolution of said shaft; and suitable means for securing said arm against movement longitudinally of said post.

5. A drill-press comprising a frame; a vertical post rigidly secured to said frame; an arm journaled on said post and slidable longitudinally of same; a screw-threaded shaft journaled in said frame and disposed in parallel relation with said post; means for rotating said shaft; a suitable clamp secured to said arm, adapted to be thrown into and out of engagement with the thread on said shaft, and adapted, when in engagement with said thread, to move said arm longitudinally of said post, through the revolution of said shaft; suitable means for securing said arm longitudinally of said post; a gear secured to said threaded shaft; a gear journaled on said post and meshing with the gear on said shaft; a driven shaft, journaled to said arm on a vertical axis, having mounted thereon and revoluble therewith a pinion meshing with the gear on said post, said pinion being secured against movement longitudinally of said post; drilling mechanism mounted on said arm; and suitable gearing connecting said drilling mechanism with said driven shaft.

6. A drill-press comprising a frame; a vertical post rigidly secured to said frame; an arm journaled on said post and slidable longitudinally of same; drilling mechanism mounted on said arm; a screw-threaded shaft journaled in said frame and disposed in parallel relation with said post; means for rotating said shaft; suitable gearing connecting said shaft with said drilling mechanism whereby said drilling mechanism may be driven by said shaft regardless of the position of said arm along said post; a clutch for disconnecting said shaft from said drilling mechanism; a member slidably mounted on said post and adapted to engage said arm; a suitable clamp secured to said member and adapted to be thrown into or out of engagement with the thread on said shaft and adapted, when in engagement with said thread, to move said member and cause same to carry said arm

longitudinally of said post; and means for securing said arm independently of said member.

7. In a drill-press, the combination of a bed-plate; a vertical post rigidly secured to said bed-plate; a pair of arms independently journaled on said post and independently slidable longitudinally of same; drilling mechanism mounted on each of said arms; a gear journaled on said post between said arms; a driven shaft journaled on each of said arms and in parallel relation to said post; a pinion secured to each of said driven shafts and meshing with said gear; said pinions being of less width than said gear and being adapted to pass each other while in mesh with said gear; suitable mechanism connecting each of said driven shafts to the drilling mechanism on its respective arm; and means for transmitting power to said gear.

8. In a drill-press, the combination of a frame; a vertical post secured to said frame; a screw-threaded shaft journaled in said frame in parallel relation to said post; an arm having a hub journaled on said post and slidable longitudinally of same, said hub having therein an annular groove extending around said post; a segment loosely seated in said groove; a pair of screw-threaded clamp-jaws secured to said segment, adapted to be thrown into or out of engagement with said shaft and adapted to move said arm along said post through the revolution of said shaft.

Signed at Chicago this 28th day of March, 1902.

ADOLPH VLK.

Witnesses:
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