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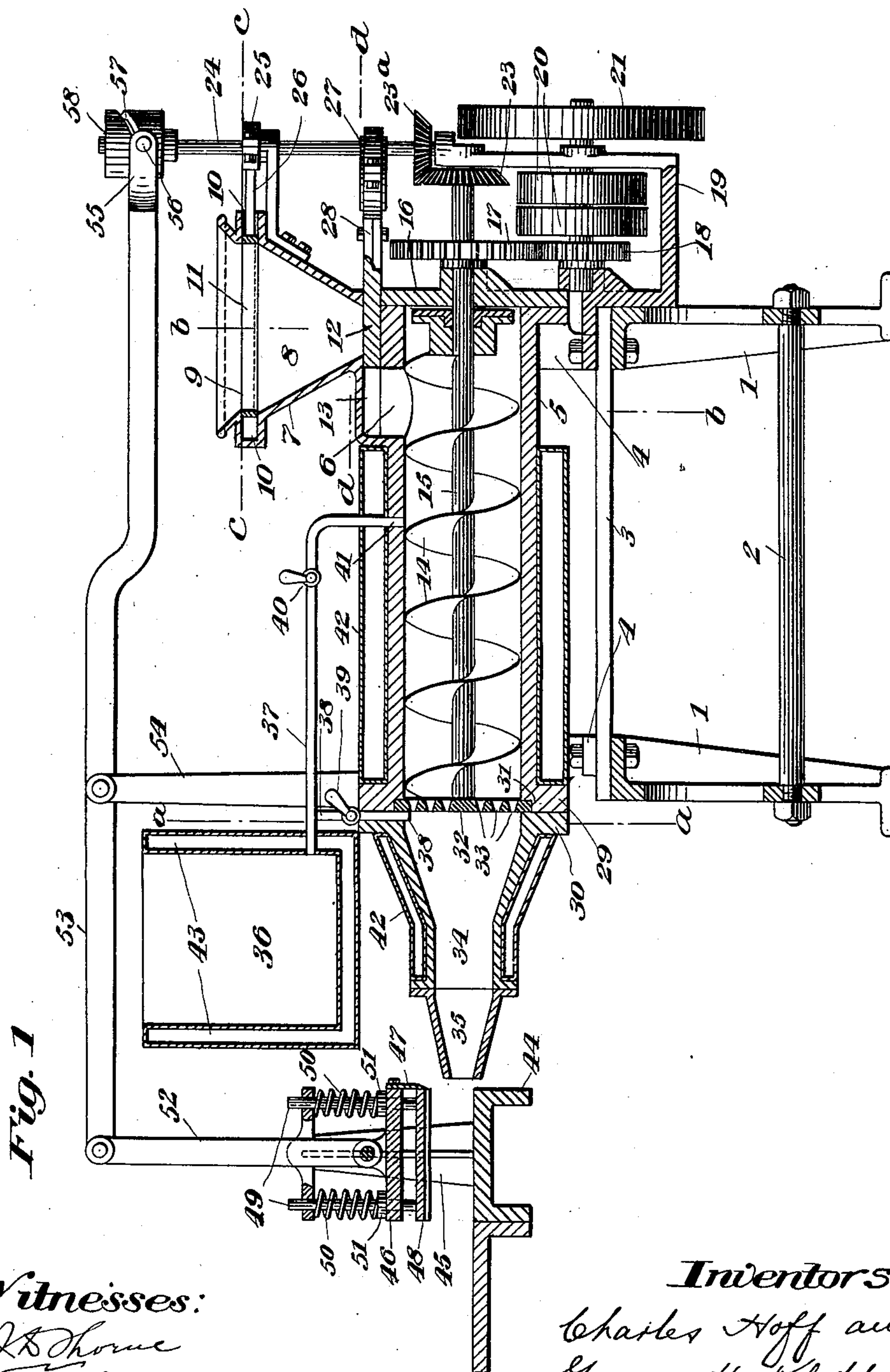
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MACHINE FOR MANUFACTURING FIRE KINDLERS, &c.

(Application filed July 1, 1899.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses:

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Inventors:

Charles Hoff and
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their Attorney.

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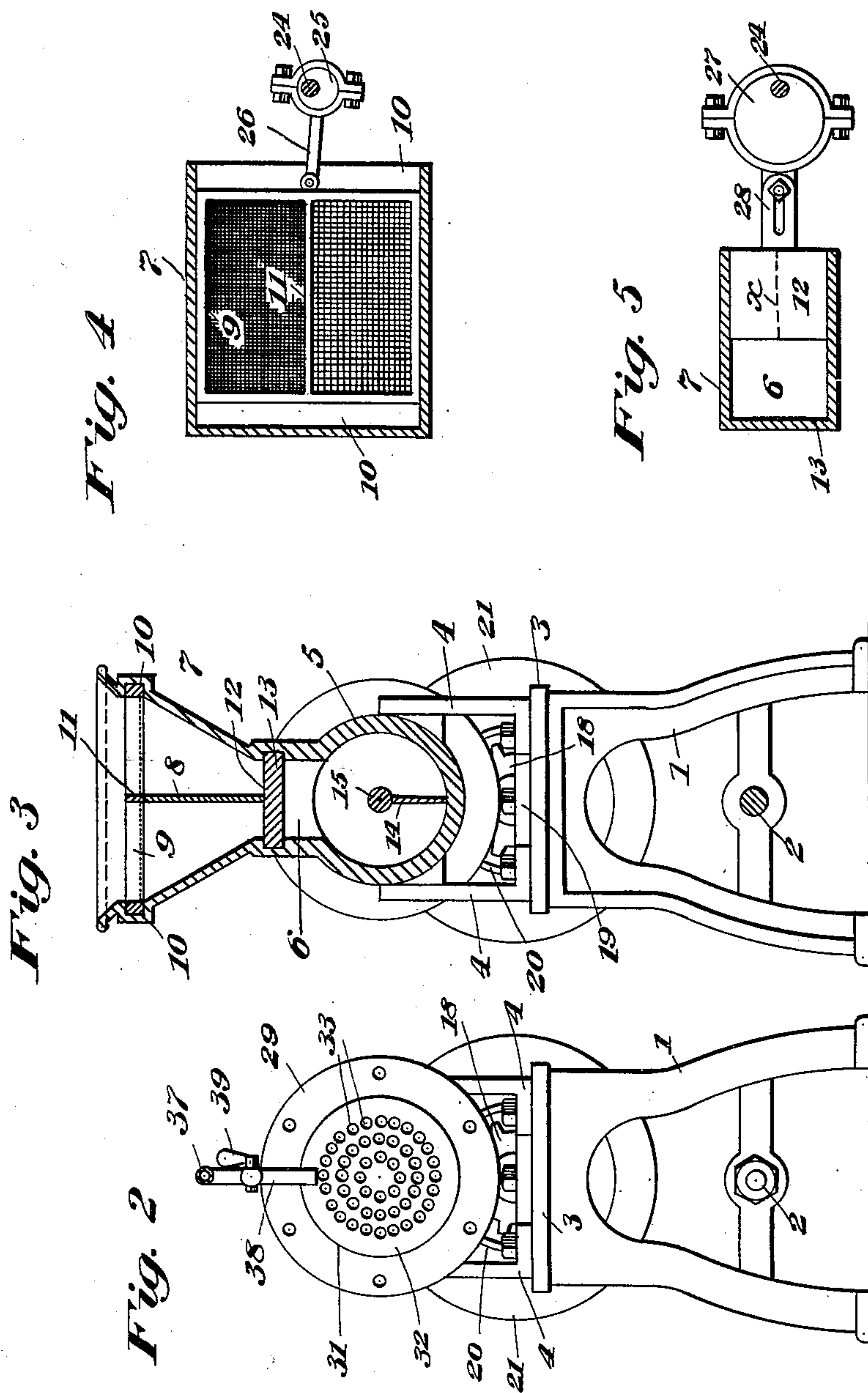
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UNITED STATES PATENT OFFICE.

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

MACHINE FOR MANUFACTURING FIRE-KINDLERS, &c.

SPECIFICATION forming part of Letters Patent No. 636,530, dated November 7, 1899.

Application filed July 1, 1899. Serial No. 722,490. (No model.)

To all whom it may concern:

Be it known that we, CHARLES HOFF and GEORGE H. KLOTTER, citizens of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented new and useful Improvements in Mixing and Concentrating Machines for Use in the Manufacture of Fire-Kindlers, Sausages, Popcorn Balls, and other Compounded Commodities, of which the following is a specification.

This invention relates to certain improvements in apparatus for mixing and forming or molding plastic or compound materials, and has for its object to provide a machine or apparatus of a simple and inexpensive nature and of a strong and durable construction which shall be adapted for use in intimately mixing plastic or semiplastic materials and for forming them into shape, the machine being more especially designed for the manufacture of fire-kindlers from coal-slack, sawdust, wood-shavings, and similar waste material.

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 vertical section taken longitudinally through a machine embodying the invention, and Fig. 2 is a fragmentary cross-section taken vertically through the same in the plane indicated by the line *a a* in Fig. 1. Fig. 3 is a fragmentary cross-section taken vertically through the machine in the plane indicated by the line *b b* in Fig. 1. Fig. 4 is a fragmentary sectional plan taken in the plane indicated by the line *c c* in Fig. 1. Fig. 5 is a fragmentary sectional plan taken in the plane indicated by the line *d d* in Fig. 1.

As shown in the drawings, the frame of the machine is constructed of end pieces 1, connected at their lower parts by means of a longitudinal brace or tie rod 2 and at their upper parts by means of a bed-plate 3, whereon

is secured, by means of suitable brackets 4, the cylinder 5 of the machine, having a feed-opening 6, whereat the materials to be mixed and molded are introduced from a hopper 7, arranged over the cylinder at the rear end of the machine. The hopper 7 is, by preference, constructed with a vertical partition 8 extending across it and serving to divide its interior into two compartments, one of which is adapted to receive sawdust, wood-shavings, chips, or the like, and the other of which is adapted to receive the coal-slack from which the fire-kindlers are to be manufactured.

The hopper 7 is provided at its upper part or mouth with a screen 9 of rectangular form, mounted for sliding movement in a guide-way 10, formed in the walls of the hopper. The screen 9 has imparted to it a shaking movement to cause it to sift or screen the materials to be fed to the cylinder before they are introduced into the hopper, and said screen is provided with a central partition 11, extended across it in line with the partition 8 of the hopper and adapted to keep the materials introduced into the respective compartments of the hopper separated from each other while being screened. The lower end of the hopper is controlled by a flat valve 12, mounted to slide in a valve-chamber 13 beneath the hopper and in the upper wall of the cylinder 5 at the rear of the feed-opening 6 therein, said valve being arranged to extend, as shown in the drawings, beneath each of the compartments of the hopper and being also provided with actuating means, as will be hereinafter described.

In the interior of the cylinder 5 is mounted a feed screw or worm 14, held on a shaft 15, extending in the axis of the cylinder and having one end extended through the head 16 at the rear end of the cylinder and provided with a toothed gear 17, with which meshes a gear-pinion 18 on a driving-shaft journaled in a bracket 19, bolted to the frame, said driving-shaft carrying tight and loose pulleys 20, adapted to receive a belt (not shown) by means of which the shaft may be driven from any suitable source of power. The driving-shaft also carries outside the bracket 19 a fly-wheel 21, as shown in Fig. 1. On the projecting end of the cylinder-shaft 15 is also held a bevel gear-wheel 23, with which meshes a

bevel-pinion 23^a on a vertical shaft 24, stepped at its lower end in the bracket 19 and having suitable journals at its upper part, said shaft having on it an eccentric 25, the strap of which is coupled by a rod 26 with the shaking-screen 9, as clearly shown in Figs. 1 and 4. The shaft 24 also carries at a lower point another eccentric 27, the strap of which has an adjustable connection 28 with the sliding valve 12, which controls the discharge of material from the hopper to the feed-opening 6 of the cylinder 5. By reason of the adjustable connection 28 between the valve 12 and its eccentric 27 the valve may be positioned under the discharge-outlet of the hopper so as to feed any desired quantity of materials from the hopper to the cylinder. When it is desired to vary the proportions of the materials fed from the respective compartments of the hopper, two valves may be employed in the place of the single valve 12, the inner edges of the valves meeting along a line beneath the partition 8 of the hopper, as indicated in dotted lines at *x* in Fig. 5, and said two valves may be coupled adjustably to the eccentric 27 independently of one another.

The forward end of the cylinder 5 is constructed with an annular projecting flange 29, whereon fits a similar flange 30, formed on the rear end of the discharge-section 34 of said cylinder. The outer face of the flange 29 is formed with an annular seat or recess 31, in which is held to turn between the two flanges 29 and 30 a disk 32, secured to and held to turn with the forward end of the cylinder-shaft 15. The disk 32 by its engagement with the seat 31 of flange 29 also serves as a bearing for the forward end of the cylinder-shaft, and said disk is formed with a multiplicity of openings 33, each tapered in form, being reduced or contracted at the front face of the disk, through which openings the materials mixed within the cylinder are forced by means of the feed screw or worm 14 into the forward discharge-section 34 of the cylinder. The discharge-section 34 is made tapering in form, being contracted at its forward end, and is formed with a flange at said end, to which flange may be secured a suitable die 35 for imparting any desired form in cross-section to the materials passed through the apparatus.

36 indicates a reservoir or tank adapted to contain a supply of resin or other material in a liquid state, said tank having a pipe 37 leading from its lower part and connecting with a pipe 38, which is controlled by a cock 39, as seen in Figs. 1 and 2, and leads down into the discharge-section 34 of the machine at the front face of the rotative disk 32 and in position to discharge a supply of liquid resin or the like upon the materials forced through the openings 33 in said disk. The pipe 37 also extends rearwardly along the top of the cylinder 5 and is controlled by a cock 40, the extremity of the pipe being carried down into the interior of the cylinder 5, as shown at 41, so as to be capable of dis-

charging a supply of liquid resin or other substance into said cylinder for mixture with the solid materials fed into the cylinder through the feed-opening 6 thereof.

The cylinder 5 and its discharge-section 34 are surrounded by steam-jackets 42, so that they may be heated to a temperature sufficient to prevent the resin fed into the apparatus from hardening, so as to interfere with the operation of the feeding devices, and the reservoir or tank 36 is also inclosed in a similar steam-jacket 43 to maintain its contents at a sufficient temperature.

At the die 35 is arranged a table 44, over which the molded material passes when discharged from the apparatus, and at opposite sides of said table are provided upwardly-extending guides or standards 45, between which is held, to play vertically, a cross-head 46, carrying at its rear edge a depending knife 47, adapted, as the cross-head descends, to sever the material at the mouth of the die 35. The cross-head 46 also carries a presser-foot or stripper 48 beneath it, adapted to engage the molded material passing over the table 44 from the die 35 before the knife 47 has operated, so as to hold the material against lateral movement and also to strip the material from the knife as the cross-head ascends. The presser-foot 48 is carried on rods 49, which extend vertically through the cross-head 46 and also through arms at the upper part of said cross-head and carry springs 50, the upper ends of which engage under the said arms and the lower ends of which engage collars 51, secured to said rods in such a way that the rods are forced elastically downward to hold the presser-foot normally pressed down beneath the cross-head, as shown in Fig. 1. When the cross-head is lowered to sever the molded material, the presser-foot or stripper 48 is raised on contact with the material resting on the table 44 and the springs 50 are placed under tension.

To operate the cross-head, we provide a link 52, which connects the cross-head with one end of a lever 53, extended lengthwise of the machine, being pivoted on an arm 54, extending above the cylinder, the rear end of said lever being forked, as shown at 55, and having its forks provided with pins 56 and arranged to embrace a cam 58 on the upper end of the vertical shaft 24. The pins 56 of the lever 53 engage a slot 57 in the cam 58, so that pivotal movement is imparted to the lever as the shaft turns in such a manner as to raise and lower the cross-head 46 to sever the material passing over the table 44.

In operation the solid materials are introduced to the hopper 7 through the shaking-screen 9, by means of which any large particles not capable of passing through the perforations 33 of disk 32 are separated, and from the hopper such sifted materials are fed in regulated quantities to the cylinder, through the feed-opening 6 thereof, by means of the valve 12. The rotation of the screw or

worm 14 serves to move the materials along the length of the cylinder and to force them through the disk 32 and also serves to intimately mix said materials, the rotation of the disk 32 serving to bring the mixed materials in a finely-divided form, on passing through the openings 33, in position under the pipe 38 to receive a supply of liquid resin. The pipe 41 may also be employed to supply resin to the materials within the cylinder 5 before passing through the opening 33 of the disk 32. After passing through the disk 32 and being supplied with the melted resin the contracted mouth portion of the discharge-section 34 will serve to compress the mass of combustible material into a compact form, and the die 35 serves to mold the mass discharged from the apparatus to the desired form in cross-section, the knife 47 being employed to automatically sever the molded material into suitable lengths for use.

From the above description it will be seen that the machine constructed according to our invention is of an extremely simple and inexpensive nature and is especially well adapted for use in the manufacture of fire-kindlers, and it will also be obvious that the device is capable of being used for other purposes—such, for example, as the manufacture of popcorn balls, sausages, and the like. It will also be seen 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 an apparatus of the character described, the combination of a cylinder, means for forcing material through the same, a hop-

per having a partition dividing its interior into two chambers adapted to contain different materials, a screen mounted for movement over the hopper, means for operating the screen, a slide-valve controlling the discharge of material from the chambers of the hopper to the cylinder, and means for operating the valve, substantially as set forth.

2. In an apparatus of the character described, the combination of a cylinder, means for supplying material thereto, means for forcing the material through the cylinder, a perforated disk through which the material in the cylinder is forced, and a pipe arranged to supply liquid to the material passed through the disk, substantially as set forth.

3. In an apparatus of the character described, the combination of a cylinder, means for passing material through the same, a rotative perforated disk through which the material in the cylinder is passed and a pipe arranged to deliver a supply of liquid to the material passed through the disk, substantially as set forth.

4. In an apparatus of the character described, the combination of a cylinder, a feed-worm for forcing material through the same, a shaft on which the worm is held, a perforated disk on said shaft and through which the material in the cylinder is forced, and a pipe arranged to discharge a supply of liquid to the material passed through said disk, substantially as set forth.

In testimony whereof we have hereunto set our hands, at Cincinnati, Ohio, this 17th day of June, 1899.

CHARLES HOFF.
GEORGE H. KLOTTER.

Witnesses:

JOHN E. JONES,
G. W. CARY.