

A. M. HANCE.  
 MULTIPLE PLUNGER CASE.  
 APPLICATION FILED JUNE 12, 1909.

960,903.

Patented June 7, 1910.

FIG. I.

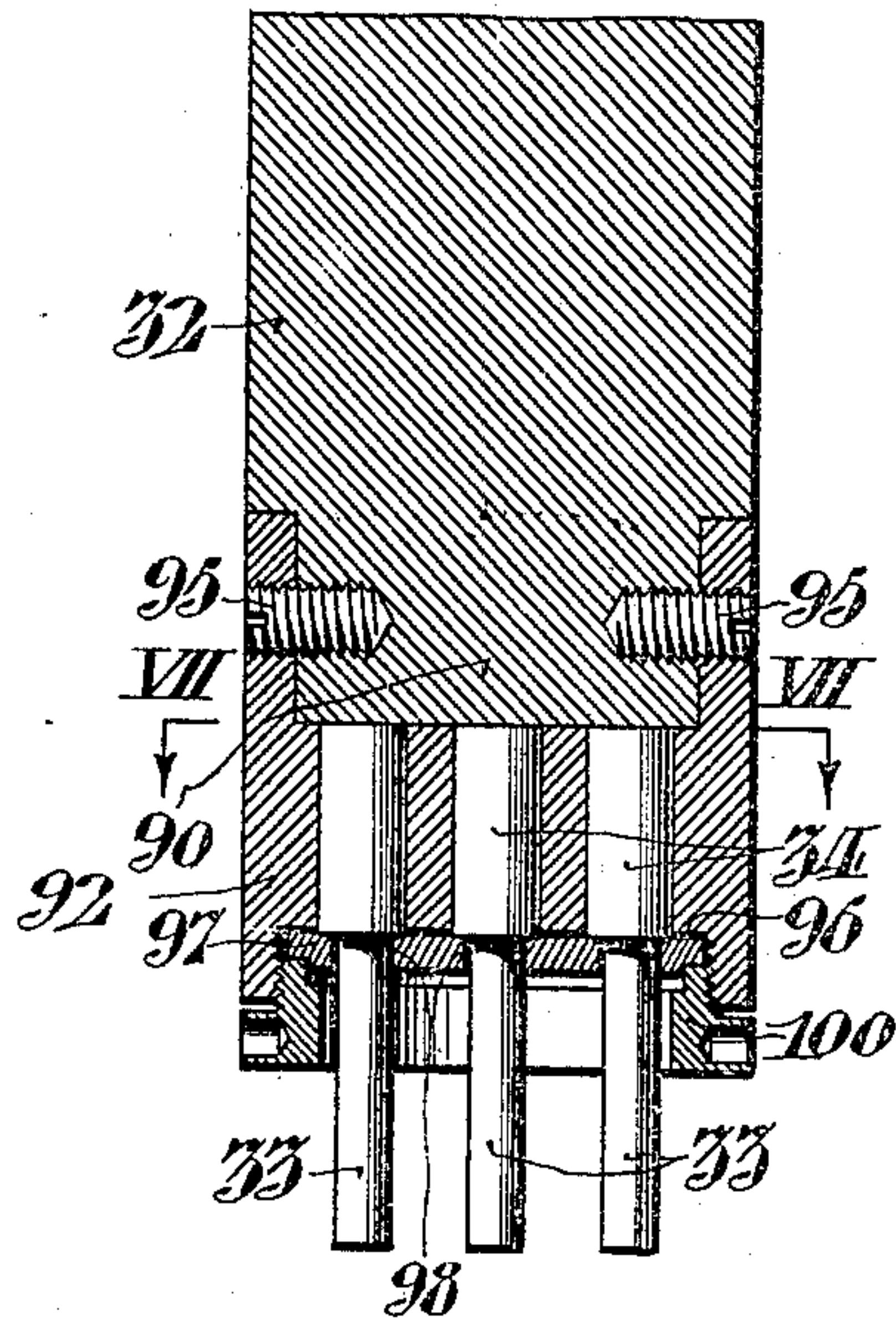


FIG. II.

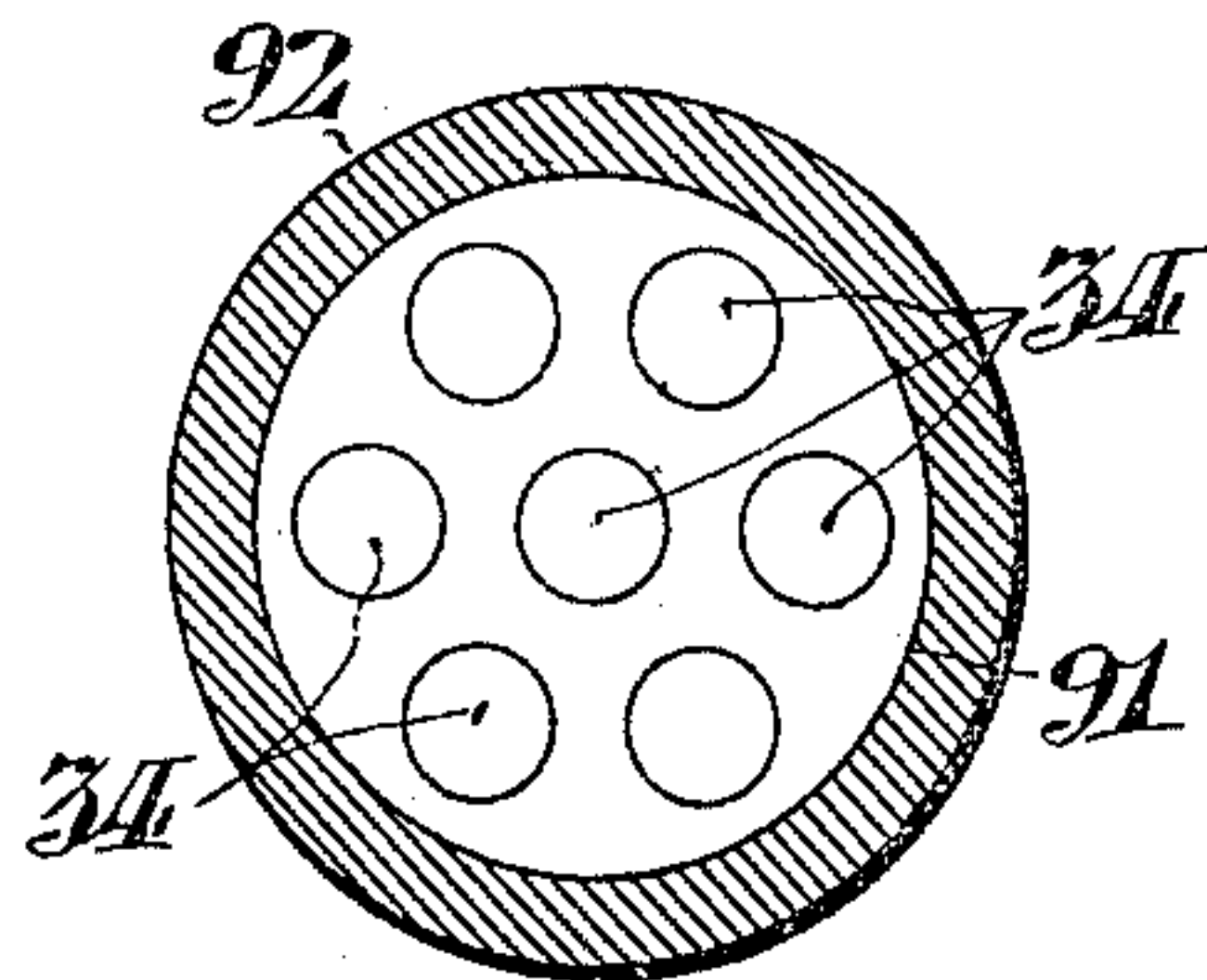
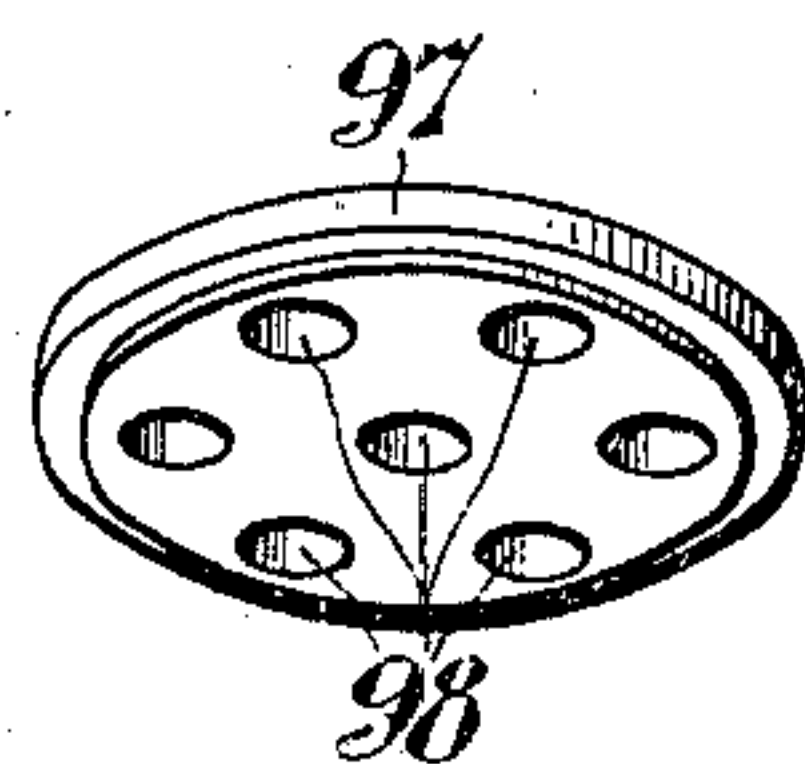


FIG. III.



WITNESSES:

John C. Bergner.  
 James H. Bell

INVENTOR:

Anthony M. Hance,  
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 May & Kauf



# UNITED STATES PATENT OFFICE.

ANTHONY M. HANCE, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO HANCE BROTHERS & WHITE, OF PHILADELPHIA, PENNSYLVANIA, A FIRM.

## MULTIPLE-PLUNGER CASE.

960,903.

Specification of Letters Patent.

Patented June 7, 1910.

Application filed June 12, 1909. Serial No. 501,712.

*To all whom it may concern:*

Be it known that I, ANTHONY M. HANCE, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Multiple-Plunger Cases, whereof the following is a specification, reference being had to the accompanying drawings.

My invention relates to multiple plunger cases, within which a plurality of plungers are immovably held, so that they may be simultaneously reciprocated to engage with a die. Such multiple plunger cases may conveniently be used in conjunction with machines for the compression of tablets or pills. I have employed them in conjunction with a tablet compression machine, for which I am filing an application for Letters Patent, simultaneously herewith, and to which reference is made for further understanding of the same, but it will be understood that my present invention is not thus limited in its use, but may be employed in other machines in which multiple plungers are simultaneously reciprocated.

In the employment of multiple plungers, it is of importance that all of the plungers be readily removable and replaceable individually, and yet that when in place they shall all be held with the utmost rigidity, since the slightest relative motion interferes with their proper alinement, and their engagement with the die in connection with which they cooperate. By proper boring of the cylindrical seats within which the cylindrical heads of the plungers are held, lateral movement of the individual plungers may be prevented, but endwise motion is more difficult to prevent, since the compression strains to which the plungers are subject are endwise strains, and constantly tend to loosen or wear away the means by which the plunger heads are removably secured within their seats in the plunger case. My present invention accomplishes these ends.

In the accompanying drawings, Figure I, is a vertical central section of a multiple plunger case embodying the first form of my invention. Fig. II, is a horizontal section of the same, along the line VII, VII, in Fig. I. Fig. III, is a detail perspective view of the retaining plate 97.

Referring to the drawings, the plunger case 32, terminates in a reduced portion 90,

which is received within an annular recess 91, of the seating piece 92. This seating piece is suitably bored out to accurately receive the enlarged heads 34, of the plungers 33. The seats thus formed in the seating piece for the heads of the plungers are slightly less in length than the heads, so that the shoulders of the plungers when they are properly seated, will project slightly beyond the face of the seating piece. The seating piece is secured to the reduced end of the plunger case by means of set screws 95. It is recessed at the end 96, and within the recess rests a multiple washer 97, through which all of the plungers pass, and which washer is forced against the heads of the plungers by means of a ring 100, which is threaded into the recess 96, and may be screwed by a spanner so as to exert any required degree of compression to force the washer 97, against the slightly projecting shoulders of the enlarged heads of the plungers. This washer 97, is preferably made of soft metal, such as copper or lead. Its apertures correspond in number and position to the plungers, but are slightly larger than their diameters. By means of this soft metal washer 97, any slight variation in the projection of the heads of the plungers from their seat in the seating piece is compensated for, so that their upper ends are forced firmly within their seats, and immovably retained there. The importance of this arrangement will be appreciated if it is understood that any slight difference in length, or any looseness of the plungers, will cause variation in the quantity of material contained in the finished tablets. This must not occur, and it is accordingly extremely important that all of the plungers be held firmly in place in their seats, which by the arrangement which I have described, is effectively accomplished.

I am aware of previous efforts to seat plungers of this character in a punch holder, and particularly of a construction in which in order to make it possible to separately tighten each punch, a separate lock nut is employed for each. This requires wider spacing of the punches, which is objectionable, and the tightening and adjustment is more difficult. I find that by my construction with employment of the single multiple washer 97, of softer metal, I secure a more



uniform and continuous seating pressure upon the plungers, and this notwithstanding unintentional variations in the lengths of their heads.

5 It will be understood that the number of plungers may vary in multiple plunger cases of this character. I have shown a plunger case carrying seven plungers as a convenient example.

10 Having thus described my invention, I claim:—

1. The combination of a plurality of headed plungers; a plunger case provided with seats within which the heads of the  
15 plungers are received; a multiple washer of comparatively soft metal, with apertures permitting the plungers to pass through, but affording shoulders to bear upon the heads of each of the plungers; and a threaded ring  
20 whereby the multiple washer may be compressively applied to the end of the plunger

case to clamp the plunger heads within their seats.

2. In a multiple plunger case, the combination of a plurality of headed plungers; a  
25 plurality of seats adapted to receive the heads of the plungers, with slight projection of their shouldered ends; a multiple washer of soft metal passing around the plungers and bearing against their shouldered ends;  
30 and a threaded ring, whereby said soft metal washer is strongly clamped in place to exert pressure to seat the plungers, irrespective of slight variations of the length of their heads.

In testimony whereof, I have hereunto  
35 signed my name, at Philadelphia, Pennsylvania, this ninth day of June, 1909.

ANTHONY M. HANCE.

Witnesses:

JAMES H. BELL,  
E. L. FULLERTON.