(No Model.) 5 Sheets—Sheet 1.

# J. EDGE.

## CARDING ENGINE FOR GRINDING REVOLVING FLATS WHEN IN SITU.

No. 481,228. Patented Aug. 23, 1892.

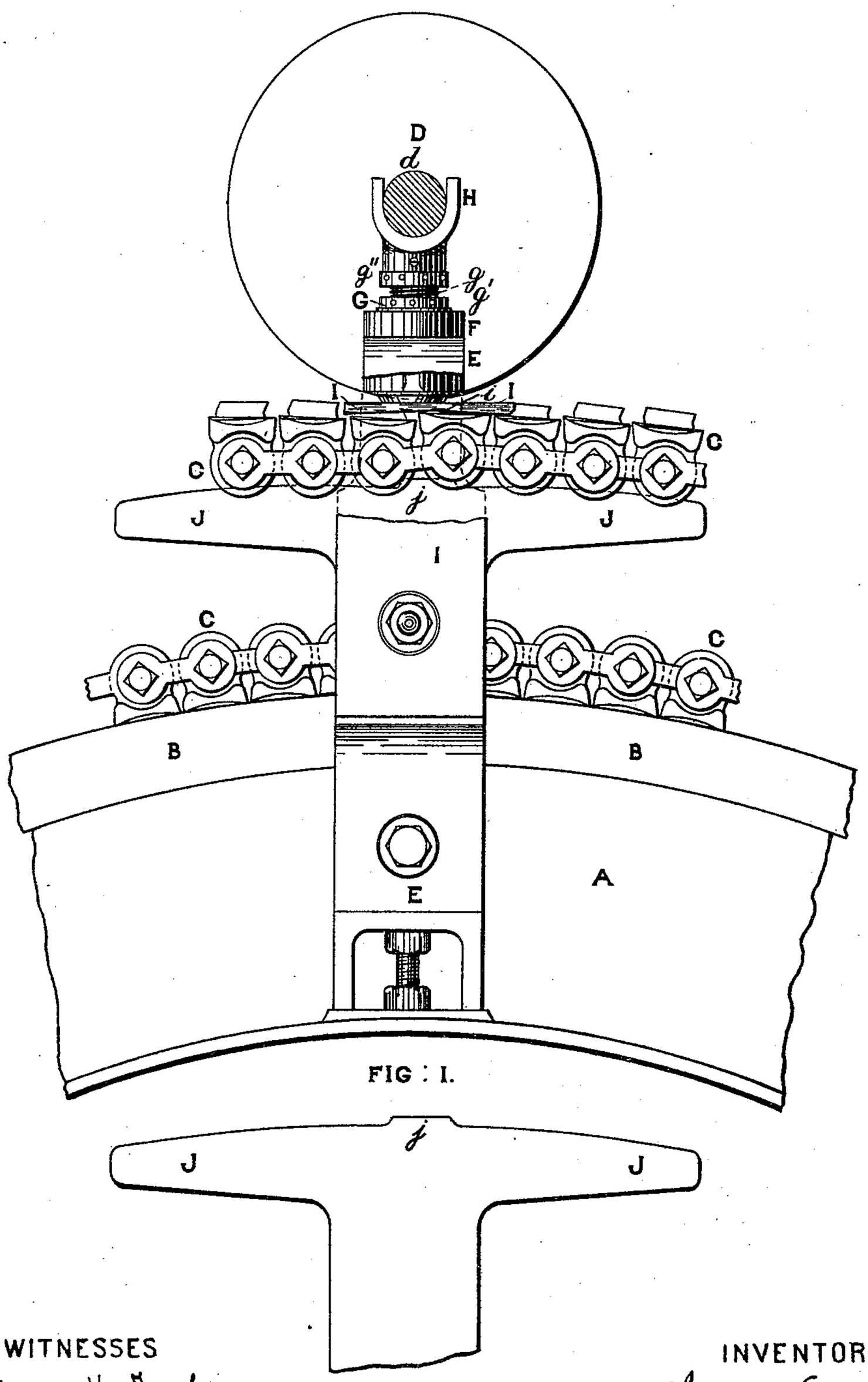


FIG: 1.




FIG: 9.

WITNESSES

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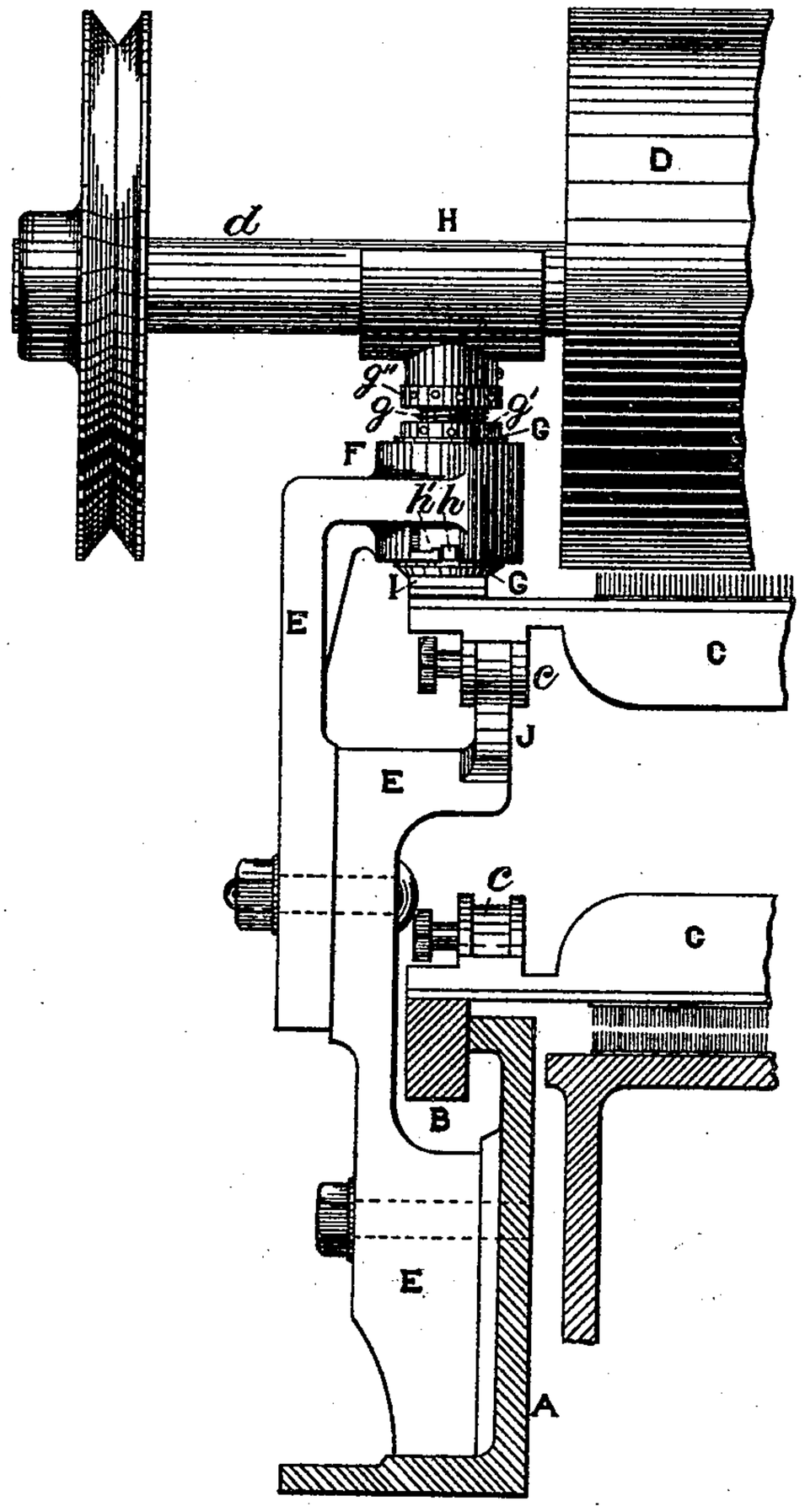


FIG. 2.

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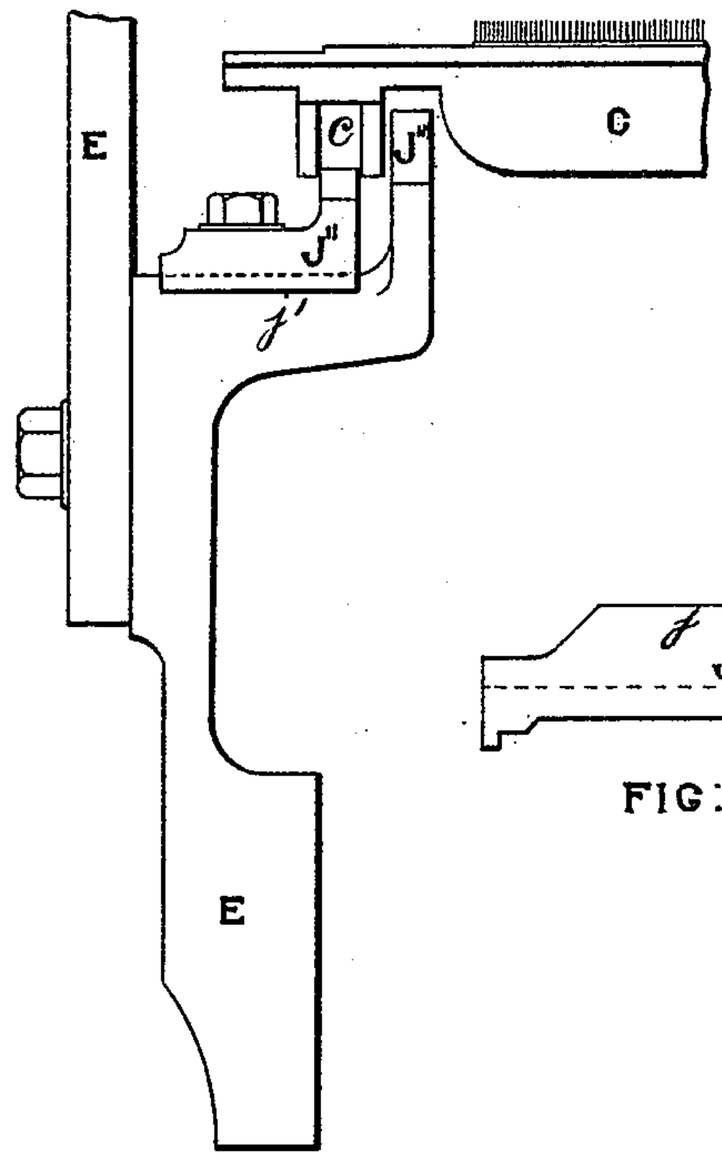
## CARDING ENGINE FOR GRINDING REVOLVING FLATS WHEN IN SITU.

No. 481,228. Patented Aug. 23, 1892.

FIG: 7.



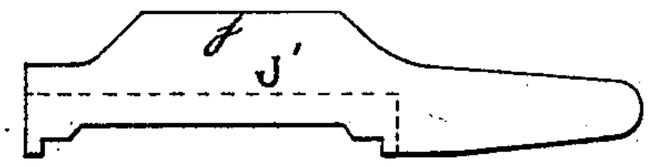




FIG: 9.a

FIG: 3.

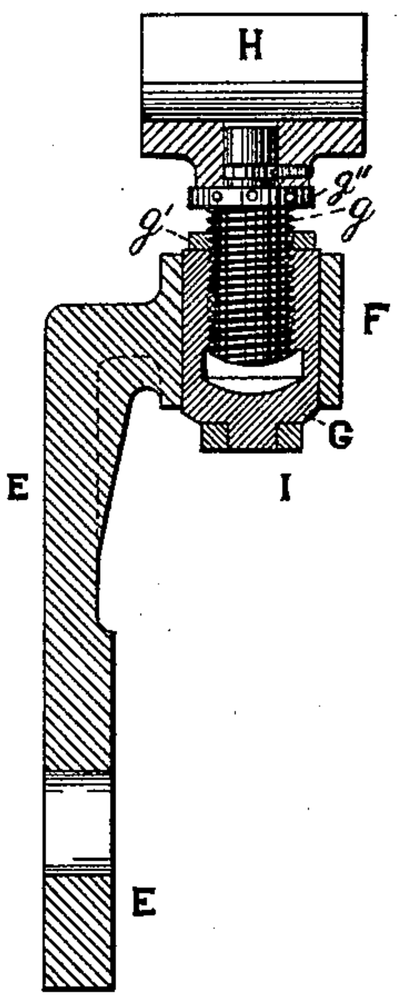
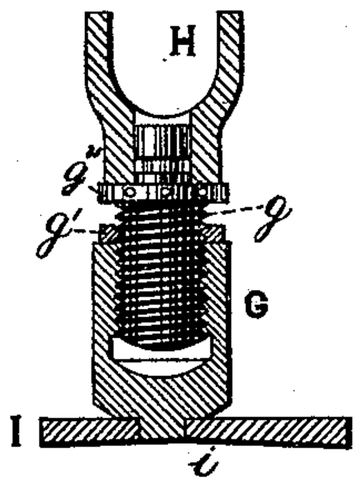



FIG: 4.



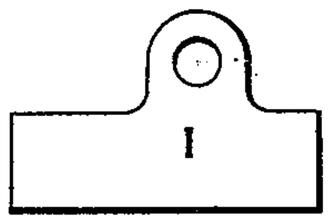





FIG: 6.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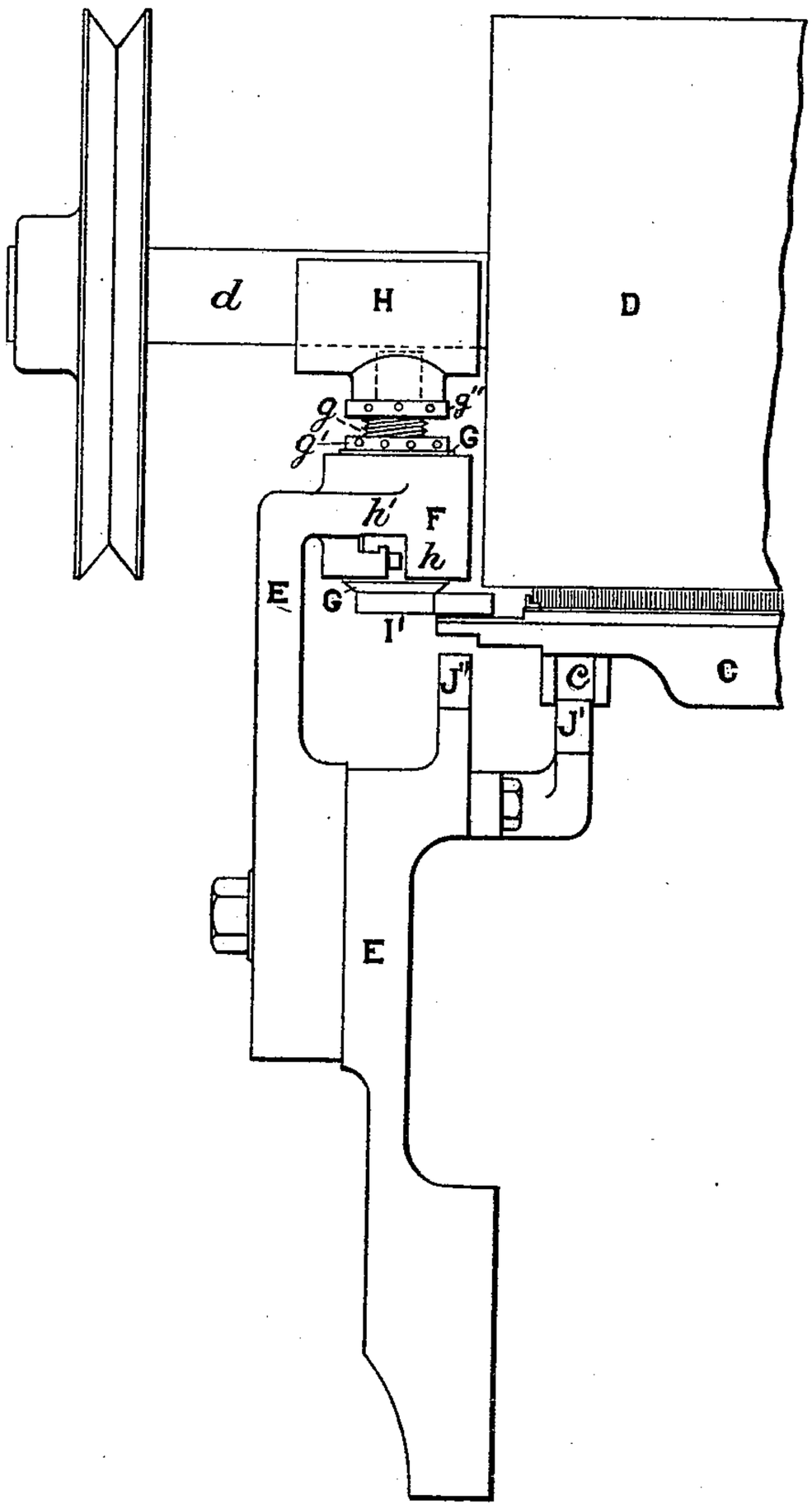
## CARDING ENGINE FOR GRINDING REVOLVING FLATS WHEN IN SITU.

No. 481,228. Patented Aug. 23, 1892.

FIG: 5.

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## CARDING ENGINE FOR GRINDING REVOLVING FLATS WHEN IN SITU.

No. 481,228. Patented Aug. 23, 1892.

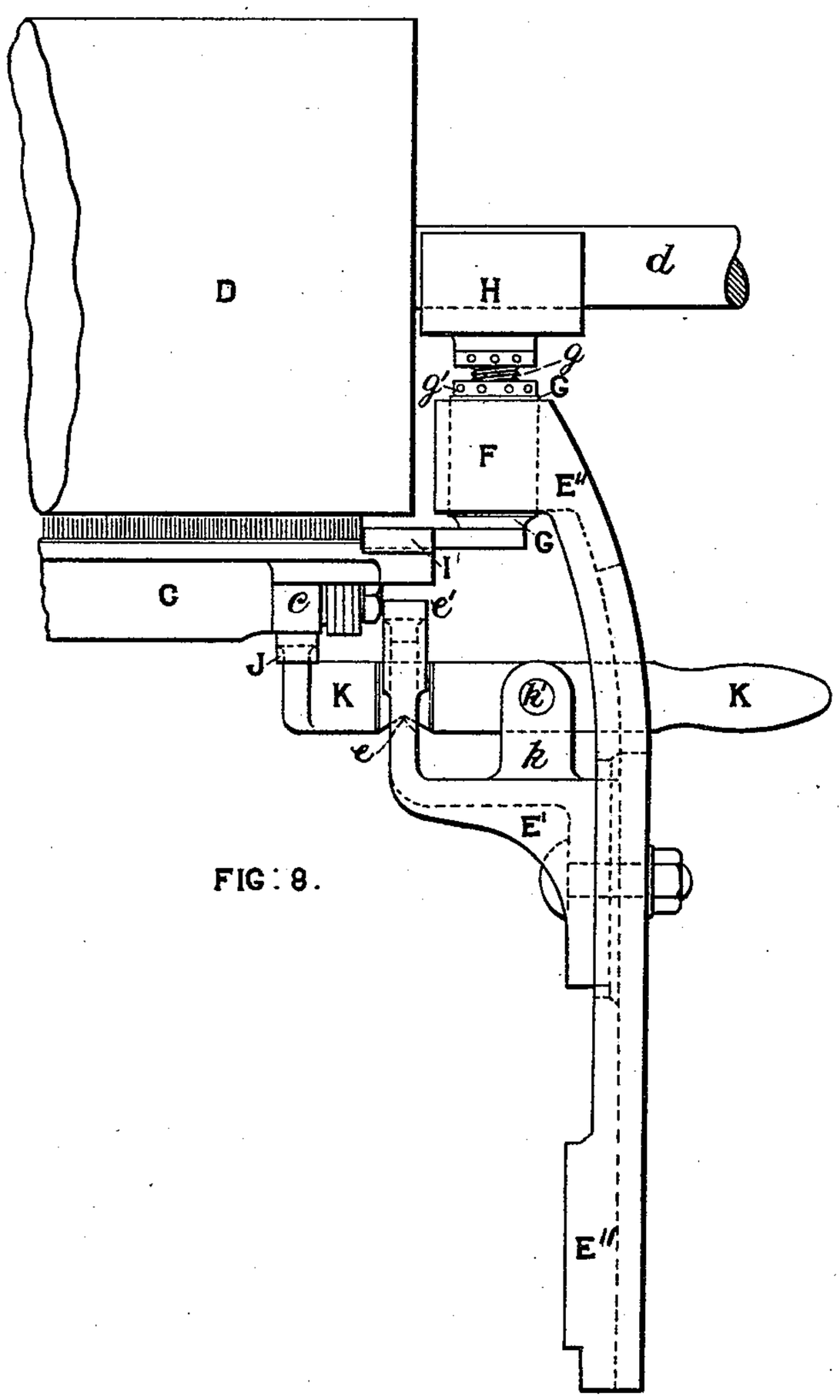


FIG: 8.

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# UNITED STATES PATENT OFFICE.

JAMES EDGE, OF GORTON, ENGLAND, ASSIGNOR OF ONE-HALF TO SAMUEL HERBERT BROOKS, OF SAME PLACE.

## CARDING-ENGINE FOR GRINDING REVOLVING FLATS WHEN IN SITU.

SPECIFICATION forming part of Letters Patent No. 481,228, dated August 23, 1892.

Application filed December 31, 1890. Serial No. 376,405. (No model.) Patented in England February 18, 1889, No. 2,835.

*To all whom it may concern:*

Be it known that I, JAMES EDGE, a subject of the Queen of Great Britain, residing at Gorton, in the county of Lancaster, England, have invented certain new and useful Improvements in Carding-Engines for Grinding Revolving Flats when in Situ, (for which I have obtained Letters Patent of Great Britain, No. 2,835, dated February 18, 1889,) of which the following is a specification.

This invention relates to that class of carding-engine in which revolving flats are employed, and is designed for the purpose of grinding such flats without removing them from the carding-engine truly and accurately, so that the face of the wires or teeth shall all be of a uniform height or distance above the working surface at the end of the flat which travels upon the flexible bend or disk and at the same inclination thereto. Hitherto this has been done in a variety of ways and by means of different arrangements of mechanism, the more usual being (*a*) to rigidly adjust the grinding-roller at the required distance above the surface of the flats and pass the flats over a rigid supporting piece or bracket upon which their backs would rest while being ground; (*b*) to rigidly adjust the grinding-roller in position above the flats and to carry the flats over the projecting end of a pivoted and counterbalanced lever which raises each flat up as it passes and holds the working surface thereof against a guide piece or bracket; (*c*) to support the grinding-roller on a vertically-sliding bracket raised as each flat passes and to carry the flats over a rigid supporting-piece, their ends coming in contact with the vertically-sliding bracket, or (*d*) to support the flat against a sliding wedge which moves with it as it passes beneath the grinding-roller.

This invention is designed with the object of supporting the grinding-roller when in operation from the "working surfaces" of the flats, and it is adjusted to each flat as it moves forward and passes beneath it. The grinding-roller at each end is mounted upon a vertically-moving stud or bracket, which during the operation of grinding is supported upon the working surface of the flat. Each flat as it passes beneath the grinding-roller is adjusted to the required angle against a surface carried by this bracket or stud, which surface is inclined to form an internal angle of from one hundred and seventy degrees to one hundred and seventy-six degrees, or such angle as is necessary to give the required bevel to the wires, and the flats are raised to or supported in position by a fixed bracket, whereon rests the curved projection which receives the link-stud, the flat being heeled or caused to move into the proper position for grinding by the inclined surface and weight of the grinding-roller bearing upon the working face thereof.

The invention will be fully described by aid of the accompanying drawings, which show sufficient of a carding-engine to illustrate the invention.

Figure 1 is a front elevation; Fig. 2, a side elevation with parts in section; Fig. 3, a sectional side elevation of the upright bracket and vertical sliding stud; Fig. 4, a front elevation of vertical sliding stud in section with plan of inclined surface plate I; Fig. 5, a side elevation applied to differently-formed card-flat; Fig. 6, a plan and front elevation of inclined surface plate I as adapted to Fig. 5; Fig. 7, an elevation showing addition of auxiliary bracket to existing supporting-brackets; Fig. 8, a side elevation of modified form of supporting-bracket to suit different makes of card; Fig. 9, an elevation of the lifting-plate J; Fig. 9ª, an elevation of lifting-plate J′.

A is the bend, and B the flexible bend or disk of the carding-engine, upon which the working surface at the ends of the flats travel.

C are the several flats, which are connected together by links in the usual way, and D is the grinding-roller, all these being constructed of any pattern or design now adopted for such parts. The grinding-roller D is supported by a bracket E, bolted to the bend. This bracket is preferably formed in two parts, one secured to the other, the function of the lower part being to lift up and support the flats as they pass forward to be ground and of the upper part to support the grinding-roller and regulate its position with reference to the flats under operation. The upper part of the upright bracket E is formed with a socket F to receive a slide or sliding stud G, upon

which rests or is carried the journal H of the grinding-roller. The journal H is of the usual half form for the spindle *d* of the grinding-roller to rest in. The shank is preferably bored out to receive the end of the stud *g*. The slide or sliding stud G is preferably formed, as shown, of two parts, the outer part, which slides in the socket F of the upright bracket, and the inner stud *g*. The inner stud *g* is screwed into the slide G, and when adjusted to the required height locked in position by the lock-nut *g'*. The stud *g* projects into the shank of the journal H, acting as a pivot for the latter to move upon, and is provided with a head *g''*, by which it can be turned, and which also serves as a collar for the journal H to rest upon.

The sliding stud G carries a plate or bracket I, the under surface of which is shaped or inclined for the working surfaces of the flats to bear against while being ground. It is preferably formed so that the lower end of the slide G projects through the bottom of the socket F, to which end the plate I is attached. The plate I is securely attached to the slide G by being riveted, bolted, or screwed thereto. The surface on the under side of the plate I is inclined in opposite directions from a point *i*, placed about half an inch in front of the center of the grinding-roller. The inclination in the direction from which the flats approach is about two and one-fourth degrees from the horizontal and in the direction in which they recede about one and three-fourth degrees, forming an angle of one hundred and seventy-six degrees (more or less) at the point *i*. The inclined surfaces as they approach the point *i* may be straight, or, if desired, curved, say to correspond with the curved surface of the flexible bend upon which the flats travel when working with the cylinder.

Hitherto, so far as I am aware, in grinding these flats the aim has been to cause the card-wire surface of the flats to travel in a plane at right angles to a radial line from the center of the grinding-roller or to a line which connects the center of the cylinder and grinding-roller. For this purpose special devices—such as a sliding wedge or two fixed parallel surfaces at different heights—have been employed. I do not consider it essential that the card-wire surface should travel throughout in the same plane; but by the inclined surface, inclined in two directions, as shown, I insure that each row of wires shall successively be presented for grinding with their bases at an equal distance from the center of the grinding-roller. The inclination of the surfaces must be adjusted to correspond with the inclination in the flats to be ground. The lower part of the bracket E, which is affixed to the bend, carries a curved or inclined lifting plate or guide J, over which the flats successively pass. The lifting plate or guide J may be formed in one with the bracket E or be attached thereto by a screw or bolt. As the flats move forward the curved projection *c* on the back of each, which is formed to receive the link-stud, rests upon and moves along the upper surface of the lifting-plate J, and the flat is gradually raised thereby until it reaches the central raised surface *j* formed thereon, when it is lifted into contact with the under inclined surfaces of the plate I. The curved under surface of the projection *c* being in contact with the surface *j* of the guide-plate, the flat can easily "heel" or turn thereon, as it may be required, consequent upon the action upon it of the inclined surfaces of the plate I. When not required to be in contact with the flats to grind them, the grinding-roller D may be raised and held clear of the flats by the pin *h* being lifted into the slot *h'*, somewhat in the form of a bayonet-joint.

The several letters of reference and the description of the parts refer to like parts in the several figures, which show the invention applied to carding-engines somewhat differently constructed or of slightly-different design. In Figs. 1 to 4 it is shown as applied to the form of carding-engine at present most generally in use. In Figs. 5 to 6 it is shown as applied to carding-engines constructed with the card-wire surface of the flat brought up to the working surface and with the flexible bend or disk so placed as to require but a very short projection of the flat beyond the cylinder. The bracket E and socket F are constructed as hereinbefore described; but the plate I', provided with the inclined surfaces, projects beyond the center of the sliding stud, so as to engage with the ends of the flats, and the lifting-plate or guide J'' is affixed to the side of the bracket E, so as to extend out to engage with the curved projection *c* of the flat. J' shows the position of the old horned guide-bracket, which is utilized to gradually lift the flats until they engage with the lifting-plate J'', which may be of the form shown in Fig. 9. In Fig. 7 it is shown as applied to a flat very similar to that shown in Fig. 2; but the lower bracket E and horned guide-bracket J' are retained in the old form, and the lifting-plate J''' is shown in the form of an auxiliary bracket (see Fig. 9ª) fitted on the top of the projecting arm *j'*. The lifting-plate J''' is here shown placed to engage with the curved projection *c* of the flat, as hereinbefore described. The lifting-plate J''' may be removed when the grinding-roller D is not in operation.

The arrangements shown in Figs 5 and 7 are intended to utilize existing brackets instead of a specially-formed bracket, as in Figs. 1, 2, and 8.

Referring to Fig. 8, the bracket E'' is shown of somewhat different shape, the plate I' with the inclined surface being arranged to project forward beyond the center of the sliding stud, as in Figs. 5 to 6. The guide J× is arranged to be interchangeable and removable from one carding-engine to another. It is carried at the end of a lever K, fulcrumed on a knife-edge at *e* on the bracket E', and is

secured in position for raising the flats up to be ground by a pin $k'$, passing through the lever K and bracket $k$, attached to or forming part of the bracket E'. The bracket E' is formed with a slide $e'$ of usual form, over which the flats travel when not being ground.

In the drawings and throughout the specification the apparatus attached to one side only of a carding-engine is referred to. It will, however, be understood that similar apparatus are applied to both sides of the carding-engine to operate upon both ends of the flats.

When the invention is in operation, the flats will travel forward in contact with the carding-cylinder and back again over the top thereof in the usual way. As the flats approach the grinding-roller they will travel up the inclined lifting plate or guide J, the projecting under part $c$ of the flats resting on the guide. On nearing the center of the guide J the flats mount up upon the raised surface $j$, which brings their working surfaces into contact with the inclined surface of the plate I, carried by the slide G. The distance between the surface of the plate I and the axis of the grinding-roller having been adjusted and set by the screw on the stug $g$, it remains constant and the position of the surface of the plate I is adjusted so that each flat as it passes between it and the guide-surface $j$ is raised and the weight of the grinding-roller brought to rest upon the working surface of each flat. It follows, therefore, that the distance between the working surface of each flat and the grinding-roller is equal and that the grinding of the flats will be all alike, the inclined surface, arranged as shown, causing all the wires to be ground to a uniform length with a level surface.

The invention may also be applied to the grinding of the card-wire surface of the flats in a stationary or other grinding machine. The inclined bearing-surface I, against which the working surface of the flats bear, may also be used in conjunction with other apparatus, such as are at present in use for grinding revolving flats.

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

1. In apparatus for grinding revolving flats when *in situ*, the combination, with an upright supporting-bracket having a socket at the upper end, of a slide or stud moving therein, fitted with a journal for the grinding-roller at one end and at the other with a guide-surface for the flats, substantially as described.

2. In apparatus for grinding the revolving flats of carding-engines, the combination, with the upright supporting-bracket, of the sliding stud G, having a bearing-surface at its lower end for the flats, stud $g$, screwed therein, and journal for axle of grinding-roller pivoted thereto, substantially as described.

3. In apparatus for grinding the revolving flats of carding-engines, the bearing-surface inclined in opposite directions, forming an angle of about one hundred and seventy-six degrees or thereabout, against which the working surfaces of the flats bear while being ground, substantially as described and shown.

4. In apparatus for grinding the revolving flats of carding-engines, the combination, with the supporting-bracket E, of the socket F, sliding stud G, journal H, and plate I, substantially as described.

5. In apparatus for grinding the revolving flats of carding-engines, the combination, with the supporting-bracket E E and socket F, of the sliding piece G, the journal H for the grinding-roller, the adjusting-screw $g$, and the plate I, against the under side of which the working surface of each flat bears, substantially as described.

6. In apparatus for grinding the revolving flats of carding-engines, the combination, with the double supporting-bracket E E and socket F, of the sliding piece G, the journal H for the grinding-roller, the plate I, against the under side of which the working surface of each flat bears, and the lifting plate or guide J, formed in one piece with or affixed to the lower bracket E, substantially as described.

7. In apparatus for grinding the revolving flats of carding-engines, the combination, with the supporting-bracket E, socket F, end sliding piece or stud G, and plate I, of the adjusting-screw $g$, nut $g'$, and journal H, substantially as described.

8. In apparatus for grinding the revolving flats of carding-engines, the combination, with the supporting-bracket E, socket F, sliding piece or stud G, journal H, and plate I, of the slot $h'$ and pin $h$, substantially as and for the purpose described.

9. In apparatus for grinding the revolving flats of carding-engines, the combination, with the supporting-bracket E, socket F, stud G, journal H, and plate I, of the bracket E', lever K, carrying the lifting-plate J, bracket $k$, pin $k'$, and knife-edge $e$, substantially as described.

10. In apparatus for grinding the revolving flats of carding-engines, the combination, with the grinding-roller D, flat C, and curved projecting piece $c$ thereon, of the supporting-bracket E, the socket F, the sliding piece or stud G, adjusting-screw $g$, socket H, inclined surface plate I, and lifting-plate J, substantially as described and shown.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, the 17th day of December, 1890.

JAMES EDGE.

Witnesses:
J. OWDEN O'BRIEN,
CHAS. OVENDALE.