(No Model.) 3 Sheets—Sheet 1.

J. TANGYE & W. H. BAILEY.

MACHINE FOR FINISHING PERIPHERIES OF PULLEYS OR FLY WHEELS.

No. 577,332. Patented Feb. 16, 1897.

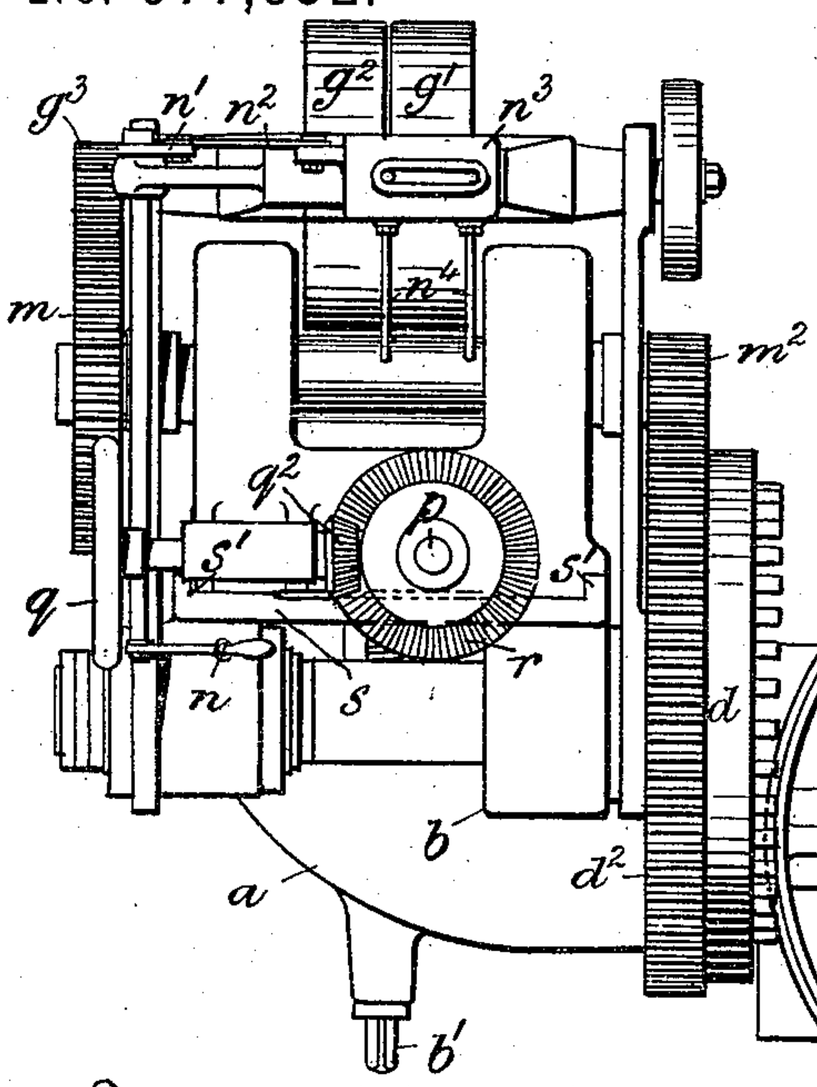


Fig. 2.

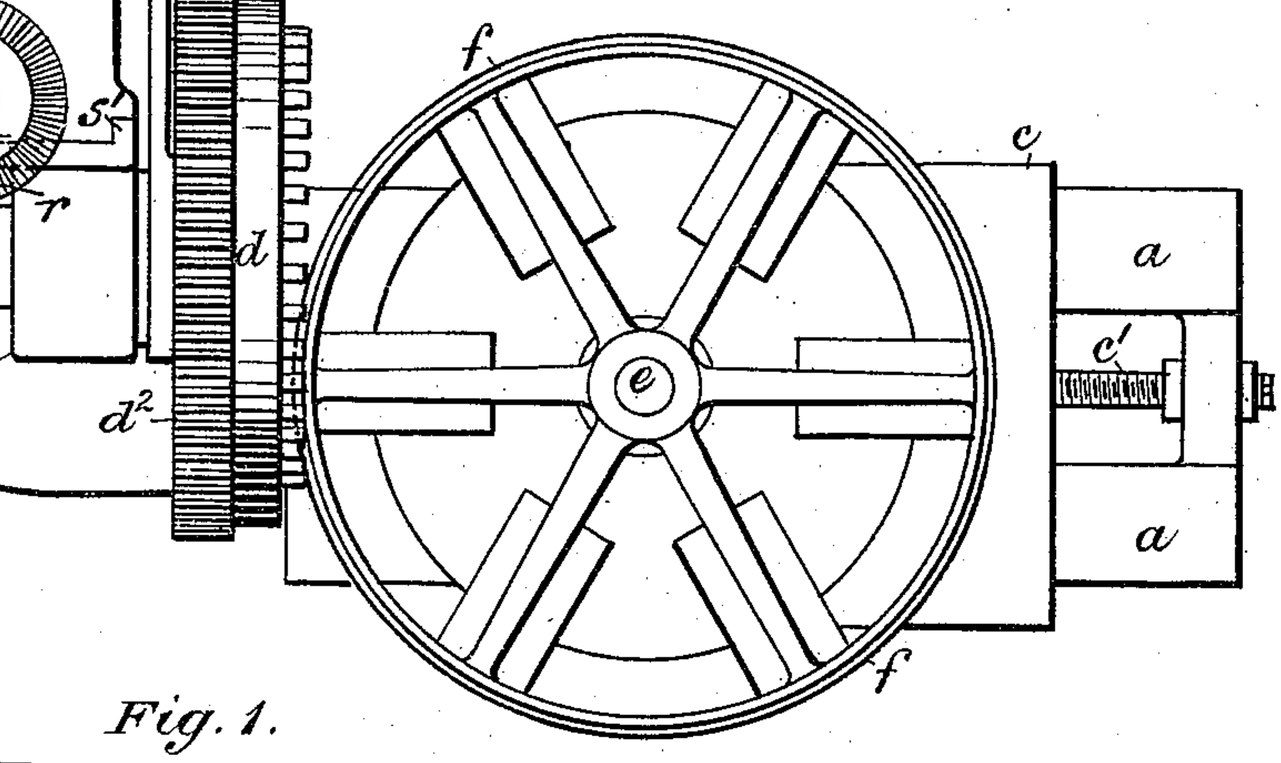
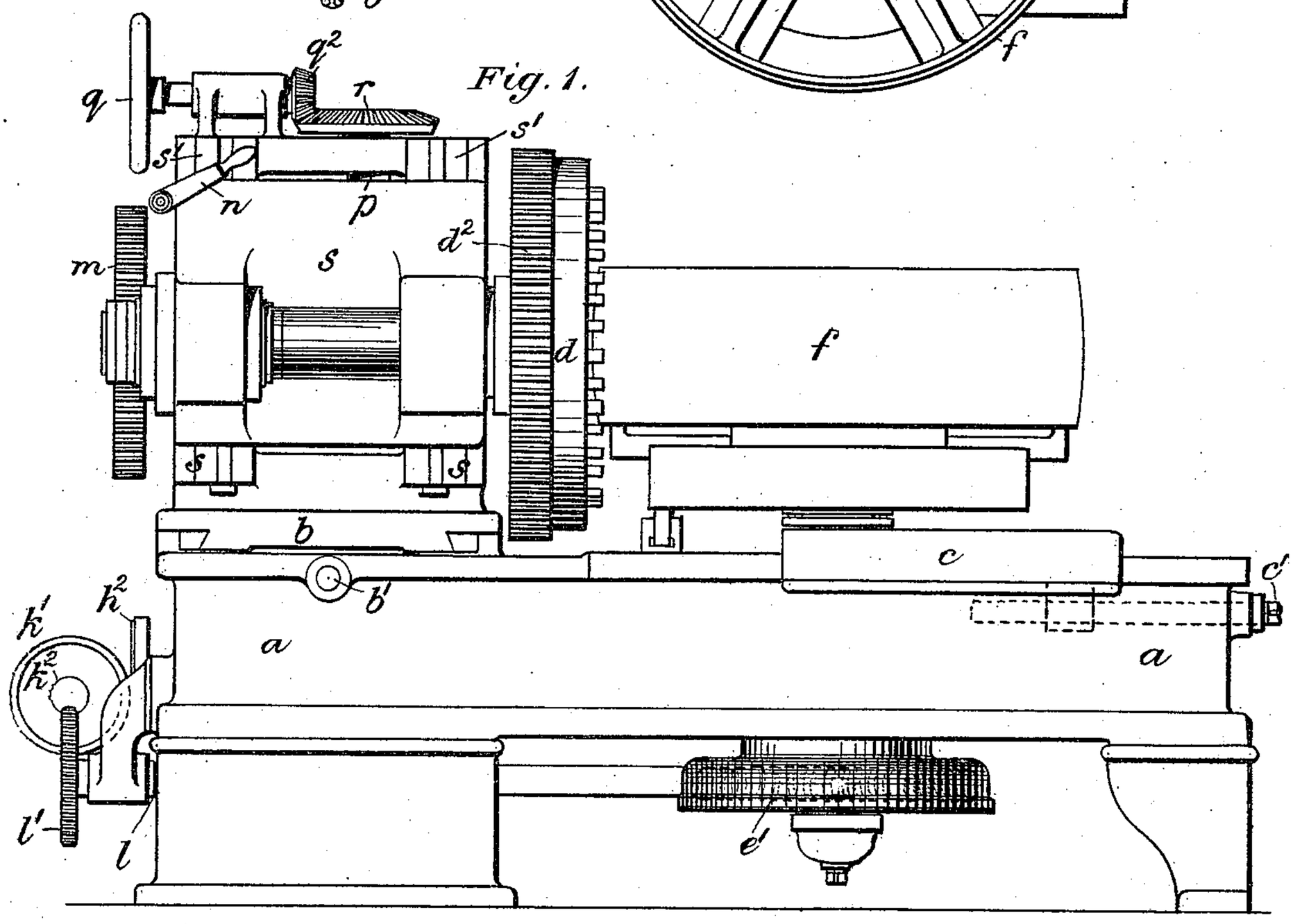


Fig. 1.



Witnesses;—
George Shaw
Richard Skerrett

Inventors;—
John Tangye
William Henry Bailey

(No Model.) 3 Sheets—Sheet 2.

J. TANGYE & W. H. BAILEY.

MACHINE FOR FINISHING PERIPHERIES OF PULLEYS OR FLY WHEELS.

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Fig. 4.

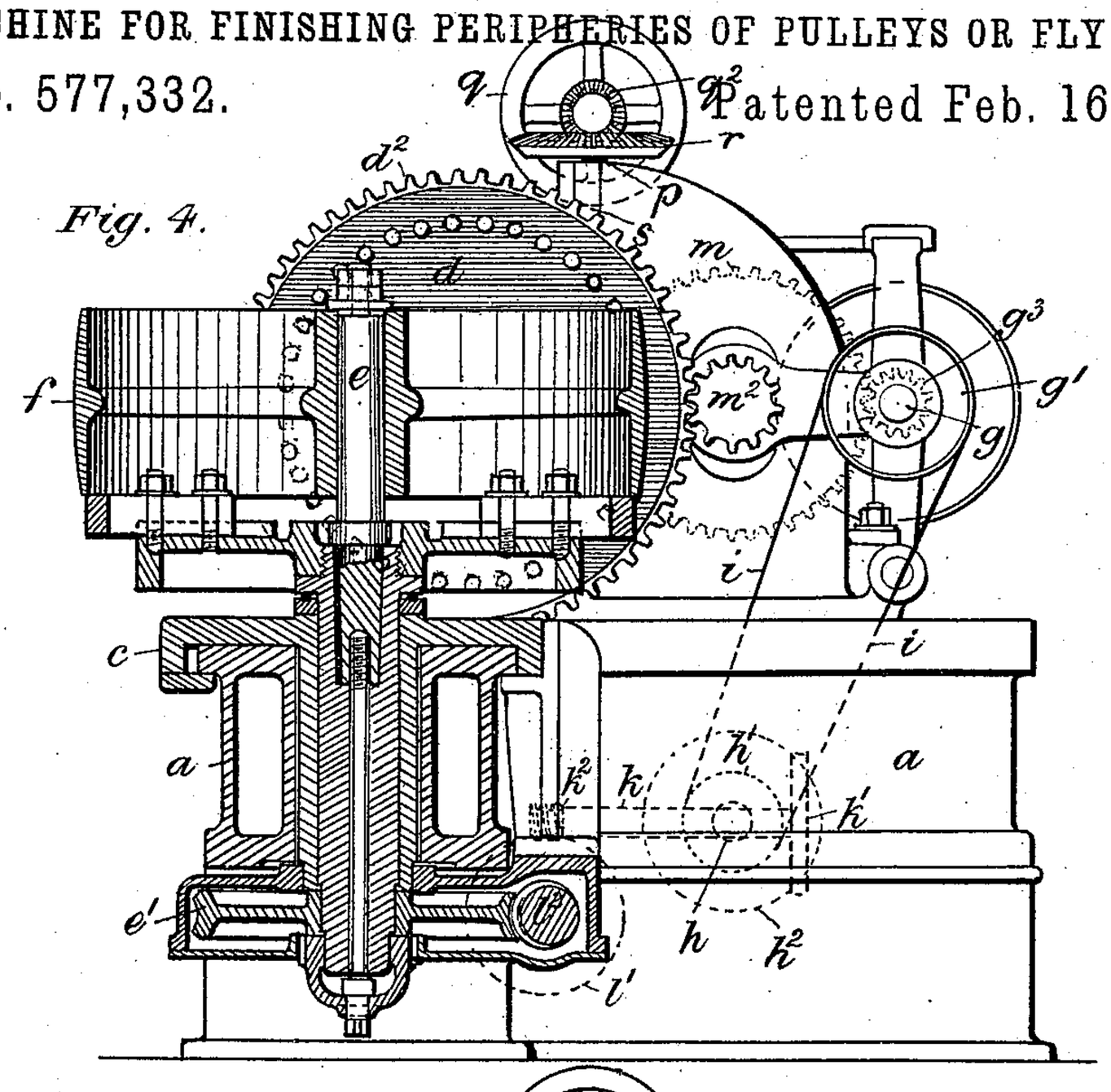
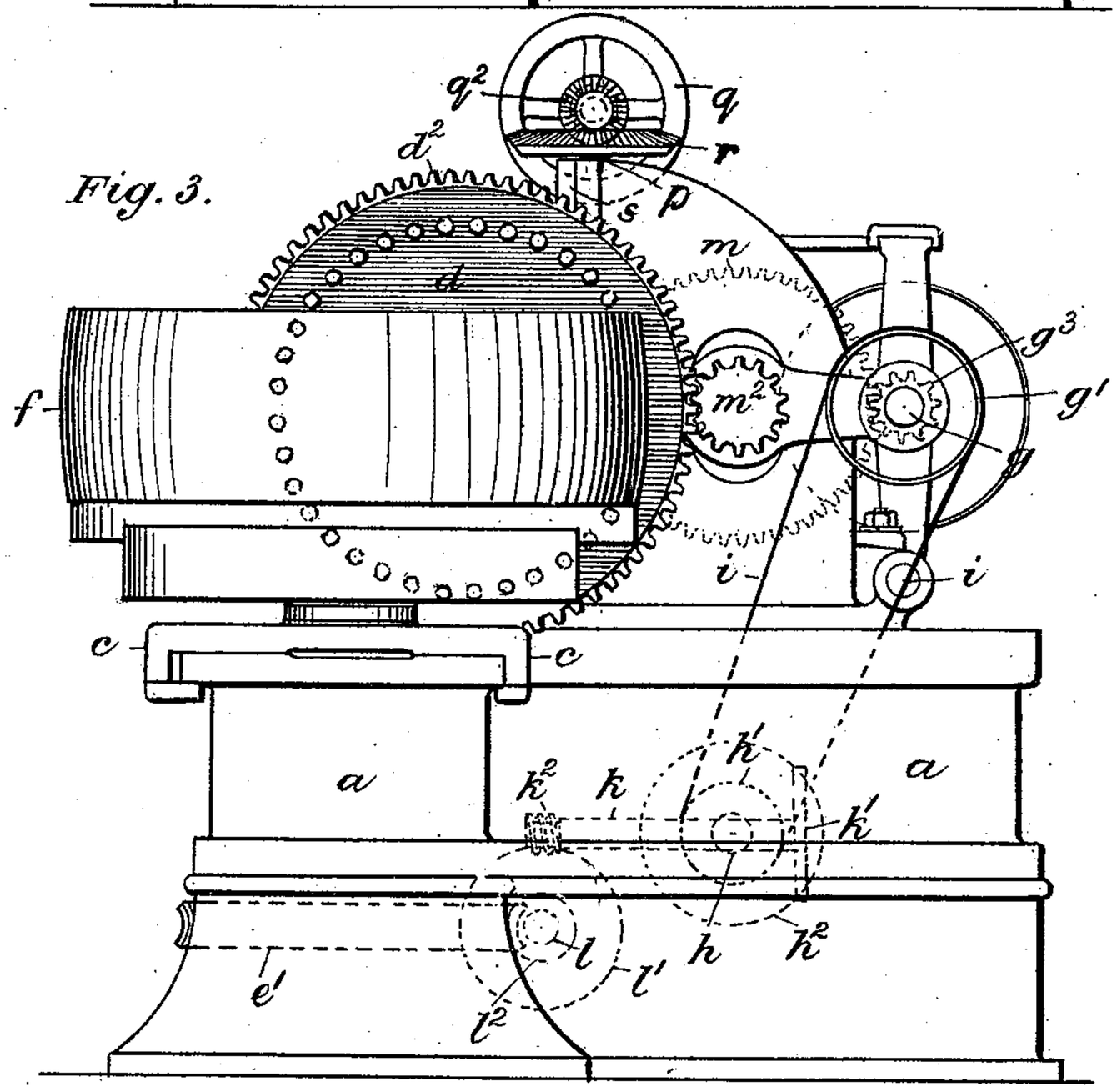


Fig. 3.



Witnesses;—

George Thurs

Richard Skerrett

Inventors;—

John Yangye

William Henry Bailey

(No Model.) 3 Sheets—Sheet 3.

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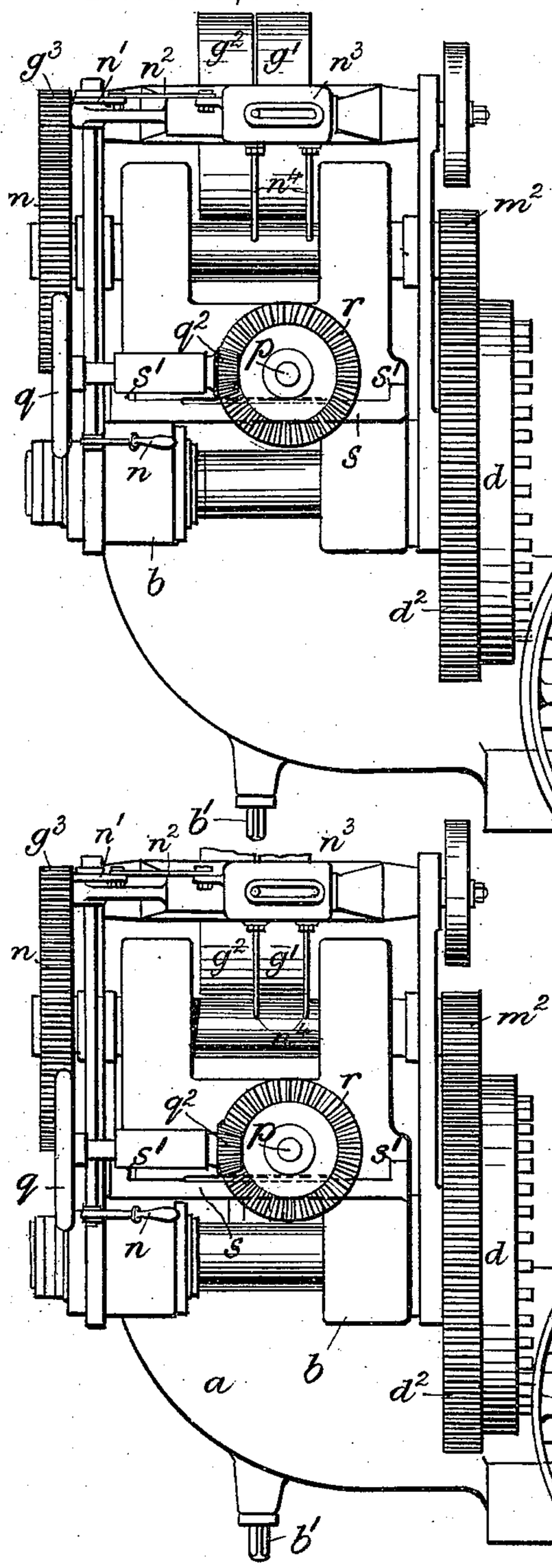
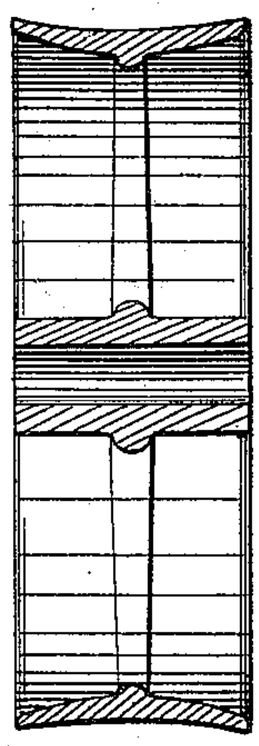


Fig. 6.

Fig. 6A.



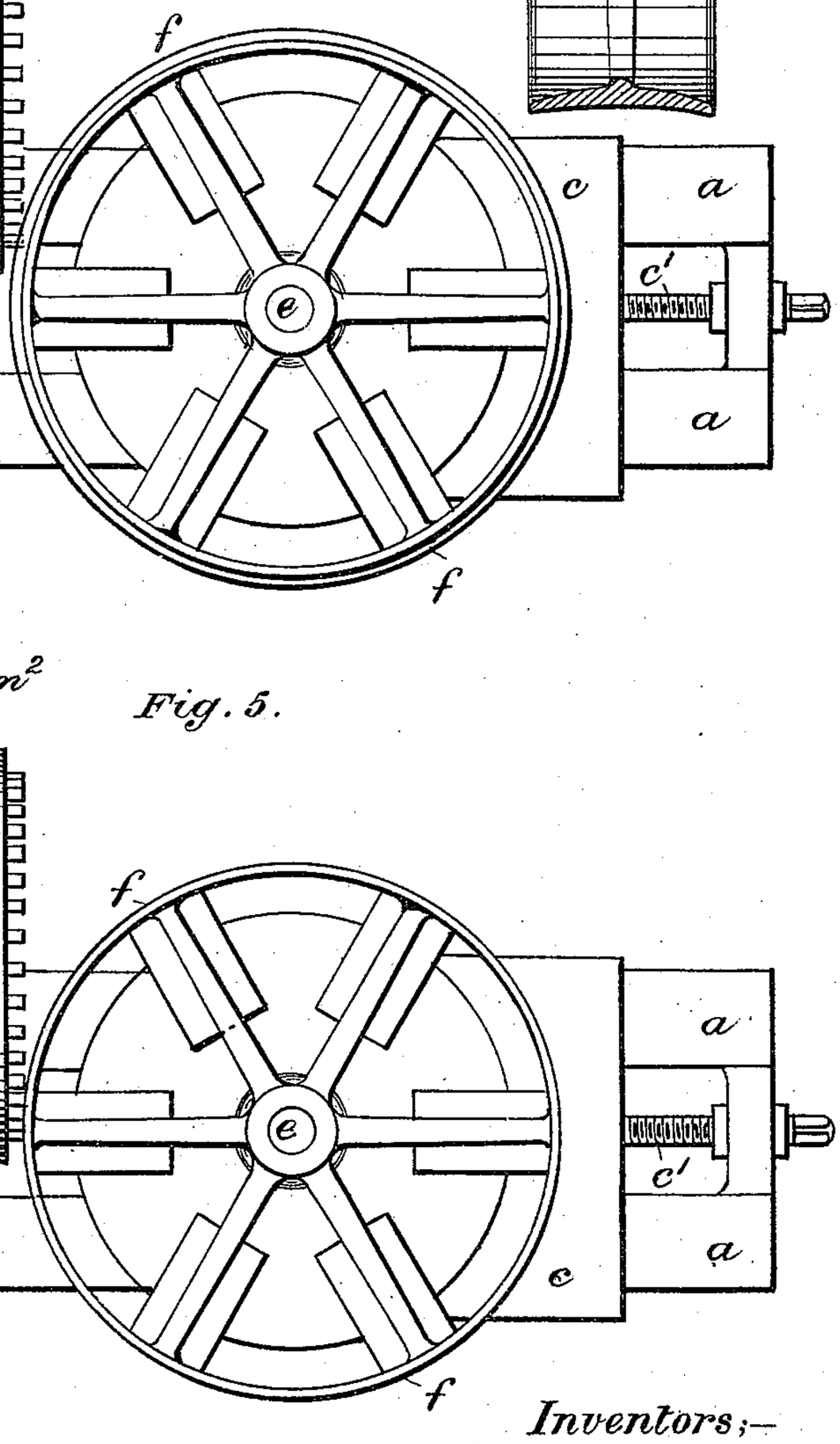


Fig. 5.

Witnesses;—

George Shard

Richard Skerrett

Inventors;—

John Tangye

William Henry Bailey

UNITED STATES PATENT OFFICE.

JOHN TANGYE, OF HANDSWORTH, AND WILLIAM HENRY BAILEY, OF SMETHWICK, ENGLAND, ASSIGNORS OF ONE-THIRD TO TANGYES, LIMITED, OF BIRMINGHAM, ENGLAND.

MACHINE FOR FINISHING PERIPHERIES OF PULLEYS OR FLY-WHEELS.

SPECIFICATION forming part of Letters Patent No. 577,332, dated February 16, 1897.

Application filed June 11, 1896. Serial No. 595,191. (No model.)

To all whom it may concern:

Be it known that we, JOHN TANGYE, of Handsworth, and WILLIAM HENRY BAILEY, of Smethwick, England, subjects of the Queen of Great Britain, have invented certain new and useful Improved Machinery for Finishing or Machining the Peripheries of Pulleys or Fly-Wheels and for other Like Purposes; and we do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

Our invention consists in the construction and arrangements hereinafter described of the parts of machinery for finishing the peripheries of metallic and non-metallic pulleys and fly-wheels and for other like purposes, the said machinery being capable of producing on the periphery of the pulley or fly-wheel or the like a surface truly cylindrical, or nearly so, or a surface slightly convex or slightly concave, as hereinafter more particularly described.

We will describe our invention in connection with the finishing, or, as it is technically called, the "machining," of a metallic or non-metallic pulley.

Figures 1 and 2 of the accompanying drawings represent in front elevation and plan, respectively, the new or improved machinery constituting our invention, the parts of the said machinery being in position for producing on the periphery of the metallic pulley to be operated upon a convex, or, as it is technically called, a "crown" face. Fig. 3 is an end elevation of the new or improved machinery; and Fig. 4 is a vertical section of the same, the said section being taken through the axis of the vertical spindle on which the pulley to be operated upon is fixed. Fig. 5 represents the new or improved machinery in plan with the parts in position for producing on the periphery of a pulley a cylindrical or approximately cylindrical surface. Fig. 6 represents another plan of the said new or improved machinery, the parts being in the position for producing on the periphery of a pulley a concave or hollow face. Fig. 6^A represents in section a pulley with a concave or hollow face or periphery produced by the new or improved finishing machinery constituting our invention when the parts are in the positions represented in Fig. 6.

The same letters of reference indicate the same parts in the several figures of the drawings.

The said new or improved machinery consists, essentially, of a table or bed *a*, on which is supported and work two slides, (marked, respectively, *b* and *c*,) the said slides having motion in planes at right angles to one another, being operated by the respective screws *b'* *c'*, working in screw-boxes on the under sides of the slides, as is well understood. The transverse slide *b* carries an ordinary face-rolling cutter *d*, having solid or inserted teeth, and the longitudinal slide *c* carries a vertical spindle *e*, on which is fixed the pulley *f* to be finished or machined. The vertical spindle *e*, carrying the pulley *f*, receives a slow rotary motion, the said rotary motion being communicated to the pulley-spindle *e* in the following manner.

A pulley *g'* on the driving-shaft *g* of the machine drives, by means of the belt or band *i*, the pulley *h'* on the second and parallel shaft *h*. On the said shaft *h* is a friction-disk h^2, against the face of which the edge of a second adjustable friction-disk *k'* on a shaft *k* at right angles to the shaft *h* bears (see Figs. 3 and 4) and receives rotary motion therefrom. On the end of the shaft *k'* is a worm k^2, gearing with a worm-wheel *l'* on the shaft *l*, a worm l^2 on which shaft *l* gears with the worm-wheel *e'* on the vertical spindle *e*. By sliding the adjustable friction-disk *k'* along the shaft *k* it may be made to bear against the driving friction-disk h^2 at a greater or less distance from the center of the said disk h^2, and thereby rotate the pulley *f* at a greater or less speed, as desired.

The face-milling cutter *d* is driven from the main shaft *g* through the pinion g^3, which gears with the spur-wheel *m*, on the opposite end of the shaft of which is a second spur-wheel m^2, gearing with the teeth on the periphery d^2 of the face-milling cutter *d*.

When for any reason it is wished to stop the machine, the handle *n* is turned and op-

erates through its spindle the lever n', link n^2, slide n^3, and belt-fork n^4, so as to throw the belt i onto the loose pulley q^2.

When it is wished to machine or finish a pulley so as to produce on its periphery a crown or convex face, the transverse slide b, carrying the cutter-head, is adjusted so as to bring the axis of the face-milling cutter d in line with the vertical spindle e, or so as to bring the face-milling cutter d into such a position that the vertical spindle e is in a line situated between the axis of the face-milling cutter and the path of the cutters of the face-milling cutter, the exact position depending on the amount of convexity desired, the maximum convexity being obtained when the spindle is in line with the axis of the face-milling cutter and the minimum convexity when the spindle e is in a line just within the path of the rotating cutters.

Figs. 1, 2, 3, and 4 represent the machine in position for producing crown or convex faces on pulleys of the character shown in the drawings.

When it is desired to produce on the surface of pulleys straight faces, that is to say, to make the peripheries truly cylindrical, or approximately cylindrical, the transverse slide b of the cutter-head is adjusted so as to bring the path of the rotating cutters in line with the vertical spindle e, as represented in Fig. 5, and when it is desired to produce on the periphery of a pulley a hollow or concave face, as is represented in the pulley Fig. 6^A, the transverse slide b of the face-milling cutter is adjusted so as to throw the vertical spindle e outside the line or path of the rotating cutters, as is represented in Fig. 6.

In order to insure that the center of curvature of the periphery of the pulley when producing crown or hollow faced pulleys shall be in the same line as the middle of the pulley, or, in other words, that the middle of the pulley in the case of crown-faced pulleys shall be of largest diameter and in the case of hollow-faced pulleys of smallest diameter, it is necessary that the middle line of the pulley shall be in the same horizontal plane as the axis of the face-milling cutter d, and for this reason the face-milling cutter is made capable of vertical adjustment to fit the machine to operate on pulleys of varying widths.

The vertical adjustment is effected as follows: A vertical screw, the axis of which is marked p, works in a screw-box on the inner side of a vertical slide s, the guides of which are marked s' s', carrying the face-milling cutter. By turning the screw p by means of the hand-wheel q in one or other direction, acting through the bevel-pinion q^2 and bevel-wheel r, the vertical slide s, and with it the face-milling cutter d, is raised or lowered.

The application of our invention to machinery for finishing or machining fly-wheels and for other like purposes differs in no essential respect from its application to machinery for finishing or machining metallic and non-metallic pulleys, as hereinbefore described.

Having now particularly described and ascertained the nature of our invention and in what manner the same is to be performed, we declare that we claim as our invention—

1. In a machine for finishing the peripheries of pulleys and other wheels the combination with a bed, a slide c horizontally and longitudinally movable thereon, means for moving said slide, a vertical pulley-spindle e journaled in said slide, of the slide b mounted on said bed and movable transversely to the line of travel of the slide c, a vertical milling-cutter mounted on the slide b at a tangent to the rim of the pulley to be operated upon, means for adjusting said milling-cutter vertically, and means for moving the slide b, whereby the milling-cutter is caused to impart either a concave, convex or cylindrical shape to the periphery of the pulley, substantially in the manner specified.

2. In a machine for finishing the peripheries of pulleys and other wheels the combination with a bed, a slide c horizontally and longitudinally movable thereon, means for moving said slide, a vertical pulley-spindle e journaled in said slide, of the slide b mounted on said bed and movable transversely to the line of travel of the slide c, a slide S movably mounted on the vertical face of the slide b, means for vertically adjusting the slide S, a vertical milling-cutter journaled in the slide S at a tangent to the pulley to be operated upon, and means for moving the slide b across the path traversed by the slide c, substantially as shown and described and for the purpose specified.

JOHN TANGYE. [L. S.]
WILLIAM HENRY BAILEY. [L. S.]

Witnesses:
GEORGE SHAW,
RICHARD SKERRETT.