

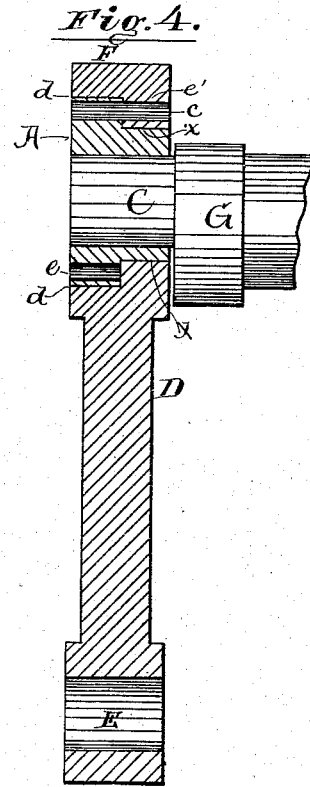
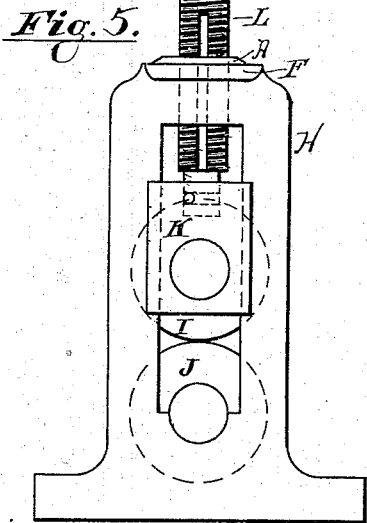
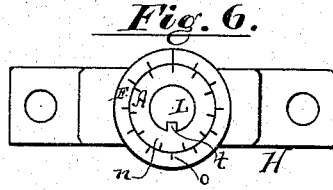
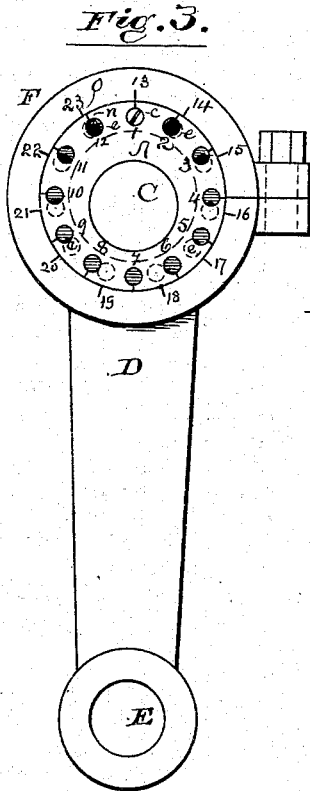
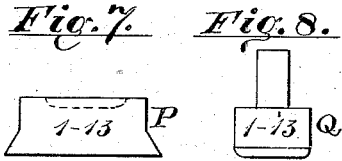
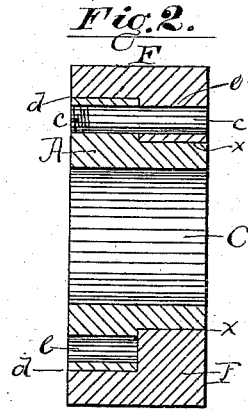
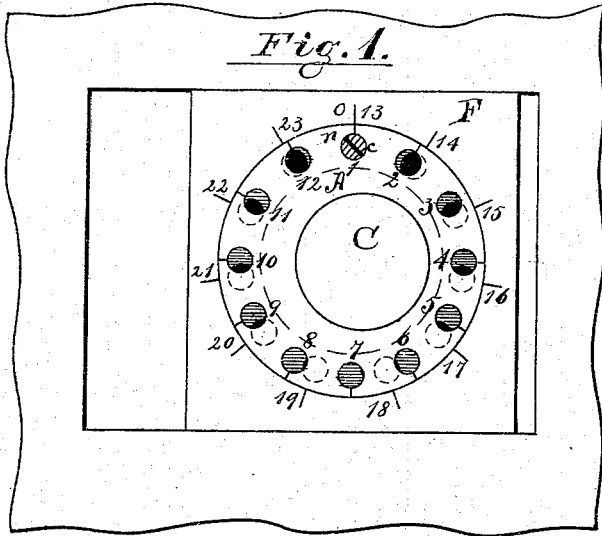
(No Model.)

J. M. SEYMOUR.

DIFFERENTIAL INDEX FOR MACHINE TOOLS.

No. 276,292.

Patented Apr. 24, 1883.



Attest:
S. H. Baldwin
Thos. S. Crane.

Inventor:
J. M. Seymour

UNITED STATES PATENT OFFICE.

JAMES M. SEYMOUR, OF NEWARK, NEW JERSEY.

DIFFERENTIAL INDEX FOR MACHINE-TOOLS.

SPECIFICATION forming part of Letters Patent No. 276,292, dated April 24, 1883.

Application filed February 1, 1882. (No model.)

To all whom it may concern:

Be it known that I, JAMES M. SEYMOUR, a citizen of the United States, residing in the city of Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Indexes for Machine-Tools, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

In the manufacture of articles of thin metal—such as watch-cases and the like—it is now customary to execute much of the work with dies which was formerly executed by the lathe or by tools managed by the workman's hands. The dies and operative mechanism of the press require to be of exceedingly-accurate workmanship and operation and susceptible of very delicate adjustment. These adjustments must be changed from time to time, because it is seldom, if ever, possible to keep one press constantly employed upon precisely the same order of work, and with each change in the quality or thickness of stock, or with each change of dies it will be necessary to readjust accordingly. When it is considered that these adjustments are measured by the thousandth part of an inch or less, and that the machines are necessarily heavy and ponderous to prevent the slightest perceptible yielding of any of their parts under the resistances encountered, the difficulty of securing such adjustment will be understood.

I am aware that instruments of precision have been made capable of adjustment to the degree of delicacy mentioned above; but such instruments have always been intended merely as delicate measures, and not as tools capable of doing work.

Heretofore the necessary adjustments at each change above mentioned have been ascertained by repeated trials, and hours are frequently consumed before reaching success, and this process is repeated each time a die is placed in the press, whether said die has been used before or not.

My invention obviates all of the difficulties alluded to above, first, by means of two differentially-graduated concentric circles, which have a constant vernier action as to each other, said circles being placed respectively upon the frame and upon the rotating adjustable member; sec-

ond, in the structure of the adjusting members; third, in the system of marking, to facilitate the record of tools and the adjustments of the machine with reference to them.

That others may more fully understand my invention, I will particularly describe the structure which I prefer, having reference to the accompanying drawings, wherein—

Figure 1 is an elevation of the adjusting-block, which bears the driving-pin. Fig. 2 is a transverse central section of the same. Fig. 3 is the front elevation of a pitman or connecting-rod for a power-press, with my device for adjusting the throw of said pitman. Fig. 4 is a longitudinal section of the same. Figs. 5 and 6 show how my invention may be applied to a housing-screw. Figs. 7 and 8 respectively represent the die and punch, hereinafter referred to.

In Fig. 1, D represents a connecting-rod; C, the driving-pin; E, the eye for the driven pin, and x a circular recess or bore for the insertion of a movable disk, A. The recess is counterbored for a flange, d , formed upon the rim of the disk, and holes e and e' are provided in the flange and in the metal beneath the same under the counterbore for the insertion of a pin to lock the disk in any desired position. Differential graduations are formed upon the edge of the disk and upon the head F of the connecting-rod, just around the counterbore at n and o , and the holes are equal in number to the graduations in the same parts. The graduations upon the disk are numbered from 1 to 12, consecutively, and those upon the head F from 13 to 23, and twelve holes are formed in the disk and eleven in the circle e' beneath it. The pin c can therefore be inserted in eleven different positions in the holes e' through the holes numbered from 1 to 11 in the circle e before the disk is moved one-eleventh of a rotation. Each shift of the pin is arranged to bring the graduations n and o successively into coincidence, and such shift to adjacent holes therefore produces but the one-hundred-and-twentieth part of a rotation.

The pin C is shown in Fig. 2 as formed upon a driving-shaft, G, and has a positive movement, due to its eccentricity upon the shaft. The hole in which the pin is fitted in the disk

A is formed eccentric to the recess x and periphery of the disk, and the rotation of the disk in the head F thus produces a slight variation or intentional change in the working length of the rod D, which effects the adjustment desired in the parts moved by the rod. For instance, if a die were secured upon the bed of a press having the shaft G mounted upon it, the connecting-rod would be used to operate the punch appropriate to the die, by means of a cross-head or slide, in the usual manner. The stroke of the pin C being positive, the punch and die would be constructed to fit one another as nearly as possible, and their required adjustment effected by the rotation of the disk A.

Power drawing-presses have been constructed in which the total motion produced by a rotation of the disk was one-quarter of an inch, and twenty holes being provided in the circle o , the movement effected by inserting the pin in adjacent holes was but one four-hundredth of that amount. As the coincidence of each hole with every one in the opposed circle indicates and secures a different position for the disk, there are in such a press a number of positions attainable, corresponding with the number of differentiated pin-holes or their equivalents; and a record of any specified position, so that it can be restored at a future time, consists simply in the recording of the two numbers representing the coincident holes or graduations, as 9 and 6 or 2 and 11. To prevent ambiguity, the numbers are made different in both indices, or letters may be applied to one set of marks, as a , b , c , &c. The record of any given position would then be formed by the letter and number coincident, as b 4.

It is evident that when a die, P, punch Q, has been properly adjusted the index-marks may be stamped upon the tools themselves as a memorandum. They can then be put in the press at any time and at once restored to the precise adjustment found satisfactory before. In setting punches for fine work—as in forming watch-cases—this construction offers a great advantage, as no means has heretofore been known of restoring a tool to a former adjustment, except by tedious trials, often resulting in injury to the material operated upon. The mere provision of differential notches, as heretofore known, only suffices to effect a small movement of the tool employed, but without my improvements does not afford any means of restoring an adjustment once secured.

The construction of the disk with a flange, d , in which round holes can be made, secures a much firmer connection of the parts when once adjusted than the notches heretofore used; but such construction renders the graduations particularly desirable, in conjunction with the

indicating-marks. Such marks could be applied to the holes in the disk, but as the holes in the pitman are buried under the disk in the recess x the marks could not be applied to them and would have to be placed upon the margin of the recess outside, where their positions would not accurately indicate any desired coincidence. Without the graduated lines n o a former adjustment could not so readily be found, while with the use of them it can be secured at once without experiment or trial. It is therefore obvious that the function of the notches themselves or of the holes described herein is different in my invention from what it was heretofore, when they served merely to lock the disk in various positions after a slight movement.

Having thus fully set forth the nature of my invention, I claim the same, as follows:

1. The combination, in a machine, of the following instrumentalities for effecting a delicate adjustment, viz: a relatively-fixed member or bearing, a member capable of circular movement thereon, and two circular concentric differential scales affixed to said members, respectively, substantially as and for the purpose set forth.

2. Two circular concentric differential scales capable of relative movement around their common axis, and provided with ordinals constituting dissimilar series for each scale, whereby said ordinals are not duplicated on said scales.

3. The head F, provided with the circular recess d , and the disk A, fitted therein and provided with the eccentric bearing for the driving-pin C, and the differential pin-holes e e' , located entirely within the edges of said head and disk, respectively.

4. The head F, provided with the circular recess d , and the disk A, fitted therein and provided with the eccentric bearing for the driving-pin C, combined with differential pin-holes e e' , located entirely within the edges of said head and disk, respectively, combined with the differential scale-marks n o , whereby the positions of said pin-holes are exactly indicated, as set forth.

5. The method of recording the coinciding ordinals of the differential scales which indicate the adjustment proper for any certain set of dies, which consists in marking said ordinals directly upon said dies, substantially as set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JAS. M. SEYMOUR.

Witnesses:

THOS. S. CRANE,
SAMUEL H. BALDWIN.