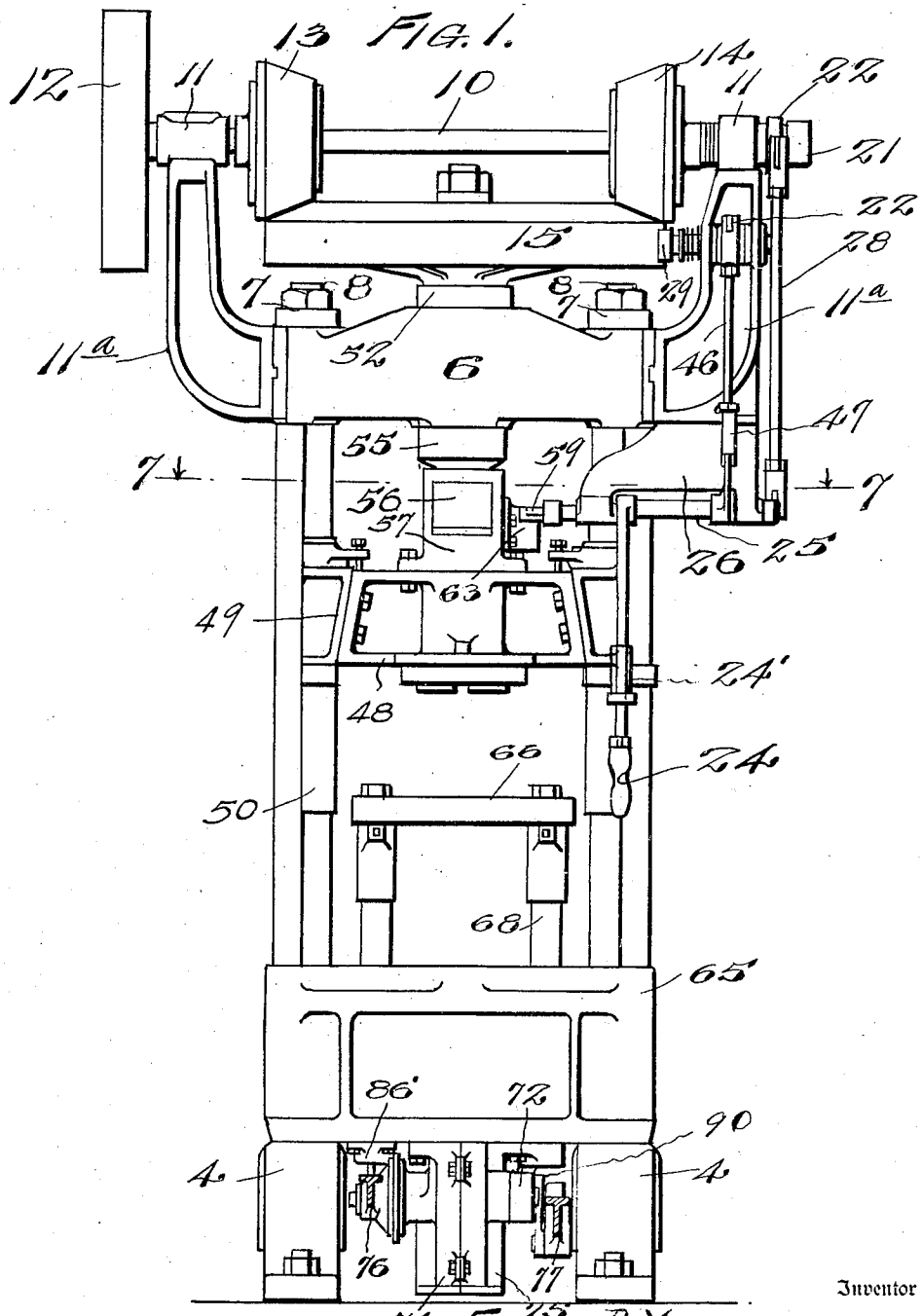
May 13, 1930. F. B. YINGLING 1,758,772

FRICTION TILE PRESS

Filed Aug. 1, 1927 6 Sheets-Sheet 1

FIG. 1.



Inventor

FRANK B. YINGLING

By

Fenelon B. Brock

Attorney

May 13, 1930. F. B. YINGLING 1,758,772

FRICTION TILE PRESS

Filed Aug. 1, 1927 6 Sheets-Sheet 2

FIG. 2.

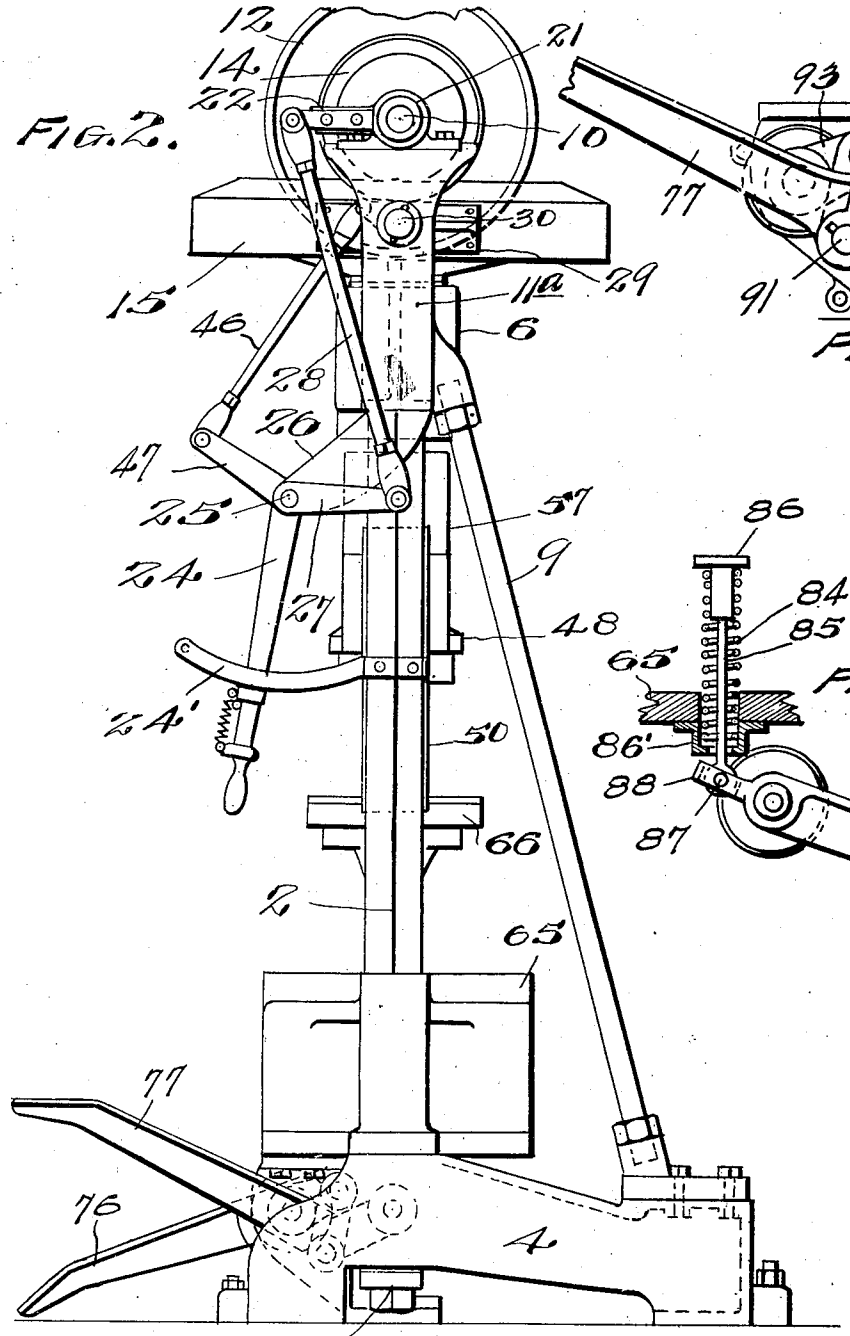


FIG. 3.

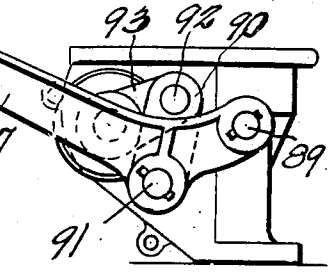


FIG. 4.

Inventor

FRANK B. YINGLING

By

Henelon B. Brocke

Attorney

May 13, 1930. F. B. YINGLING 1,758,772

FRICTION TILE PRESS

Filed Aug. 1, 1927 6 Sheets-Sheet 3

FIG. 6.

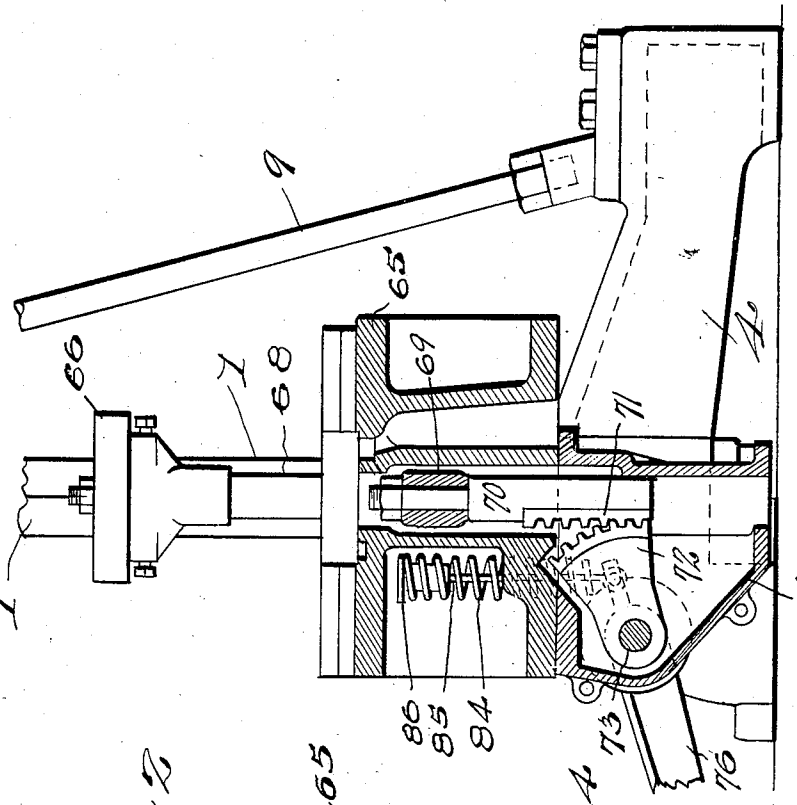
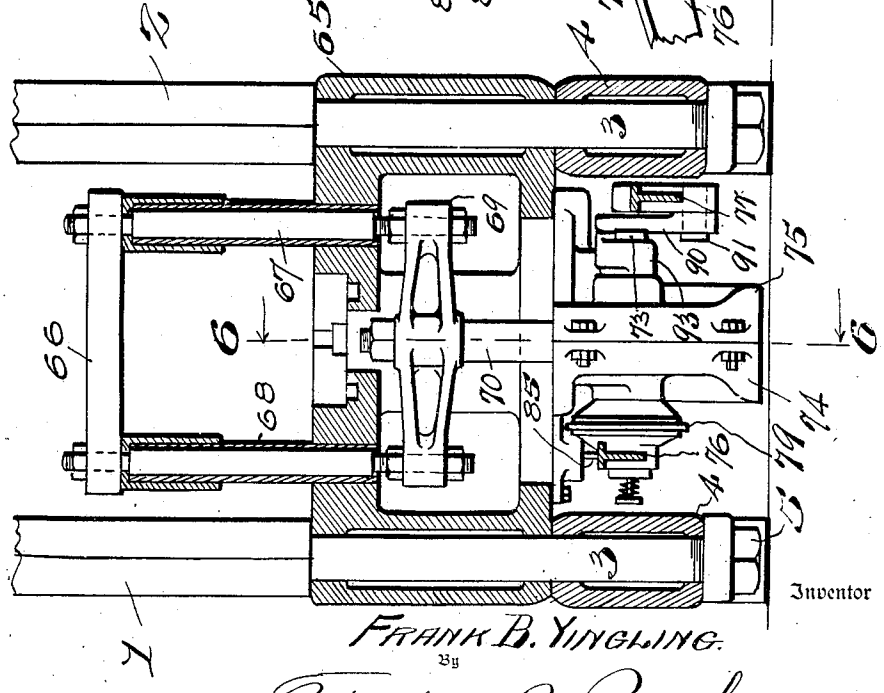


FIG. 5.



Inventor

FRANK B. YINGLING.

By

Henelon B. Brock

Attorney

May 13, 1930. F. B. YINGLING 1,758,772

FRICTION TILE PRESS

Filed Aug. 1, 1927 6 Sheets-Sheet 4

FIG. 7.

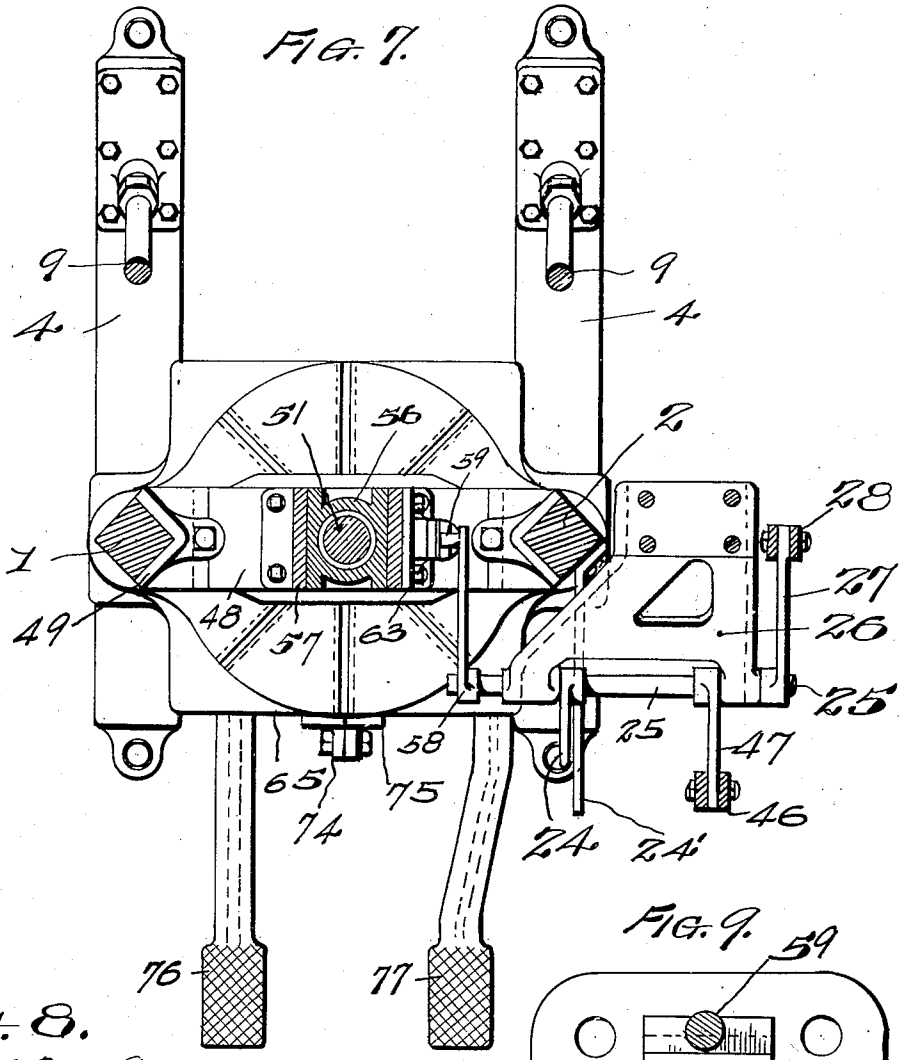


FIG. 8.

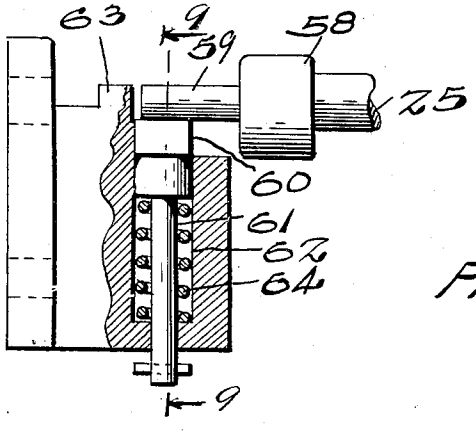
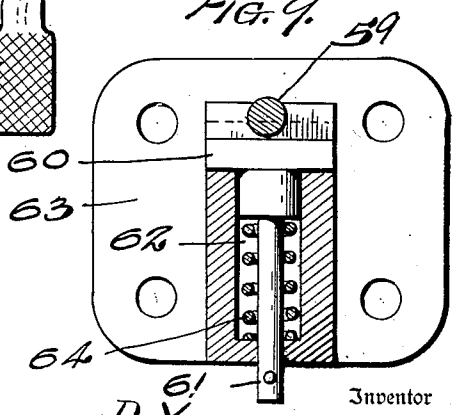


FIG. 9.



Inventor

FRANK B. YINGLING

By

Clenelow B. Brock

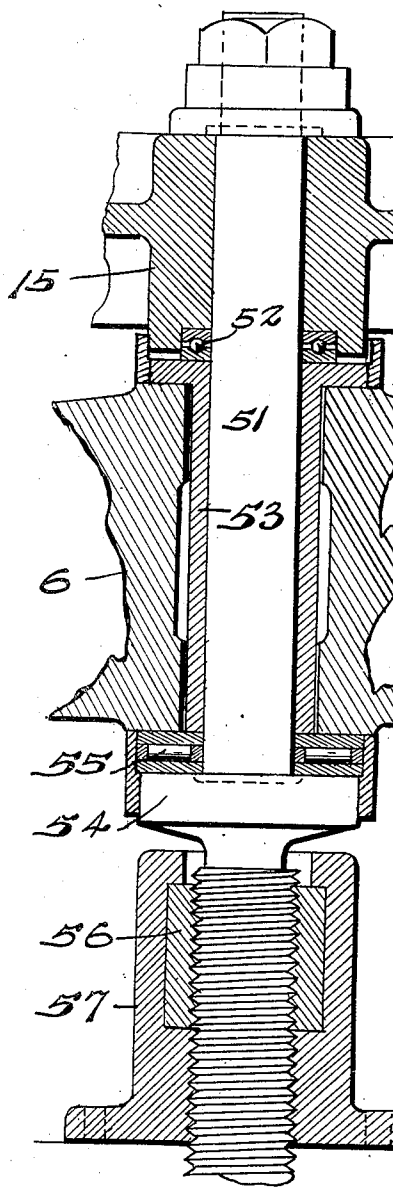
Attorney

May 13, 1930. F. B. YINGLING 1,758,772

FRICTION TILE PRESS

Filed Aug. 1, 1927 6 Sheets-Sheet 5

FIG. 10.



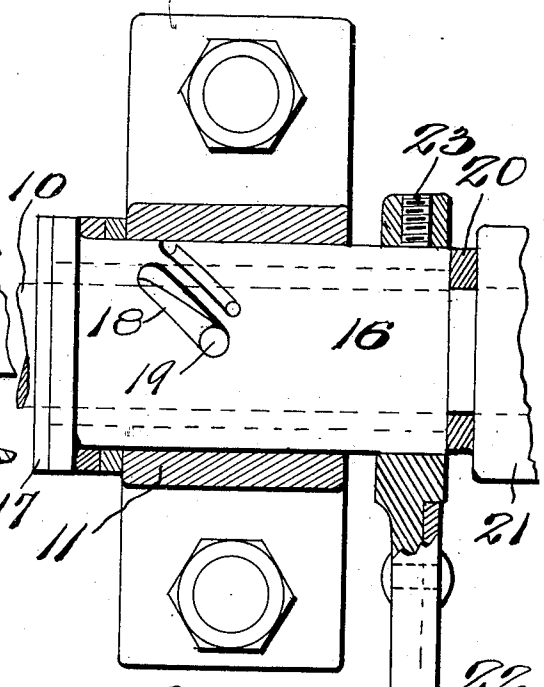
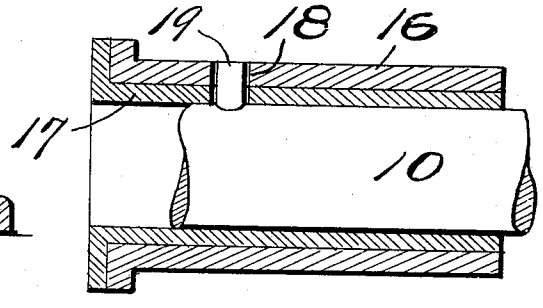


FIG. 11.

FIG. 12.



FRANK B. YINGLING. Inventor

By Henelon B. Brock

Attorney

May 13, 1930. F. B. YINGLING 1,758,772

FRICTION TILE PRESS

Filed Aug. 1, 1927 6 Sheets-Sheet 6

FIG. 13.

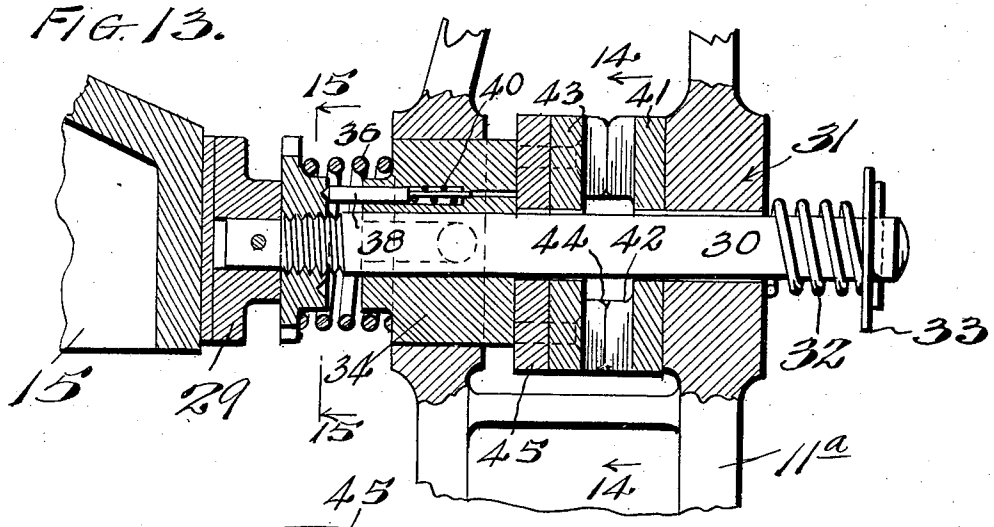


FIG. 14.

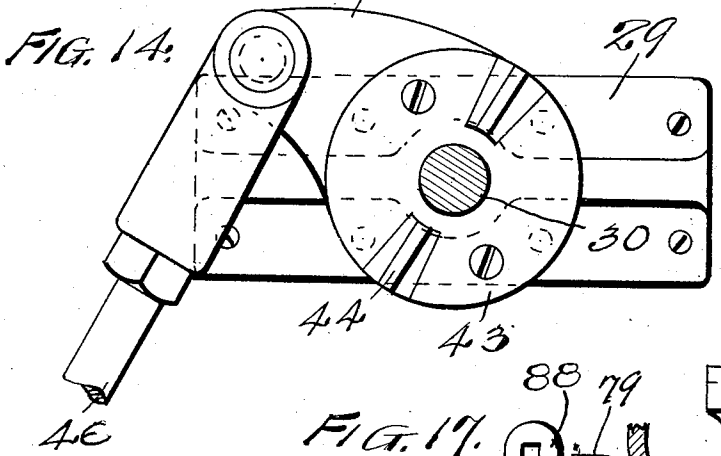


FIG. 15.

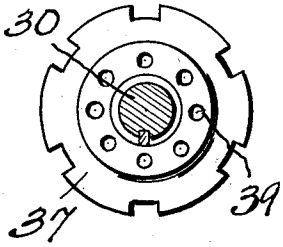


FIG. 17.

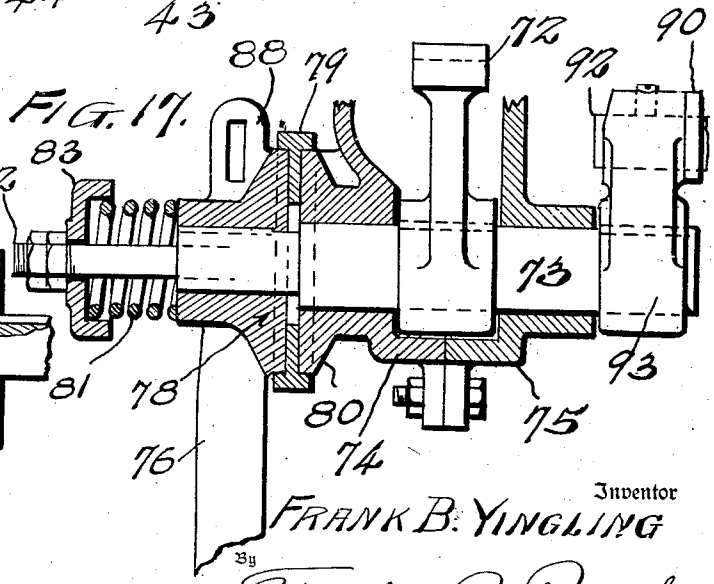
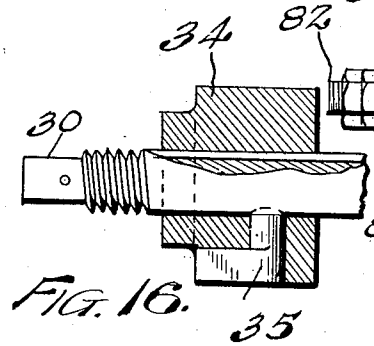


FIG. 16.



Inventor

FRANK B. YINGLING

By

Clenelon B. Brock

Attorney

Patented May 13, 1930 1,758,772

UNITED STATES PATENT OFFICE

FRANK B. YINGLING, OF HAMILTON, OHIO, ASSIGNOR TO THE CERAMIC MACHINERY COMPANY, OF HAMILTON, OHIO

FRICTION TILE PRESS

Application filed August 1, 1927. Serial No. 209,837.

While the press of my invention is adapted for various uses, it is particularly designed for the production of tile or other ceramic articles and is especially applied to the manufacture of tile of special shape for ornamental use as in trim. The press of my invention involves the use of a power operated vertically reciprocal plunger, and a lower die with pedal operating mechanism for raising and lowering said lower die. Manually operated means are provided for controlling the reciprocal movement of the plunger and means automatically operated by the upwardly moving plunger are employed for applying a brake to the friction driven member, and for holding the latter while the plunger is in its top most position, after the friction drive members have been disconnected from the driven member, either by automatic action or by manually operated means.

In the manufacture of especially shaped tile for ornamental work or trim, dies of greater depth are required than for the usual flat ware, and this required variation in the periphery of the upper die or plunger, is accomplished with facility by the use of the bevel friction drive mechanism of my improved press. A greater range of travel is also required for the die ring of the lower plunger to compensate for the deeper fill in the manufacture of special shapes compared with the manufacture of the usual flat tile, and this movement is accomplished by the use of the pedal operated mechanism of my invention.

The tile of special shape are most efficiently produced by means of a pushing or squeezing action of the upper die rather than by an impact or blow from the plunger upon the dust in the mold, and this action of the press is secured by the bevel friction drive with a uniform speed of travel.

In the manufacture of shape tile unusual care and attention on the part of the operator are required in handling the pressed tile as they are lifted and removed from the mold or lower die, and for this reason it is desirable and practically essential that the knockout be controlled by foot pedals. Thus in the press of my invention, one pedal is employed to control the operating mechanism for raising or elevating the lower die ring, and another pedal is used for the purpose of lowering the elevated die ring. As the power operated upper plunger is controlled by one hand of the operator while the pressed tile are being extracted from the lower die under control from one foot pedal, the other hand of the operator is thus left free to take care of the finished article.

In making up what are known as shape or special tile, it is necessary that the excess dust be cut out of the die and a smooth even surface of dust be presented to the descending plunger in order that the latter may impose a uniform pressure over the entire dust area. The long upward travel of the plunger carries the latter out of the way of the operator and provides ample space in which he may work in thus making up the tile in preparation for the working or down stroke of the upper plunger. The working parts that control the die ring or lower plunger of the press are entirely enclosed to make them dust proof, and thus these parts are protected from unnecessary wear and tear.

In the accompanying drawings, I have illustrated one complete example of the physical embodiment of my invention wherein the parts are combined and arranged according to the best mode I have so far devised for the practical application of the principles of my invention. It will be understood, however, that changes and alterations may be made in the exemplified structure, within the scope of my claims, without departing from the principles of my invention.

Figure 1 is a front elevation of a ceramic press involving the construction of my invention, showing the upper die or plunger in uppermost position at the end of its idle stroke, and with the brake applied;

Fig. 2 is a view in side elevation showing the manual operating lever in neutral or midway position while the plunger is in its uppermost position as in Fig. 1;

Fig. 3 is a detail side view of the pedal mechanism for lowering the lower die;

Fig. 4 is a detail view in side elevation show-

ing the mechanism for raising the lower die, parts being shown in section;

Fig. 5 is a vertical sectional detail view at the base of the press showing the lower die in elevated position;

Fig. 6 is a vertical sectional view at line 6—6 of Fig. 5;

Fig. 7 is an enlarged horizontal sectional detail view at line 7—7 of Fig. 1;

Fig. 8 is a detail view of the automatic trip device which is operative at the end of the upper stroke of the plunger to disconnect the drive mechanism and apply the brake to the friction drive mechanism;

Fig. 9 is a sectional detail view at line 9—9 of Fig. 8;

Fig. 10 is a view showing the operating screw and connections of the press;

Fig. 11 is a detail sectional view of the means for longitudinally shifting the drive shaft;

Fig. 12 is a detail view showing the relation of the shifting sleeve and drive shaft;

Fig. 13 is a detail sectional view of the brake device for the driven disk of the drive mechanism;

Fig. 14 is a detail view as seen at line 14—14 of Fig. 13;

Fig. 15 is a detail view as seen at line 15—15 of Fig. 13;

Fig. 16 is a sectional detail view showing the means for keying the brake sleeve to the brake shaft; and

Fig. 17 is a detail view of the pedal operated throwout shaft with its brake device in section.

In carrying out my invention, I utilize in the construction of the press a pair of posts 1 and 2 which are rectangular in cross section, and provided with low threaded ends 3 that are inserted through openings in the two base members 4, and nuts 5 are employed for securing the post in the base members as indicated in Fig. 5. The base members are spaced apart the required distance and they are of sufficient length to form a firm foundation or support for the machine, and at their upper ends these posts are joined by a head piece 6 and nuts 7 are employed on the threaded ends 8 of the posts, which threaded ends are passed through bolt openings in the head piece 6.

At the rear of the machine, a pair of spaced diagonally arranged brace bars 9 are used to connect the head piece and the base members, and these parts form a rigid supporting structure for the operating parts of the press.

At the upper or top portion of the press, a transversely arranged drive shaft 10 is journaled in bearings 11 at the upper ends of the bearing supports or arms 11^a, which arms are supported at the ends of the head piece 6. Power is applied to the shaft 10 through a pulley 12, and the shaft is provided with spaced beveled drive disks 13 and 14 for coaction with the horizontally disposed driven disk 15. The drive disks 13 and 14 are designed for alternate driving contact with the driven disk 15 for imparting the downward or working stroke and the upward or idle stroke of the plunger or upper die of the press. The drive mechanism is controlled by either or both manually operated means, and automatically operated means, and mechanism is employed on the shaft 10 for shifting the shaft 10 longitudinally in its bearings to engage one or the other of the drive disks with the driven disks. In Figs. 11 and 12, the details of construction of the mechanism for shifting a drive shaft are disclosed. A shifting sleeve 16 having a lining 17 is supported in one of the bearings 11 and encloses a portion of the shaft 10. The sleeve is provided with a slot 18 arranged tangentially of its periphery, and this slot coacts with a pin 19 fixed to and radially projecting from the drive shaft 10. In Fig. 11, it will be apparent that when the sleeve 16 is turned anticlockwise, the pin 19 will be caused to ride through the slot 18, and consequently the shaft 10 will be shifted to the left. Then a reverse movement of the sleeve will cause the shaft to be shifted to the right. At the end of the sleeve a thrust collar 20 is located on the shaft, and an end collar 21 is also fixed on the shaft to limit the movement of the sleeve 16. The sleeve is given a partial revolution or turn through the action of a lever 22 fixed on the sleeve by means of set screw 23, and this lever is turned through the action of the manual control lever 24 which is retained in position by its bracket 24′ as seen in Fig. 2. This operating lever 24 is pivoted on the operating shaft 25, which shaft is supported in bearings fashioned on the bracket 26 that is supported from the head 6. A lever arm 27 is secured on the operating shaft 25 and a pivoted link 28 connects this lever arm 27 with the lever arm 22 on the shifting sleeve 16. Thus it will be apparent that when the lever 24 in Fig. 2 is moved to the right or left, the driving shaft will be shifted to frictionally engage one or the other of the drive disks with the beveled driven disk, and the machine is thus manually controlled.

In the midway or neutral position of the lever 24 in Fig. 2, a brake shoe 29 is applied to the driven friction member, and this brake is always applied at the end of the upward stroke of the plunger. The brake 29 is carried at the end of the brake shaft 30, as best seen in Fig. 13, and this shaft 30 is supported in bearings 31 of the supports 11^a of the press. A spring 32 coiled about one end of the shaft 30 and interposed between a washer 33 and one of the bearings 31, is designed to urge the brake shoe 29 out of contact with the driven disk 15, and means are provided for positively shifting the shaft 30 to the left in Fig. 13 to apply the brake as illustrated. A brake sleeve 34 is locked to the shaft by an

angular key 35, see Fig. 16, and this sleeve moves longitudinally with the shaft 30 in the operation of the brake mechanism. A tension spring 36 is interposed between the sleeve 34 and a screw collar 37 that is threaded on one end of the brake shaft 30. The tension of the spring may be varied by turning the screw collar, and the screw collar is then locked in adjusted position by means of a spring bolt or spring pressed plunger 38 carried in a socket of the sleeve 34. The pointed free end of the spring bolt is adapted to engage one of a series of depressions 39 in the face of the screw collar 37, and a spring 40 at the rear of the bolt 38 holds the bolt in engagement with one of these depressions. The brake sleeve 34 and the brake shaft 30 are shifted through the operation of a brake cam disk 41 which is stationary with relation to the shaft 30 and provided with a cam or cams 42. A cam disk 43 on the shaft is provided with cams 44 complementary to the cams 42, and this cam disk is fashioned with a rigid cam lever 45 to which is pivoted a cam rod 46. This cam rod extends to a cam lever 47 on the operating shaft 25, and of course when the operating lever 24 is manually moved to control the driving shaft, the brake shaft is also controlled through these operative connections. The driving shaft and the brake shaft in addition to being under manual control, are also automatically controlled as will be described.

The upper member of the mold, or the plunger, comprises a cross head 48 which has at its ends V-shaped gibs 49 that slidably engage the squared portions of the posts 1 and 2 of the press, and the vertical reciprocal movement of the plunger is thus guided, the posts being provided with the usual liners 50 to reduce friction and wear on the operating parts.

The vertical reciprocation of the plunger is attained through the use of a vertically arranged operating screw 51 which passes through the head piece 60 and the driven disk 15. Between the disk and the head piece 6, a ball bearing 52 is arranged, and a bearing bushing 53 is included within the head 6. Beneath the head piece 6 the operating screw is provided with a circular head 54, and between this head and the lower face of the head piece a roller bearing 55 is interposed to facilitate the smooth operation of the driven member 15 and the operating screw 51.

The operating screw of course is stationary, and it actuates the plunger through the instrumentality of an operating nut 56 which is carried in the cross head extension 57 that is bolted on the top face of the cross head 48.

The plunger carries the actuating device for the automatic control of the drive shaft and brake shaft, and the mechanism on the plunger coacts with a trip lever 58 secured on one end of the operating shaft 25. At the free end of this trip lever, a pin 59 is carried, and this pin coacts with a head 60 of a bolt 61 which is retained in a socket 62 in the bracket 63 which is bolted on the cross head extension 57. A spring 64 within the socket urges the bolt 61 into elevated position in Figs. 8 and 9, and this spring cushions the action of the bolt when it contacts with the finger 59 as the plunger reaches the end of its upstroke. As the head 60 contacts with the finger 59, it will be apparent that the lever 58 is turned to also turn the operating shaft, and from this operating shaft the connections are operated to control the driving shaft and the driven shaft as previously described. The pedal control mechanism for the lower die is located below the die 65 through which the lower bolt ends 3 of the posts 1 and 2 pass to the bases 4 of the press. The lower die ring 66 is supported on a pair of side bars 67 each having a dust guard as 68, and these bars reciprocate vertically with the lower die ring. The bars are guided in holes through the table top, as illustrated in Fig. 5, and at their lower ends they are connected by a cross head 69 within the hollow table 65. The die ring, the bars, and the cross head, thus form a rigid vertically reciprocable frame, and this frame is provided with a central rack bar 70 which is bolted to the cross head 69, and is fashioned with a rack plate 71 projecting downwardly from the table 65. This rigid frame and the lower die are adapted to be elevated and lowered in the operation of the parts, and a segmental rack plate 72 is provided for coaction with the rack 71 on the bar 70. The segmental rack plate 72 is fixed on a pedal shaft 73 which is enclosed in a housing located below the table, and comprising two sections 74 and 75. These sections are bolted together and attached at the underside of the table 65, and they enclose the working parts of the pedal mechanism.

The left pedal 76 is adapted to raise the die ring 66, and the right pedal 77 is designed for the purpose of lowering the die ring, and of course these pedals are operated alternately by the left foot and right foot respectively of the operator. The pedal 76 is provided with a friction device including a brake hub 78 which is keyed on the pedal shaft 73. A friction ring or brake ring 79 is located between the hub 78 and a circular brake head 80 on the section 74 of the housing, as best seen in Fig. 17. A brake spring 81 is located on the bolt 82 which forms a reduced extension of the shaft 73 and a retaining collar 83 is secured on the bolt. By means of the spring, the head 78 is held in frictional contact with the flanged brake ring 79, and the latter is forced into contact with the stationary head 80 of the housing 74. The spring 81 presses the head 78 against the brake ring 79 with

sufficient force to create the necessary friction that will give a retarding or braking effect to the turning of the shaft 73.

A tension spring 84 for the pedal 76 is provided, and is coiled about a bolt 85 which is fashioned with a head 86 and projects upwardly into the hollow table 65. The lower end of this spring is seated in a pocket 86′ secured at the under side of the bottom of the table 65. The bolt is pivoted at 87 in a slotted arm 88 which is integral with the pedal 76, and in Fig. 4, it will be apparent that the tendency of the spring is to lift the slotted arm 88 and thus lower the pedal 76.

The pedal 77 which is used to lower the die ring 66 is pivoted at 89 on the housing section 75 as best seen in Fig. 3, and this lever or pedal is connected by a link 90 which is pivoted to the pedal at 91 and also pivoted at 92 to the free end of a crank arm 93 which is secured on the pedal shaft 73. In Fig. 3, it will be seen that by depressing the pedal 77, the pedal shaft 73 will be rotated or turned sufficiently to cause the segmental rack in engagement with the rack bar, to lower the die ring.

In the operation of the press, with the plunger or upper die in topmost or uppermost position, the die table or lower plunger in elevated position, as shown in Figs. 1 and 2 of the drawings, the operating lever 24 is in neutral or midway position of its bracket 24′. The operator deposits the dust or material upon the die plate of the die ring 66 of the lower die, and ample space is provided between the upper and lower members of the press for this work. The operating lever 24 is shifted to the left in Fig. 2 to release the brake shoe 29 from the driven disk and to shift the drive shaft to cause frictional engagement between the drive disk 14 and the driven disk 15. The rotation of the driven disk causes the operating screw to turn within the traveling operating nut 56, causing the nut and its plunger to descend with a smooth and uniform squeezing or pushing movement for its working or compression stroke.

The dust having been compressed to the tile shape, the operator swings the lever 24 to the right in Fig. 2 to disengage frictional drive disk 14 from the driven disk 15 and to engage disk 13 with the disk 15 to reverse the action of the operating screw and thus lift the plunger to uppermost position. When the plunger reaches its uppermost position, it automatically trips the operating lever as described to shift the driving mechanism to neutral position and to apply the brake shoe 29 to the driven disk, thus retaining the plunger in uppermost position.

In controlling the press, the operator is required to use only one hand and of course only one foot at a time and the lifting and lowering of the die ring or lower plunger are controlled by the pedals as described. The control of the upper plunger is accomplished with one hand while one foot of the operator is being employed to cause extraction of the tile from the die, which of course leaves the other hand of the operator free to take care of the finished tile.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent is—

1. In a tile press the combination with a lower reciprocable die, of pedal operated means for elevating said die, a brake device for coaction with said pedal device, and a second pedal device for lowering said die.

2. In a tile press, the combination with a lower reciprocable die and its supporting frame including an upright rack bar, of a pedal shaft and a rack arm thereon, a pedal for operating the shaft, and a friction brake device coacting with said pedal.

3. The combination in a tile press with a lower reciprocable die including its side bars, cross head, and vertically arranged rack bar, of a pedal and pedal shaft, a rack lever on said shaft, and a spring pressed friction brake device cooperating with said pedal.

4. The combination in a tile press with a reciprocable lower die and its central rack bar, of a pedal shaft and a pedal therefor, a rack arm on the shaft, a second pedal, and linkage between said second pedal and the pedal shaft for reversing the movement of the die.

FRANK B. YINGLING.