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Patented Oct. 9, 1900.

C. HOFF & G. H. KLOTTER.

MACHINE FOR MANUFACTURING FIRE KINDLERS, &c.

(Application filed Nov. 27, 1899.)

(No Model.)

3 Sheets—Sheet 1.

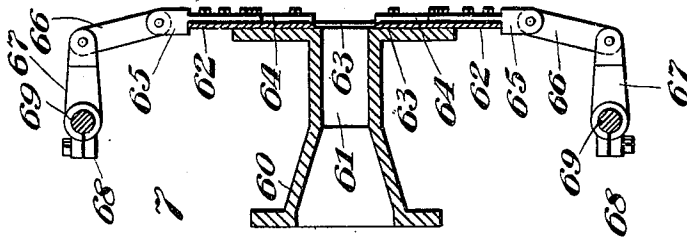


Fig. 7

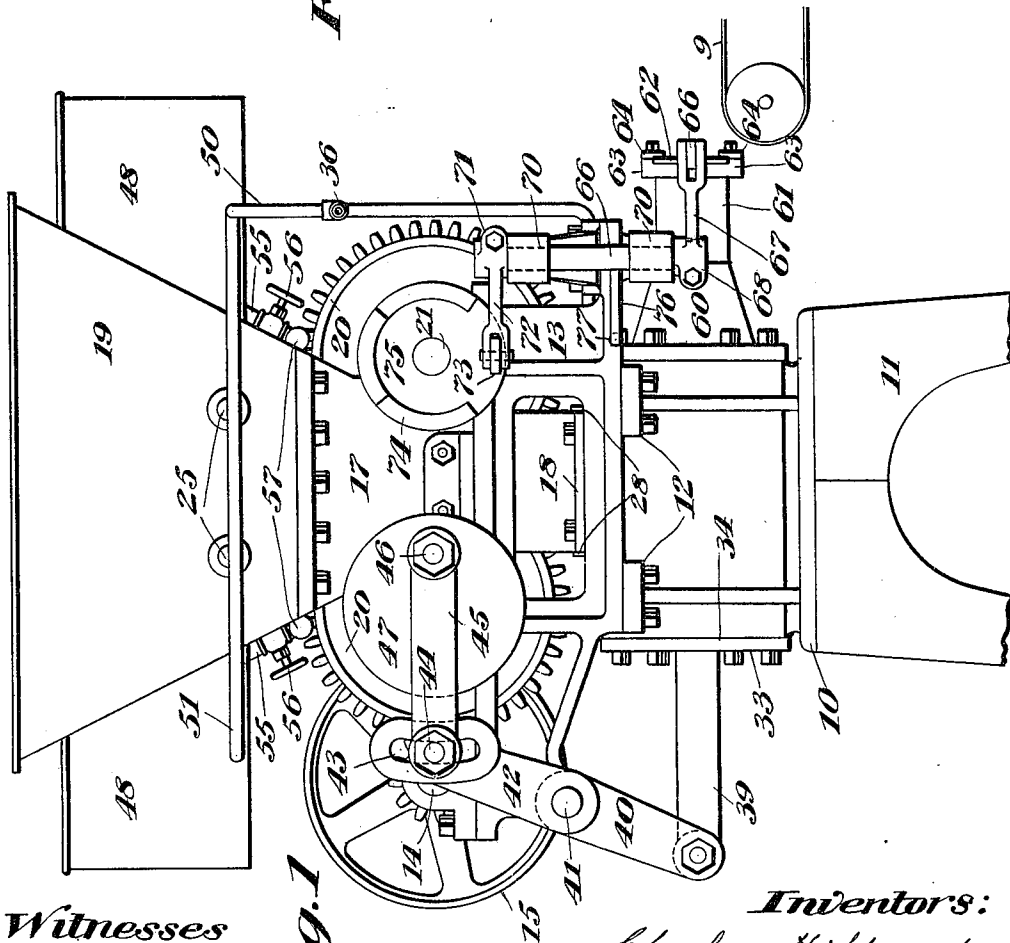


Fig. 1

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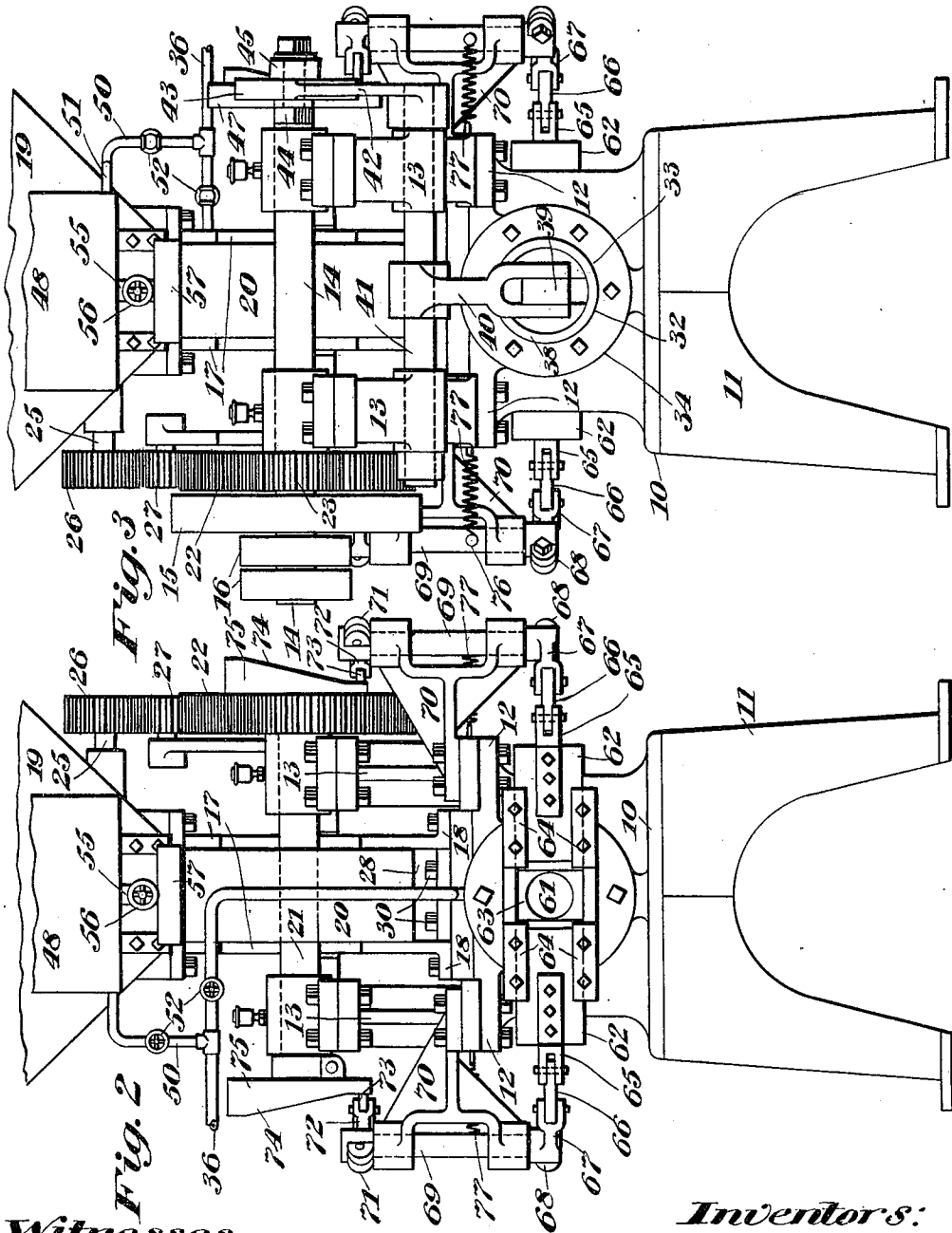
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3 Sheets—Sheet 2.



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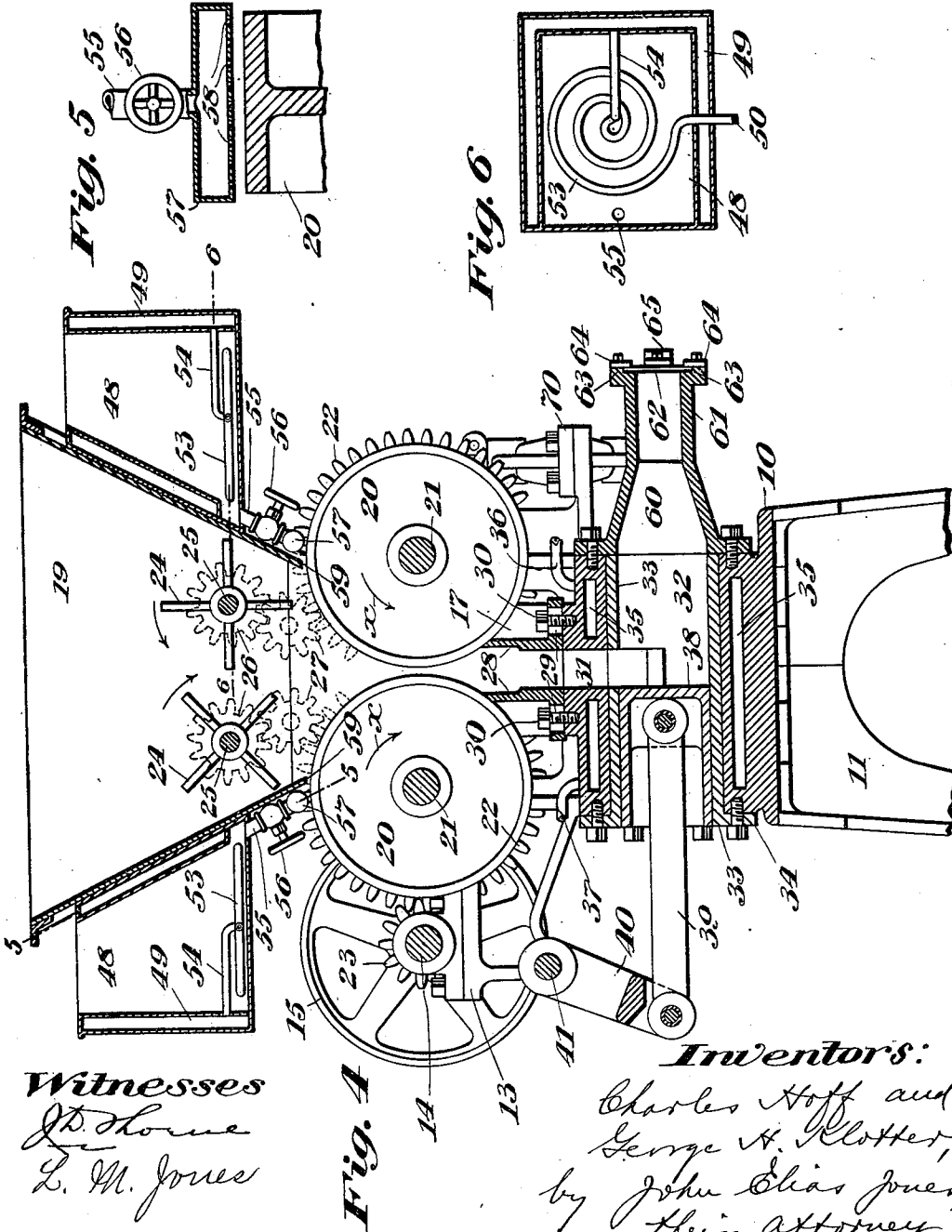
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3 Sheets—Sheet 3.



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# UNITED STATES PATENT OFFICE.

CHARLES HOFF AND GEORGE HUMBOLDT KLOTTER, OF CINCINNATI, OHIO.

## MACHINE FOR MANUFACTURING FIRE-KINDLERS, &c.

SPECIFICATION forming part of Letters Patent No. 659,229, dated October 9, 1900.

Application filed November 27, 1899. Serial No. 738,299. (No model.)

*To all whom it may concern:*

Be it known that we, CHARLES HOFF and GEORGE HUMBOLDT KLOTTER, citizens of the United States of America, and residents of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Machines for the Manufacture of Fire-Kindlers, &c., of which the following is a specification.

This invention relates to certain improvements in machines for manufacturing fire-kindlers from sawdust, chips, coal-slack, &c., with rosin, pitch, or the like; and the object of the invention is to provide a machine of this character of a simple and inexpensive nature which shall be strong and durable in construction and shall be adapted for intimately mixing the several ingredients together and compressing and molding them while in a plastic or semiplastic state into the desired form and in a continuous and rapid manner.

The invention consists in certain novel features of the construction, combination, and arrangement of the several parts of the improved machine, whereby certain important advantages are attained and the device is made simpler, cheaper, and otherwise better adapted and more convenient for use, all as will be hereinafter fully set forth.

The novel features of the invention will be carefully defined in the claims.

In the accompanying drawings, which serve to illustrate our invention, Figure 1 is a side elevation of the improved machine, the lower part of the bed-plate being broken away. Fig. 2 is a front end elevation of the machine, showing the discharge end thereof; and Fig. 3 is a rear end elevation of the machine. Fig. 4 is a vertical section taken lengthwise through the machine. Fig. 5 is an enlarged fragmentary sectional view taken in the plane indicated by the line 5 5 in Fig. 4 and showing the means for supplying liquid material for admixture with the solid substance or substances. Fig. 6 is a fragmentary sectional view taken in the plane indicated by the line 6 6 in Fig. 4 and showing the arrangement of the steam-coils in the liquid-reservoirs. Fig. 7 is a sectional view taken horizontally through the discharge end of the compression-cylinder and showing the means for cutting the com-

pressed and molded material into lengths or sections.

In the views, 10 indicates the bed-plate of the machine, supported upon legs 11 and having at its upper part oppositely-extended lugs 12, whereon are supported brackets 13, at opposite sides of the machine. On the brackets 13, at the rear end of the machine, are boxes wherein is held to turn the machine a shaft 14, having a fly-wheel 15 and tight and loose pulleys 16, so that the machine may be driven from any suitable source of power, and on the bed-plate 10, between the brackets 13, are mounted side plates or flattened standards 17, having at their lower ends flanges 18, bolted to the bed-plate. A hopper 19 is supported upon the upper ends of the standards, such hopper being designed to hold the solid materials to be mixed, compressed, and molded and being arranged to discharge its contents down into the space between the standards or side plates 17, which, as shown, are separated from each other to receive between them feed-wheels 20, having flat peripheries and held on shafts 21, which extend parallel with the machine-shaft 14, but in front thereof, and are also held in boxes on the brackets 13.

The feed-wheel shafts 21 are geared to turn in opposite directions by means of inter-meshing gear-wheels 22, which in turn are driven from a pinion 23 upon the machine-shaft 14, so that in the operation of the machine the rotation of the feed-wheels will aid in feeding the materials supplied into the space between the standards down between them to the compressing and molding devices and will also aid in mixing the materials intimately together and in crushing up any lumps or large particles, which might otherwise tend to clog the machine. To further assist in feeding the materials from the hopper 19, agitating devices, as indicated at 24, may be employed, held in the hopper upon shafts 25, the ends of which extend outside the hopper and carry spur-gears 26, meshing with pinions 27 in gear with the gear-wheels 22 of the feed-wheel shafts.

Beneath the feed-wheels 20 the space between the standards or side plates 17 is closed at front and back of the machine by scrapers 28, made in angular form, having slots 29 to receive screws 30, by means of which they

may be adjustably secured upon the bed-plate 10, as clearly shown in Fig. 4, in position with their upper beveled edges in close contact with the peripheries of the feed-wheels in such a way as to scrape off all of the materials which may adhere to the feed-wheels and direct such materials down through a port 31 in the upper part of the bed-plate 10 and between the scrapers 28 and side-plates 17 into the compression chamber or cylinder 32 of the machine, which chamber is formed in the said bed-plate, as clearly shown in Fig. 4, and has a removable lining 33, flanged, as shown at 34, at one end and bolted to the rear end of the bed-plate 10. A steam-jacket 35 is also formed in the bed-plate surrounding the compression-chamber 32, said jacket being supplied with steam by means of a pipe 36, leading to a suitable steam-supply, and having an exhaust-pipe 37 for the discharge of steam from it, and in the compression-chamber is arranged to play a piston 38, having its connecting-rod 39 protruding at the rear end of the chamber or cylinder and connected to a forked arm 40, held on a rock-shaft 41, journaled in the brackets 13 at the rear end of the machine and beneath the machine-shaft 14.

The rock-shaft 41 has at one end an upwardly-extending arm 42, the extremity of which is slotted, as shown at 43 in Fig. 1, to receive a pin 44, whereby one end of a connecting rod or link 40 is adjustably coupled thereto, the opposite end of said link being held on a crank or wrist pin 46 upon a crank-disk 47, fixed to the end of the rearmost feed-wheel shaft 21, at the end thereof opposite to the gears 22.

48 indicates the reservoir for containing the liquid material for admixture with the solid materials held in the hopper 19, there being, as herein shown, two of these reservoirs, one at the front and one at the back of the machine. The reservoirs have their walls formed with steam spaces or jackets 49, to which steam is admitted by way of a pipe 50, branching from the steam-pipe 36, which leads to the jacket 35 of the compression-chamber. The pipe 36 is located at the front of the machine, and the branch pipe 50 connects it with the forward liquid-reservoir 48, the rear reservoir being supplied with steam by way of a pipe 51, (see Figs. 1 and 3,) extending along one side of the hopper 19. Inside each reservoir the steam-supply pipe communicates with a coil 53 at the bottom of the reservoir, said coil being in communication with the steam space or jacket 49 by way of a pipe 54, as clearly shown in Figs. 4 and 6. Cocks 52 (seen in Figs. 2 and 3) serve for the proper regulation of the steam-supply to the jackets 35 and 49.

The liquid is discharged from the reservoirs 48 by way of outlet-pipes 55, having valves 56 and extending down close to the walls of hopper 19 into communication with diffusing or spraying devices 57, made in elongated or tu-

bular form, as clearly shown in Figs. 2, 3, 4, and 5, and arranged each above one of the respective feed-wheels 20. The under side of each of the spraying-tubes 57 has a longitudinal series of openings 58, through which the liquid is discharged upon the peripheries of the feed-wheels 20, and the hopper-walls are cut away slightly, as shown at 59 in Fig. 4, to insure the free passage of the liquid upon the feed-wheels, which move in the directions of arrows  $x$  in said figure, into the space wherein the solid, finely-divided, or powdered material is held.

The compression cylinder or chamber 32 has a cone-shaped or tapered discharge-section 60, which terminates in a die portion 61, of rounded or other cross-sectional form, said die portion having lateral extensions at its front end, whereon are held knives 62, movable toward and from each other in undercut guideways 63 and held in place by suitable keepers 64, as clearly shown in Figs. 2, 4, and 7. To the blades 62 are bolted plates 65, which are forked to receive pivoted links 66, the opposite ends of which are held pivotally in forked arms 67, held by means of split collars 68 upon the lower ends of vertical rock-shafts 69, carried in brackets 70, and having at their upper ends arms 72, held also by split collars 71 upon the shafts and forked at their ends to receive collars 73, which engage and roll upon cam-surfaces 74 upon the outer faces of cams 75, held upon opposite ends of the forward feed-wheel shaft 21.

In the operation of the machine the machine-shaft 14 being set in rotation imparts its movement through the gearing to the agitator-shafts 25 to stir the solid materials in the hopper and to turn the feed-wheels 20 in the direction of the arrows  $x$ , so as to cause the material from the hopper to pass down between said wheels, so as to be intimately mixed and, if need be, broken up. From the feed-wheels the material passes through the port 31 into the compression-chamber, wherein the piston 38 reciprocates, being also actuated from the shaft 14, so as to force the material toward the tapered discharge end of the chamber, whereby the material is compressed and molded into the proper form by the die portion 61 of the section 60. During the feeding of the dry materials from the hopper, as above set forth, the liquid material contained in the reservoirs 48 will be added thereto by manipulating the cocks 56, so as to permit the discharge of such liquid from the spraying-tubes 57 through their orifices 58 onto the peripheries of the feed-wheels 20, by which the liquid is carried into the apparatus and incorporated with the other ingredients. The steam-jackets 49 and 35 serve to maintain the liquid in the reservoirs at the proper temperature and also to maintain the plastic or semiplastic mass within the compression-chamber at a suitable temperature to prevent the liquid rosin or pitch from solidifying before the mass has been compressed and molded into form.

As the mixed materials under compression in chamber 32 are acted on by the piston they will be forced out through the discharge-section 60 of the compression-chamber, and by the die 61 thereof will be molded to the desired cross-sectional form, and on issuing from said die the molded material will be cut or severed into suitable lengths by the knives 62, said knives being moved toward each other at each rotation of the forward feed-wheel shaft 21, from the cams 75 of which they are actuated, and being moved away from each other again by the springs 77, which return the rock-shafts 69 to their normal positions after the rollers 73 have passed over the raised surfaces of the cams 75. Upon issuing from the die 61 the completed fire-kindlers fall upon a conveyer of suitable construction, (indicated at 9 in Fig. 1,) by which they are carried away and permitted to dry thoroughly.

From the above description it will be seen that the machine constructed as above described is of an extremely simple and inexpensive nature and is especially well adapted for use in manufacturing fire-kindlers and the like from rosin or pitch and sawdust, wood shavings, chips, or coal-slack, or other waste materials, and it will also be obvious that the machine is capable of some modification without material departure from the principles and spirit of the invention, and for this reason we do not wish to be understood as limiting ourselves to the precise form and arrangement of the several parts herein set forth.

Having thus described our invention, we claim—

1. In a machine of the character described, the combination of compressing and molding devices, feed-wheels arranged to receive between them materials to be fed to the compressing and molding devices, means for supplying solid materials between the feed-wheels, tubes arranged across the peripheries of the feed-wheels and having spray-orifices for the discharge of liquid thereon, and means for supplying liquid to said tubes, substantially as set forth.

2. In a machine of the character described, the combination of a bed-plate having a compression-chamber and provided with a port leading thereto, feed-wheels arranged to discharge materials to said port, shafts on which

the feed-wheels are held, a crank on one of the said feed-wheel shafts, a compressing device in the compression-chamber, a driving means for the feed-wheel shafts, and means comprising a rock-shaft connected to the crank on the feed-wheel shaft for actuating the compressing device from the feed-wheel shafts, substantially as set forth.

3. In a machine of the character described, the combination of a bed-plate having a compression-chamber and provided with a port leading thereto, feed-wheels arranged to discharge materials to said port, shafts on which the feed-wheels are held, a piston in the compression-chamber, a crank on one of the feed-wheel shafts, and a rock-shaft having one arm connected to the piston and another arm connected to the crank of the feed-wheel shaft, substantially as set forth.

4. In a machine of the character described, the combination of a bed-plate having a compression-cylinder, a piston therein, a discharge-section for the cylinder provided with a die portion, knives arranged on opposite sides of the die and adapted to move toward and away from each other to sever the molded material issuing from said die into lengths, and means for actuating said knives, substantially as set forth.

5. In a machine of the character described, the combination of a bed-plate having a compression-cylinder, a piston therein, a discharge-section for the cylinder provided with a die portion, knives arranged on opposite sides of the die and arranged, when moved toward each other, to sever the molded material issuing from said die, feed-wheels for feeding the material to the compression-cylinder, shafts on which said feed-wheels are held, cams on one of said feed-wheel shafts, and rock-shafts each provided with two arms, one of which has a roller engaging one of said cams and the other of which is connected to one of said knives for moving the same, substantially as set forth.

Signed by us, at Cincinnati, State of Ohio, this 6th day of November, 1899.

CHARLES HOFF.  
GEORGE HUMBOLDT KLOTTER.

Witnesses:

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L. M. JONES.