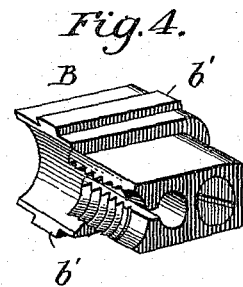
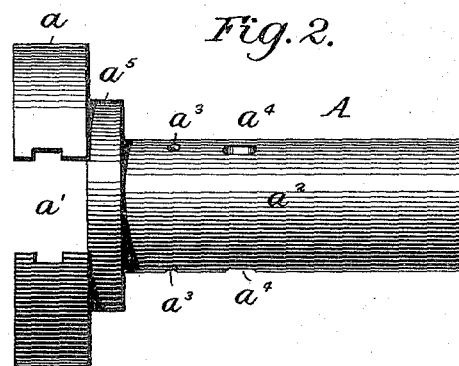
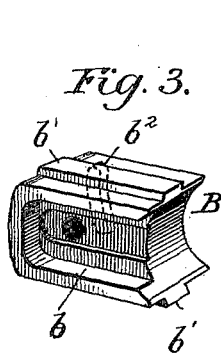
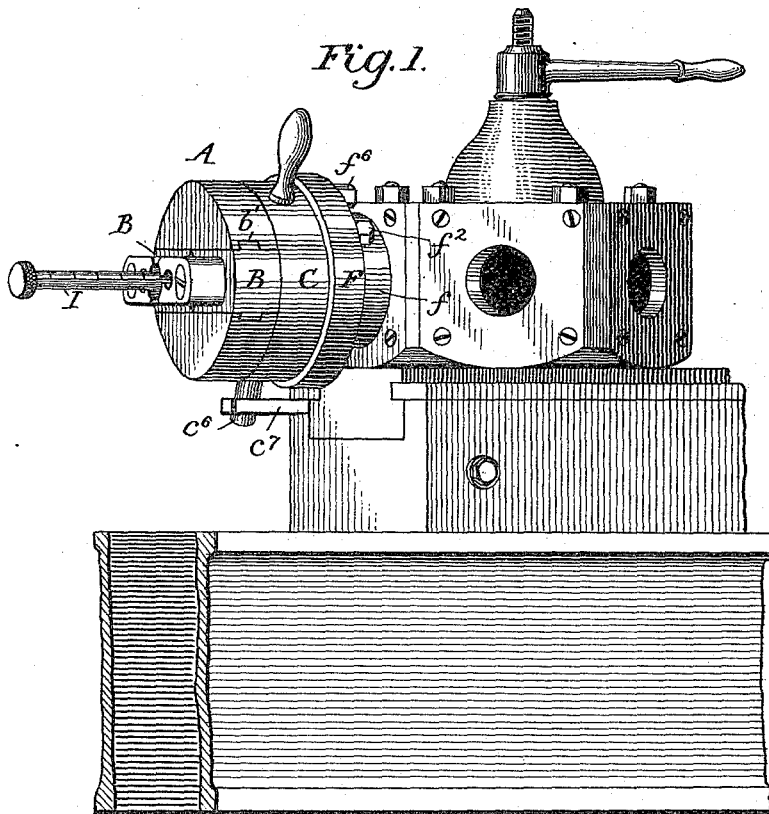


W. J. SMITH.
DIE HEAD FOR SCREW CUTTING.

No. 572,934.

Patented Dec. 8, 1896.



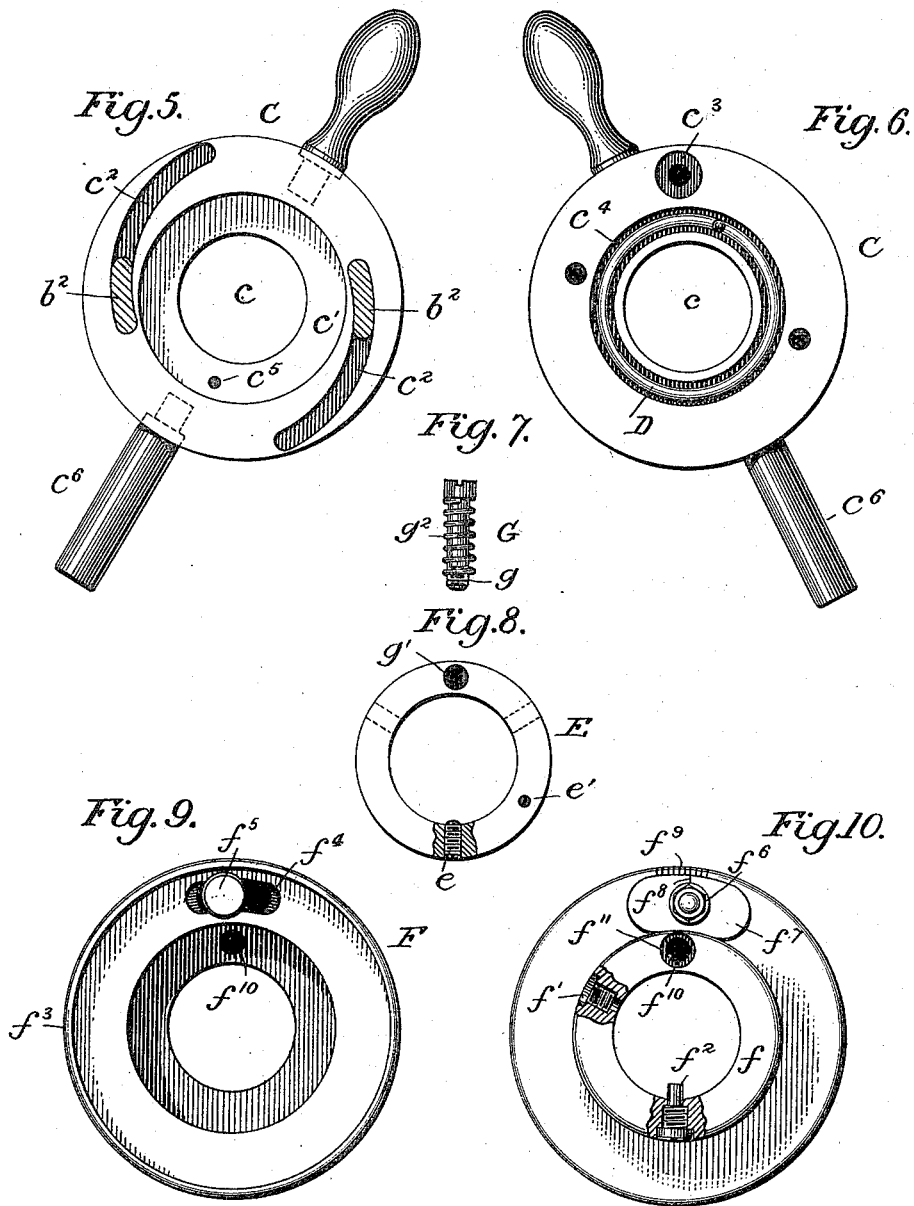
Witnesses
J. G. Hinkel.
M. C. Kelly.

Inventor
William J. Smith.
 By *Daniel H. Mead.*
 Attorneys

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Inventor
William J. Smith
Ray D. Smith, m.e.d.
 Attorneys

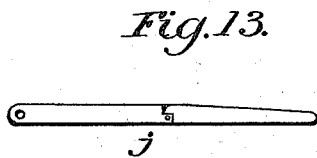
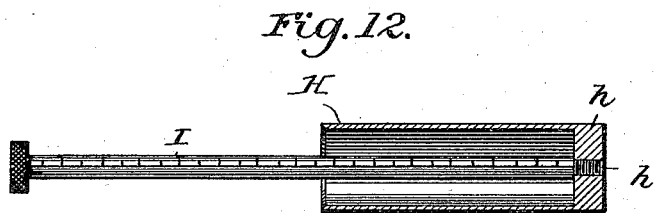
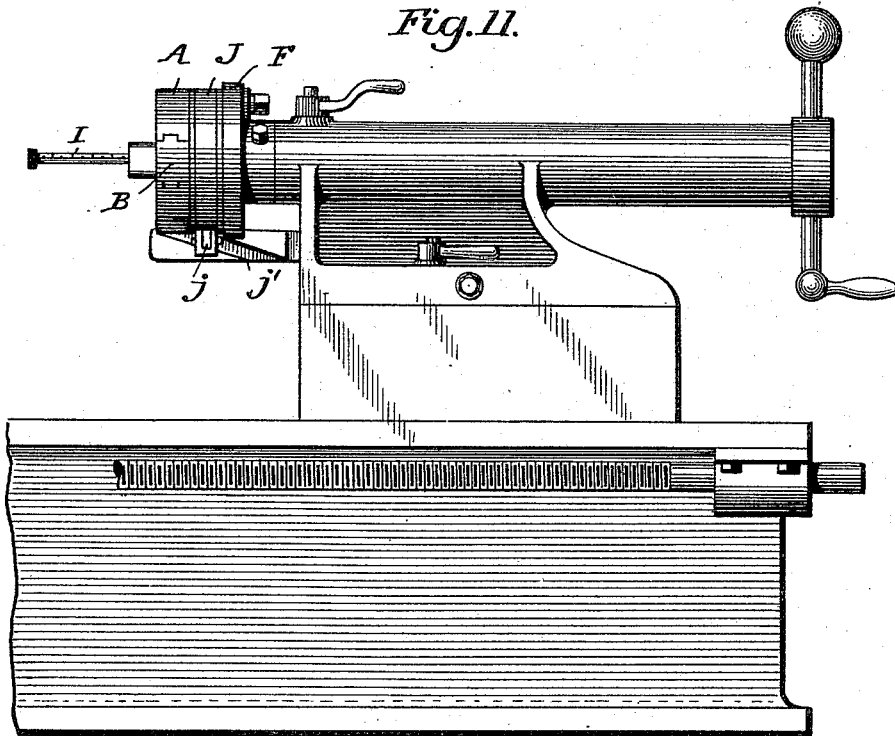
(No Model.)

3 Sheets—Sheet 3.

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Witnesses
John G. Hinkel
W. A. Kelly

Inventor
William J. Smith.
Ray Davis & Wood
 Attorneys

UNITED STATES PATENT OFFICE.

WILLIAM J. SMITH, OF NEW HAVEN, CONNECTICUT, ASSIGNOR TO THE
GEOMETRIC DRILL COMPANY, OF DELAWARE.

DIE-HEAD FOR SCREW-CUTTING.

SPECIFICATION forming part of Letters Patent No. 572,934, dated December 8, 1896.

Application filed August 31, 1896. Serial No. 604,404. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM J. SMITH, a citizen of the United States, residing at New Haven, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Die-Heads for Screw-Cutting; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to die-heads for screw-cutting.

The object of the invention is to produce a simple and easily-operated device capable of use on an ordinary mechanic's lathe, on a turret-lathe, on a bolt-cutting machine, or on an automatic screw-cutting machine, whereby a screw of any desired length may accurately be cut, and in which the cutting operation can automatically be stopped when a screw of any predetermined length has been cut.

With this object in view the invention consists of a die-head for screw-cutting constructed substantially as herein described and claimed.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view of a die-head constructed in accordance with my invention and being shown in position on a turret-lathe, the cam by which the dies are operated being shown as provided with a handle for grasping and with a projection for engaging a lug on the turret-lathe for use in rotating the cam to place the dies in operative position. Fig. 2 is a side elevation of the frame of the device. Fig. 3 is a perspective view of one of the die-holders, showing by dotted lines the lug on its rear face. Fig. 4 is a perspective view showing one of the die-holders with a cutting-die connected thereto. Fig. 5 is a front face view of the cam-ring by which the dies are operated, showing the cam-grooves receiving the lugs on the holders. Fig. 6 is a rear face view of the cam-ring, showing the spring by which the cam is operated in position. Fig. 7 is a side view of the screw and spring by which the locking and releasing sleeve is retained in place.

Fig. 8 is a face view of the collar by which the cam-ring is retained in place and by which one end of the spring for rotating the cam-ring is held. Fig. 9 is a view showing the front face of the locking and releasing sleeve by which the position of the cam is governed. Fig. 10 is a view of the rear face of the locking and releasing sleeve. Fig. 11 is a side elevation of a portion of a mechanic's lathe having a stop thereon, showing my die-head in position and showing a friction device operated by contact with the stop to place the dies in position for work after cutting a screw. Fig. 12 is a view, partly in section, of the stop with which the work comes into contact after a screw of the desired length is cut; and Fig. 13 is a side view of the arm on the die-head which comes into contact with an incline on the lathe-frame to put the die-head into position for operation.

In the drawings, A represents the main portion or frame of the die-head, which is of a single piece of metal and is composed of the carrier portion *a*, having guideways *a'* therein for the reception of holders to which the cutting-dies are attached, and the shank portion *a''*. The shank portion is hollow throughout its length, in order that when the screw cut is of sufficient length it may project into the shank, and is designed to be attached to the lathe. When the die-head is used in connection with a turret-lathe, the shank projects into an opening in the turret, and when the die-head is used in connection with an ordinary mechanic's lathe it is connected to the spindle of the lathe. The shank is provided with indentations *a'''*, receiving the ends of screws by which a retaining-ring is held, and with elongated openings *a''''*, through which project screws retaining the locking and releasing sleeve and the stop by which the length of the screw cut is limited. At the intersection of the carrier portion and the shank portion there is formed a ring *a''''''*, by which the frame is strengthened at that point and by which the cam-ring, which is arranged adjacent to the carrier, is guided in its rotation.

B represents the die-holders, by which the cutting-dies are carried. Each die-holder is provided with an indentation *b*, forming a socket for the reception of the cutting-die,

and each is provided on its sides with ribs b' , which enter grooves in the guideways a' . The rear face of each holder has formed integral with it a lug b^2 , which enters a cam-groove in a ring to be hereinafter described and by which the holders and the cutting-dies are adjusted to cut a screw-thread of the desired diameter, are held in position during cutting, and are moved apart when a screw-thread of the required length is cut.

Placed adjacent to the carrier is a cam-ring C, having a central opening c for the reception of the shank a^2 and provided with a circular indentation c' for the reception of the ring a^3 of the carrier portion a . The cam-ring C is designed to fit accurately against the rear face of the carrier, and it is provided in its front face with cam-grooves c^2 , which receive the lugs b^2 on the holders B. By rotating the cam-ring in one direction or the other the holders and the cutting-dies carried thereby are moved toward or away from the center of the carrier to regulate the space between the cutting edges of the dies, and consequently the diameter of the screw cut, and also to separate the dies to allow withdrawal of the work after a screw of the desired length has been cut.

The arrangement of the parts is such that when the dies are in position to cut the lugs on the holders abut against the ends of the grooves c^2 , thus forming a solid unyielding means for holding the dies to their work. By this means springing or any movement resulting from the cutting strain which would result in an uneven cutting is avoided.

The cam-ring is retained to hold the cutting-dies in operative position by an adjustable stop, hereinafter described, which enters an indentation c^3 on the rear face of the cam-ring, and it has connected with it a spring by which it is rotated, when released from the stop, to separate the cutting-dies, removing them from the work. The spring is designated by the letter D, and each end is bent to form means for attaching it to the cam-ring and to a collar E. The cam-ring is provided with a circular recess c^4 for containing the spring, and in this recess is an opening c^5 , into which one end of the spring projects.

The collar E is attached to the shank a^2 by set-screws e , the ends of which enter indentations a^3 in the shank. The collar is provided on its front face with an opening e' , by which one end of the spring D is held. When the collar is placed on the shank, it is turned to place a slight tension on the spring, giving it a tendency to rotate the cam-ring to move the cutting-dies away from each other when the cam-ring is released from the retaining device by which the cutting-dies are held in position for work.

F represents the locking and releasing sleeve, the function of which is to retain the cutting-dies in position for work through the cam-ring and to release the cam-ring when a

screw of desired length has been cut, allowing the spring D to rotate the cam-ring and thus separate the cutting-dies, removing them from the work. The locking and releasing sleeve has a short shank f , having therein openings f' , through which project set-screws f^2 , which pass through the elongated openings a^4 . The openings by their shape prevent rotation of the sleeve, and at the same time permit it to move longitudinally on the shank a^2 . The sleeve is provided on its front face with an overhanging flange f^3 , which overlaps the edge of the cam-ring C and fits closely thereto, preventing admission at the point of juncture between the two parts of dust, dirt, &c. The sleeve is provided with a groove F^4 at its forward part, in which moves a stop f^5 , designed to enter the indentation c^3 in the rear face of the cam-ring C. The stop is screw-threaded on its rear end, and is provided with a nut f^6 , which bears on a plate f^7 , which is interposed between the nut and the rear face of the sleeve F. The plate is of a size to close the opening in which the stop moves and thus prevent admission of dirt through the opening. The plate is provided with a mark f^8 , and adjacent to this mark, on the rear face of the sleeve F, is a scale f^9 . The relative positions of the plate indicated by its mark, and the scale f^9 on the sleeve indicates the position of the stop, and consequently the point at which the cutting-dies are held by the cam-ring which is regulated by the stop. By adjusting the stop back and forth the distance apart at which the cutting-dies are held when cutting may be regulated, and consequently the diameter of the screw cut is governed.

The sleeve is provided with a longitudinal opening f^{10} , through which projects a screw G, provided at its end with threads g , which enter an opening g' in the collar E. The opening f^{10} has a reduced portion for receiving the screw, and thus is formed a shoulder f^{11} , against which bears a coil-spring g^2 , the other end of which bears against the head of the screw G. When the parts are in place and the screw G projects through the sleeve F and into the opening g in the collar, a space is left between the shoulder f^{11} and the head of the screw, permitting play back and forth of the sleeve toward and away from the collar E. The tension of the spring g is sufficient to move the sleeve toward the cam-ring and to bring the stop f^5 into the opening c^3 in the cam-ring when the two are opposite each other.

H represents a stop which in its preferred form is made hollow throughout its main portion and is provided with a head h . This stop is designed to be placed in the shank of the die and to be retained in suitable position by the screws f^2 , which secure the sleeve F to the shank a^2 .

In the operation of the device the stop H is arranged in the shank and according to the

desired length to be cut the stop is placed with its head toward the cutting-dies or with its open end in that direction. Of course when the open end is placed toward the cutting-dies the work will enter the stop, and thus a screw of greater length may be cut. The length of the screw cut may be predetermined by the gage I, which is designed to be screwed into the opening *h'* of the head of the stop, and the scale on the gage will indicate the distance which the head is arranged from the dies. By loosening the retaining-screws *f*² and moving the stop back and forth the length of the screw to be cut may be predetermined. When in the operation of the device, the parts being constructed and arranged substantially as described, a screw of the predetermined length is cut and the work comes in contact with the head *h*, the locking and releasing sleeve will be pushed rearward, moving the stop *f*⁵ from the opening in the cam-ring. When this takes place, the spring D acts to rotate the cam-ring, and thus the die-holders and the cutting-dies are moved to separate the cutting-dies to move them from the work.

In order to move the dies into position for cutting automatically after being separated and when mounted on a turret-lathe, I provide the cam-rings of the cutter-heads with a projecting pin *c*⁶, which when the die-holder is moved into operative position comes into contact with a stop *c*⁷ on the frame of the lathe. By this means the cam-ring is given a partial rotation to bring the stop *f*⁵ opposite the opening *c*³ in the cam-ring, thus locking the dies in position for use. In the drawings only one die-head is shown in position on the turret in order not to confuse the illustration. Of course any desired number of die-heads may be employed or other tools may be placed in the other openings in the turret.

When the die-holder is used with an ordinary mechanic's lathe or bolt-cutting machine, and it is desired to adjust the cutting-dies automatically for work when the die-heads are placed in position to begin the cutting of a screw, I provide the exterior of the cam-ring with a circumferential groove in which is arranged a strap J. Projecting from the strap is an arm *j*, which as the die-head returns to its operative position comes into contact with an inclined groove in a projection *j*' on the frame of the lathe, the die-head being rotated during its movement to position for work. When the arm *j* comes into contact with the groove in the stop *j*', tension is put on the strap and the cam-ring will be prevented from turning with the remainder of the die-head a sufficient time to allow the parts to be turned independently of each other, to bring the stop *f*⁵ opposite the opening *c*³. When the parts are brought into this position, they will be moved toward each other by the spring *g* on the pin G and thus the dies retained in operative position until released by the work coming into contact with

the stop H after a screw of predetermined length has been cut.

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

1. A die-head comprising a carrier for receiving cutting-dies, movable dies, a spring-actuated rotatable cam connected to the dies, a lock for connecting the cam to the carrier, and a stop connected to the cam and arranged in a position to be struck by the article on which the screw is cut, whereby when the stop is pressed the cam is released and allowed to rotate, substantially as described.

2. A die-head designed to be attached to a lathe, comprising a carrier for receiving cutting-dies, movable dies arranged on the carrier, a spring-actuated cam connected with the dies, a stop connected with the cam and arranged in a position to be struck by the article on which a screw is cut, a lug on the lathe, and means attached to the cam and designed to be engaged by the lug on the lathe, whereby the dies may be automatically separated when a screw of predetermined size has been cut, and the dies moved automatically into position for operation, substantially as described.

3. A die-head comprising a carrier for receiving cutting-dies, a spring-actuated cam connected with the dies, and a locking and releasing sleeve capable of movement toward and away from the cam, the sleeve being provided with an overhanging flange closing the opening between the cam and the sleeve, whereby admission of dirt and the like between the parts is prevented, substantially as described.

4. A die-head comprising a carrier for receiving cutting-dies, and having a shank adapted for attachment to a lathe formed integral with the carrier, a rotating cam connected with the cutting-dies, and means for locking and releasing the dies consisting of a sleeve capable of moving toward or away from the cam and having a projection engaging an opening in the cam, substantially as described.

5. A die-head comprising a carrier for receiving cutting-dies and having a shank provided with longitudinal openings, formed with the carrier, a spring-actuated rotating cam arranged adjacent to the dies, a locking and releasing sleeve arranged adjacent to the cam and having pins projecting through the sleeve and into the longitudinal openings in the shank, and a projection on the locking and releasing sleeve engaging the cam, substantially as described.

6. A carrier for receiving die-cutters, cutting-dies, a rotating cam connected with the cutting-dies, and an adjustable stop connected with the cutting-dies, the stop being hollow and being provided with one open and one closed end, whereby the length of a screw cut before the article worked upon comes in contact with the stop, may be regulated by a

longitudinal adjustment of the stop and by reversing the position of the stop, substantially as described.

7. A die-head comprising a carrier, movable cutting-dies arranged thereon, a cam connected with the cutting-dies, a locking and releasing sleeve arranged adjacent to the cam, and a spring whereby a pressure is exerted to move the locking and releasing sleeve toward the cam, substantially as described.

8. A die-head comprising a carrier, cutting-dies arranged on the carrier, a cam-ring connected with the cutting-dies, a spring attached at one end to the cam-ring, a collar receiving the other end of the spring, and a locking and releasing sleeve arranged adjacent to the cam, and provided with a spring having a tendency to move it toward the cam, substantially as described.

9. A die-head comprising a carrier and shank made in one piece, the shank being provided with longitudinal openings, cutting-dies arranged on the carrier, a cam-ring engaging the cutting-dies, a locking and releasing sleeve arranged on the shank and connected thereto by screws or pins passing through the longitudinal openings in the shank, and a spring adapted to exert pressure to move the locking and releasing sleeve toward the cam, substantially as described.

10. A die-head for screw-cutting, comprising radially-movable cutting-dies, a cam connected with the cutting-dies, and by which the cutting-dies are moved simultaneously, and an adjustable stop, whereby the movement of the cam is regulated and the same is locked to retain the cutting-dies in operative position, whereby by adjusting the stop the distance apart of the cutting-dies when in position for operation is regulated, substantially as described.

11. A die-head of the kind described comprising a frame having a carrier for receiving cutting-dies, a shank for attachment to a lathe, the carrier and shank being made in one piece, die-holders having lugs, a ring capable of being attached solidly to the carrier, the ring being provided with grooves, and an adjustable stop whereby the ring is capable of adjustment to bring the lugs on the die-holders to abut against the ends of the grooves in the ring when the tool is in position for use, irrespective of the size of the screw to be cut, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM J. SMITH.

Witnesses:

L. A. BABCOCK,
GEORGE F. NEWCOMB.