(No Model.) 2 Sheets—Sheet 1.

J. ULRICH.

AUTOMATIC DRILL FEED.

No. 429,073. Patented May 27, 1890.

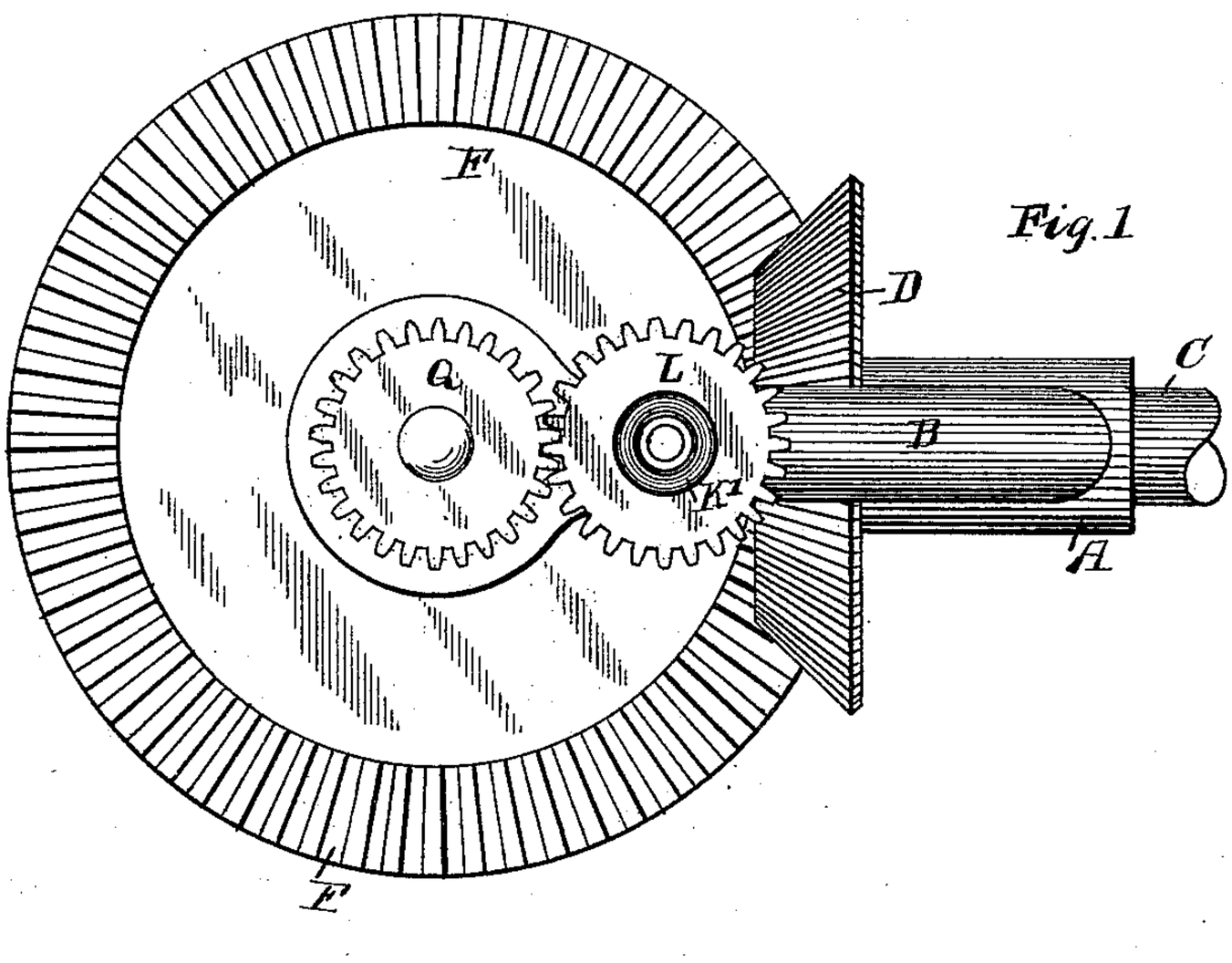


Fig. 1

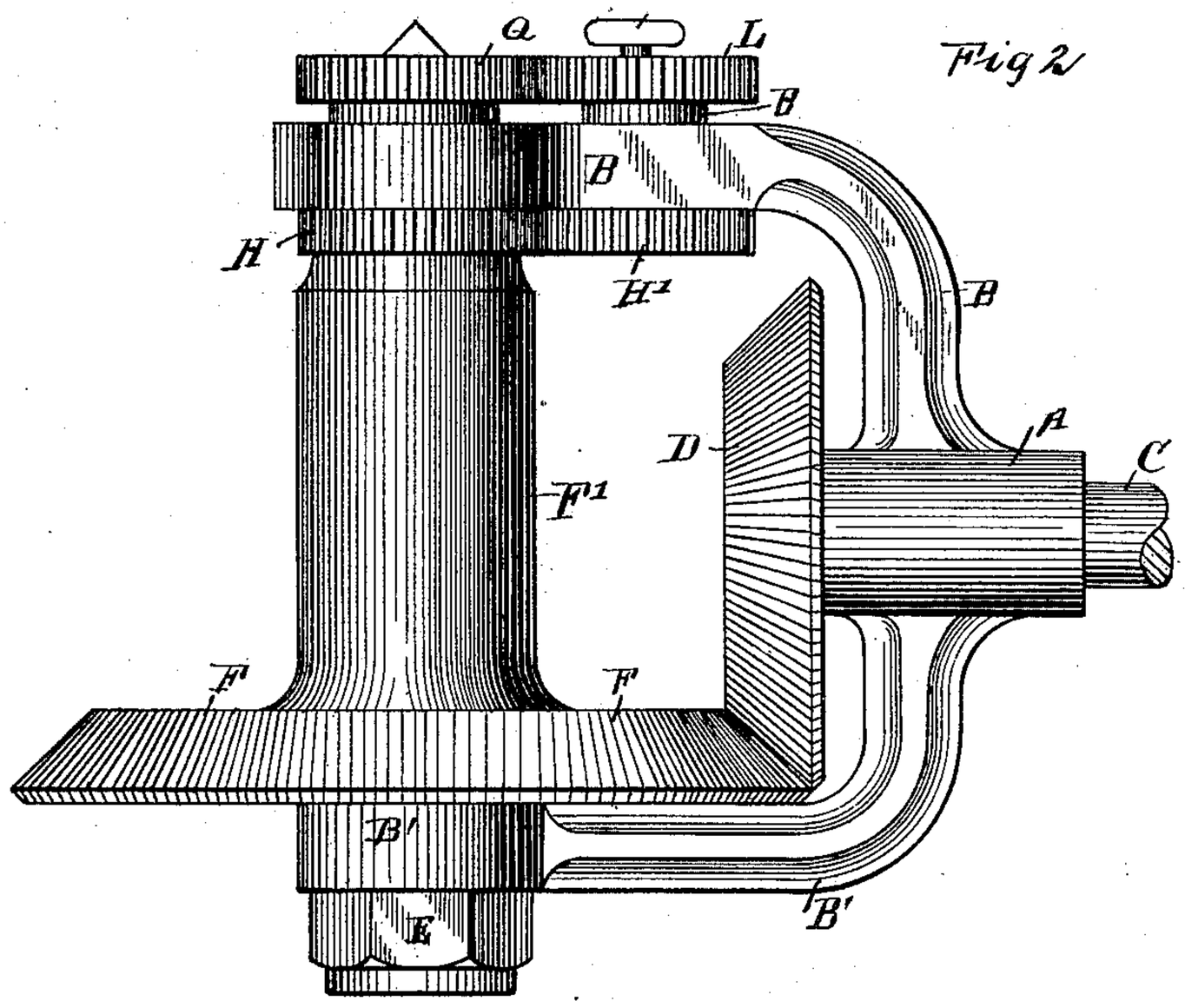


Fig 2

WITNESSES:

Jno. H. Travers

Barton Griffith

INVENTOR

John Ulrich

BY

C. C. Shepherd

ATTORNEY.

(No Model.) 2 Sheets—Sheet 2.

J. ULRICH.

AUTOMATIC DRILL FEED.

No. 429,073. Patented May 27, 1890.

Fig 3

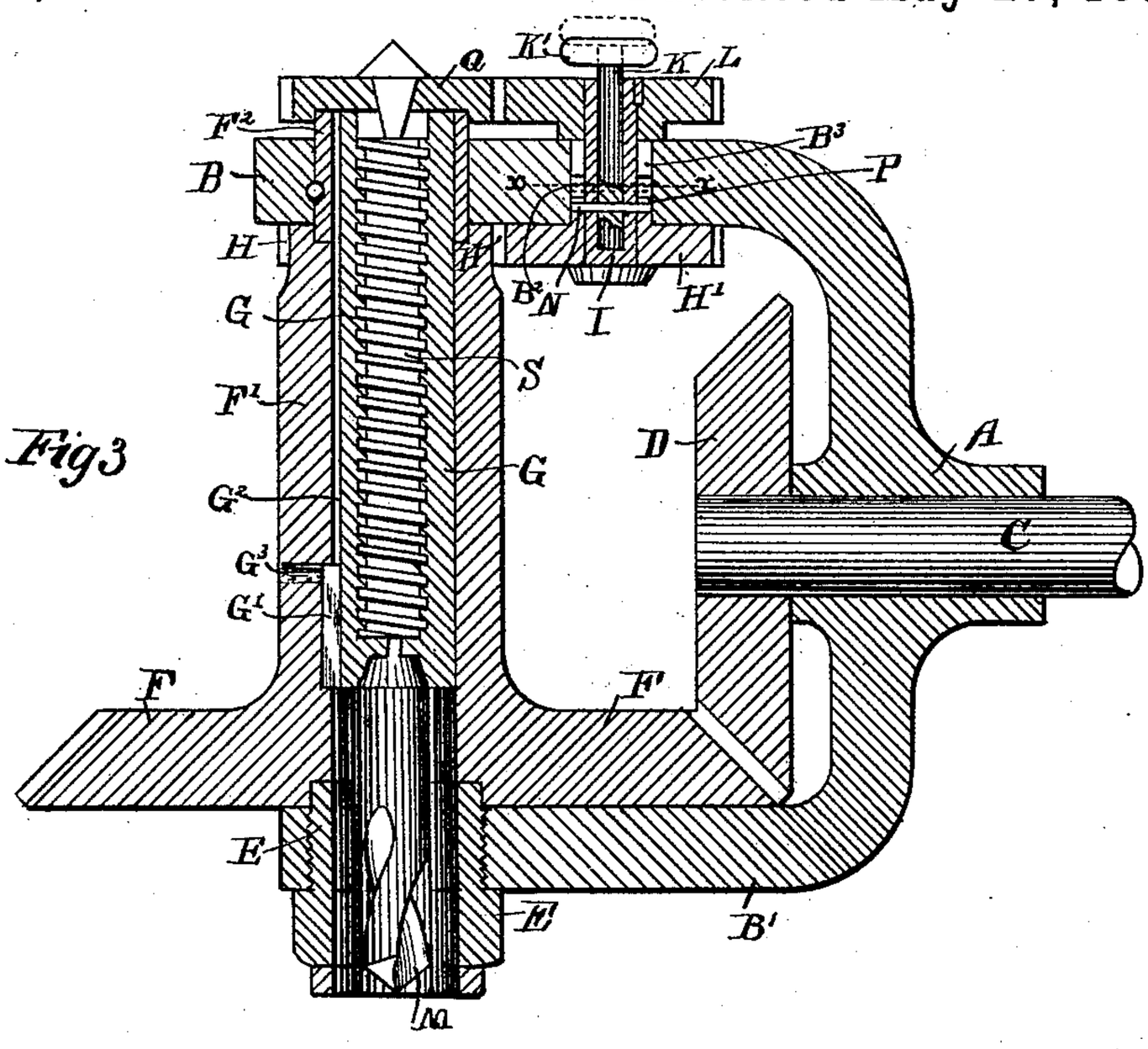
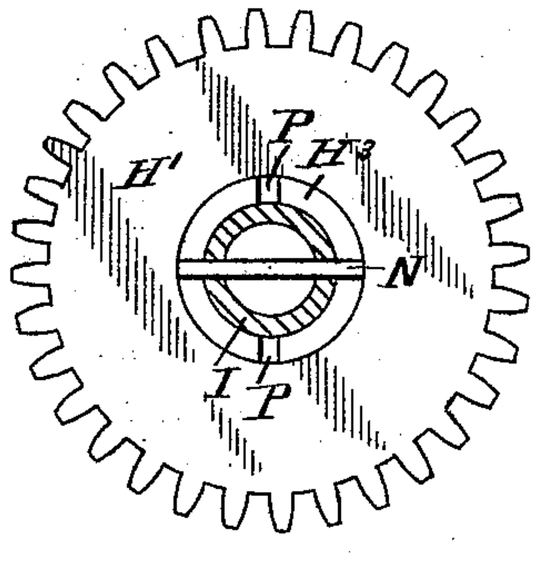


Fig 4



WITNESSES:

John. H. Franck.

Barton Griffith

INVENTOR

John Ulrich

BY C. C. Shepherd

ATTORNEY.

UNITED STATES PATENT OFFICE.

JOHN ULRICH, OF COLUMBUS, OHIO.

AUTOMATIC DRILL-FEED.

SPECIFICATION forming part of Letters Patent No. 429,073, dated May 27, 1890.

Application filed March 8, 1890. Serial No. 343,191. (No model.)

To all whom it may concern:

Be it known that I, JOHN ULRICH, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented a certain new and useful Improvement in Automatic Drill-Feeds, of which the following is a specification.

My invention relates to attachments for machines for drilling in metal; and the objects of my invention are to provide an automatic drill-feed attachment for drilling-machines, such as drilling-presses, flexibles, or machines of the lever-and-crank construction, to provide superior means for automatically feeding the drill into the work, to produce said attachment in such compact form as to admit of its use within a small operating space, to provide superior means for disconnecting the feed mechanism without affecting the rotary movement of the drill, and to construct my device in a simple, durable, and inexpensive form. These objects I accomplish in the manner illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of the invention. Fig. 2 is a side elevation. Fig. 3 is a vertical central section, and Fig. 4 is an enlarged sectional detail view on line *x x* of Fig. 3.

Similar letters refer to similar parts throughout the several views.

A represents a short horizontal bearing-hub, from which extend, respectively, upward and downward and thence forwardly two frame-arms B B′.

C represents the usual horizontal operating-shaft, which, as shown, is journaled within the frame-hub A, and carries upon its inner projecting end, in close proximity to the rear portion of the frame, a beveled gear-wheel D.

Formed in the frame-arm B′ near its outer end is a vertical screw-hole, into which is screwed from below a hollow screw E, said screw being provided with an enlarged lower end, which bears against the under side of the frame-arm B′, and having its upper end, which projects through said frame screw-hole, unthreaded, as shown.

F represents a beveled gear-wheel, having upon its upper side an elongated vertical hub F′. Formed in the lower flat side of the wheel F, about its central shaft-hole, is a circular depression or seat, which, when said wheel is supported upon the frame-arm B′, as shown, receives the upwardly-extending and smooth end of the screw E, which operates as a pivotal bearing for said wheel. The upper end of the hub F′ extends to or within close proximity to the underside of the upper arm B, and has formed therein, adjoining the central bore of the hub, a circular depression, which forms a pivotal seat for the lower end of a cylindrical bushing F^2, which passes and projects through the upper arm B, as shown.

G represents a cylindrical nut or internally-threaded sleeve, which is made to fit loosely within the bore of the hub F′, and which is of such length as to extend from the upper end of the bushing F^2 to a point in said hub approximately in line with the upper side of the wheel F. This nut or sleeve G is locked against rotary motion by means of a key G′, which, being partially seated within a vertical keyway formed in the inner wall of the lower portion of the hub F′, has a portion of its body projecting, as shown, within a vertical keyway or groove G^2, formed in and extending throughout the length of the periphery of the nut G.

As shown in the drawings, the key G′ is preferably provided at its upper end with an outwardly-extending arm G^3, which bears within a transverse key-hole in the hub, thus serving to aid in holding the key in place. The upper end of the hub F′ has formed in its periphery, by milling or otherwise, a circular row of gear-teeth H.

H′ represents a gear-wheel, which is carried, as hereinafter described, upon the lower end of a vertical spindle I, which extends through the central portion of a larger shaft-hole B^2, formed in the frame-arm B at a point in rear of the bushing F^2. This gear-wheel H′ gears, as shown, with the teeth H, and is provided on its upper side with a short upwardly-projecting hub H^3, which surrounds the shaft I and projects loosely within the shaft-hole B^2. The shaft I is provided, as shown, with a central pin-socket extending from its upper end to a point near its lower end, said socket being adapted to receive, as shown, a vertical pin K, having an enlarged head K′, which projects slightly above a gear-wheel L, fixed on the upper end of the shaft I above the frame-arm B.

Surrounding the shaft I, immediately beneath the gear-wheel L, and projecting within the upper end of the shaft-hole B^2, is a suitable bushing or collar B^3. Before the insertion of the shaft I within the shaft-hole B^2 a transverse pin or key N is made to extend through that portion of the shaft which is above and in close proximity to the gear-wheel H′. Said pin also passes through a pin-hole in the vertical pin K and has its ends projecting within the shaft-hole B^2. The projecting ends of the pin N normally rest within and engage with two oppositely-located notches P, of which there may be two or more, formed in the end of the hub H^3, thus locking together the wheel H′, shaft I, and pin K.

The gear-wheel L gears, as shown, with a gear-wheel Q, which bears upon or in close proximity to the upper end of the bushing F^2 above the frame-arm B. This gear-wheel Q is fixed upon and carried by the upper projecting end of a feeding-screw S, which is adapted to turn within the nut or sleeve G, with the internal threads of which said screw engages. The downward movement of this screw S is limited by a shoulder formed in the lower end portion of the nut G.

To the lower end of the nut G is secured in any desirable or well-known manner the upper end or shank of a downwardly-extending drill M, said drill M passing loosely through the bore of the hub F′ and its wheel F and the hollow of the screw E.

In order to attain the feed motion of my device, it is necessary that the number of the teeth H shall be less than the number of the teeth contained in the gear-wheel H′.

In constructing my device I preferably form the wheel H′ of thirty-three teeth and form thirty-four of the teeth H. The wheels L and Q are preferably formed of twenty-eight teeth. Taking these numbers as a basis, the operation of my device is as follows: Rotary motion is communicated to the beveled wheel D through the shaft C, and the revolution of the wheel D will operate to transmit motion to the wheel F and its hub F′. The rotation of the hub F′ will, through its gear-teeth H, impart motion to the wheel H′, which, through the shaft I, will impart motion to the wheel L, from which motion is transmitted to the wheel Q, and through the latter to the screw S. Owing to the nut G being keyed to the hub F′, motion is communicated from said hub to the said nut, which, through the connection of the drill and nut, imparts rotary motion to the former. Owing to the number of teeth contained in the wheel H′ being less than the number of teeth H, and to the decrease in the number of teeth in the wheels L and Q, it will be seen that the speed at which the screw S is revolved by its wheel Q will be greater than that of the speed of the hub F′ and the nut G, and that this increase of speed will result in the gradual forcing downward by the screw S of said nut within the hub, which in turn will result in the feeding downward of the drill M. In this manner it will be seen that the drill is not only revolved, but that it may be fed into the material into which the hole is being drilled without the necessity of additional attention or manipulation of the operator.

In case it is desired to disconnect the gearing which connects the screw S and hub F′, it may be accomplished by drawing upward upon the pin K until the latter is in the position shown in dotted lines of Fig. 3 of the drawings, thus withdrawing the pin or key N from its seat in the hub-notches P and allowing the wheel H′ to revolve loosely on the shaft I.

From the arrangement and construction of my device it will be seen that it may be of such compact form as to admit of its effective use within a small space, which often becomes desirable when the construction of a part to be drilled is such as to provide but a limited space for the insertion of the drill mechanism. It will also be observed that the construction of my device is simple, and that it may be produced at a reasonable cost of manufacture.

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

1. In an automatic drill-feed, the combination, with the frame, a revolving gear-wheel F, pivoted therein and having elongated hub F′, gear-teeth H upon said hub, cylindrical nut G within the bore of said hub, drill M, connected with said nut, and internal screw S, carrying gear-wheel Q, of wheel H′, the teeth of which are less in number than the teeth H, with which it gears, said wheel H′ having a gear-connection with the wheel Q, substantially as described.

2. In an automatic drill-feed, the combination, with the frame, a revolving gear-wheel F, pivoted therein and having elongated hub F′, gear-teeth H upon said hub, cylindrical nut G within the bore of said hub, drill M, connected with said nut, and internal screw S, carrying gear-wheel Q, of wheel H′, having a hub provided with notches P, shaft I, upon which wheel H is mounted, having socket and pin K therein, key or pin N, connecting, as described, shaft I, pin K, and wheel H′, and wheel L, mounted on shaft I and gearing with wheel Q, the number of teeth H being less than the teeth of the wheel H′, and the wheels L and Q having a less number of teeth than the wheel H′, as and for the purpose specified.

JOHN ULRICH.

In presence of—
C. C. SHEPHERD,
BARTON GRIFFITH.