No. 682,410. Patented Sept. 10, 1901.

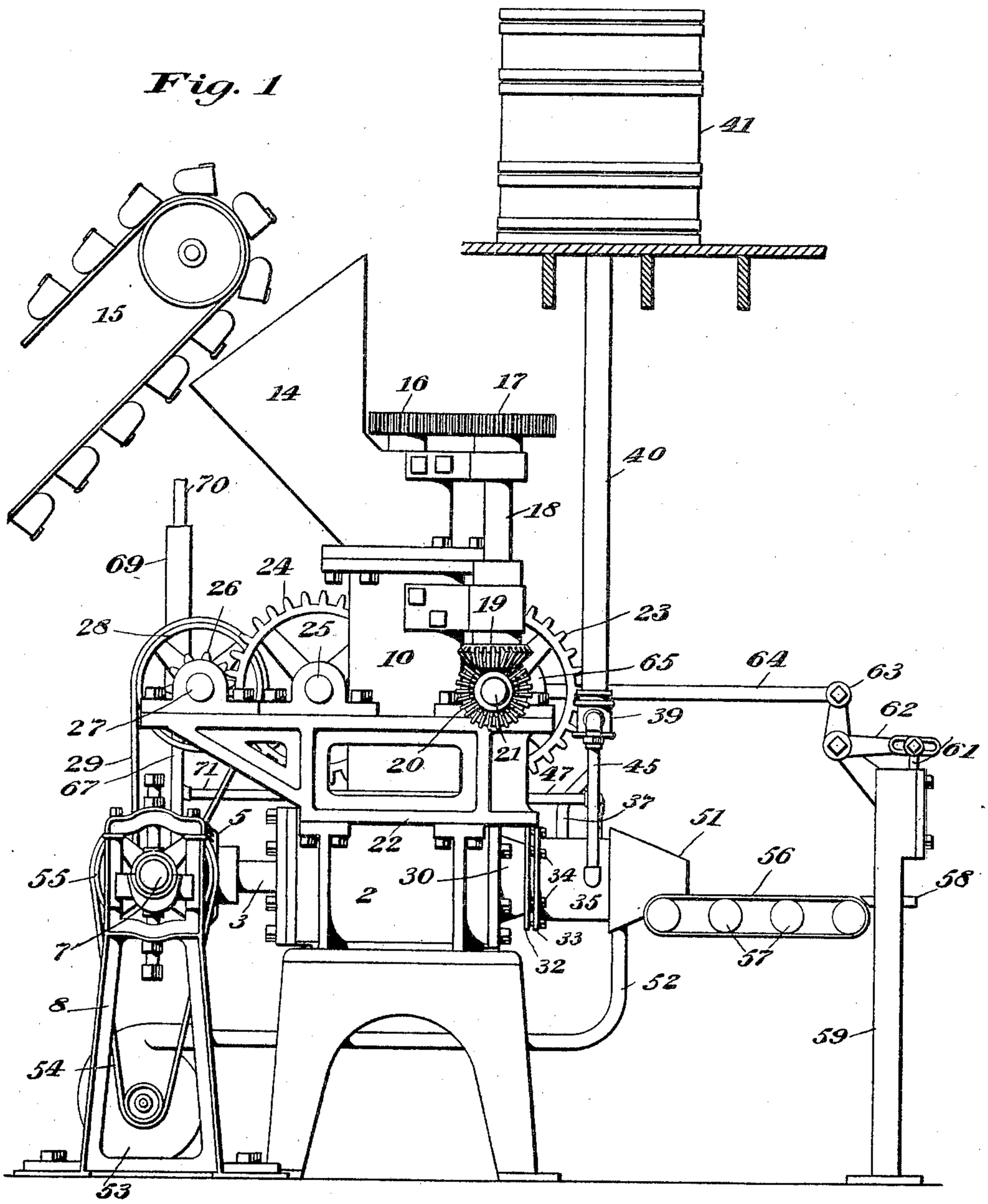
C. HOFF & G. H. KLOTTER.

MACHINE FOR MAKING FIRE KINDLERS, &c.

(Application filed Sept. 27, 1900.)

(No Model.) 4 Sheets—Sheet 1.

Fig. 1



Witnesses
J. D. Thorne
Stuart Harper.

Inventors
Charles Hoff and
George H. Klotter,
by John Clair Jones,
their attorney.

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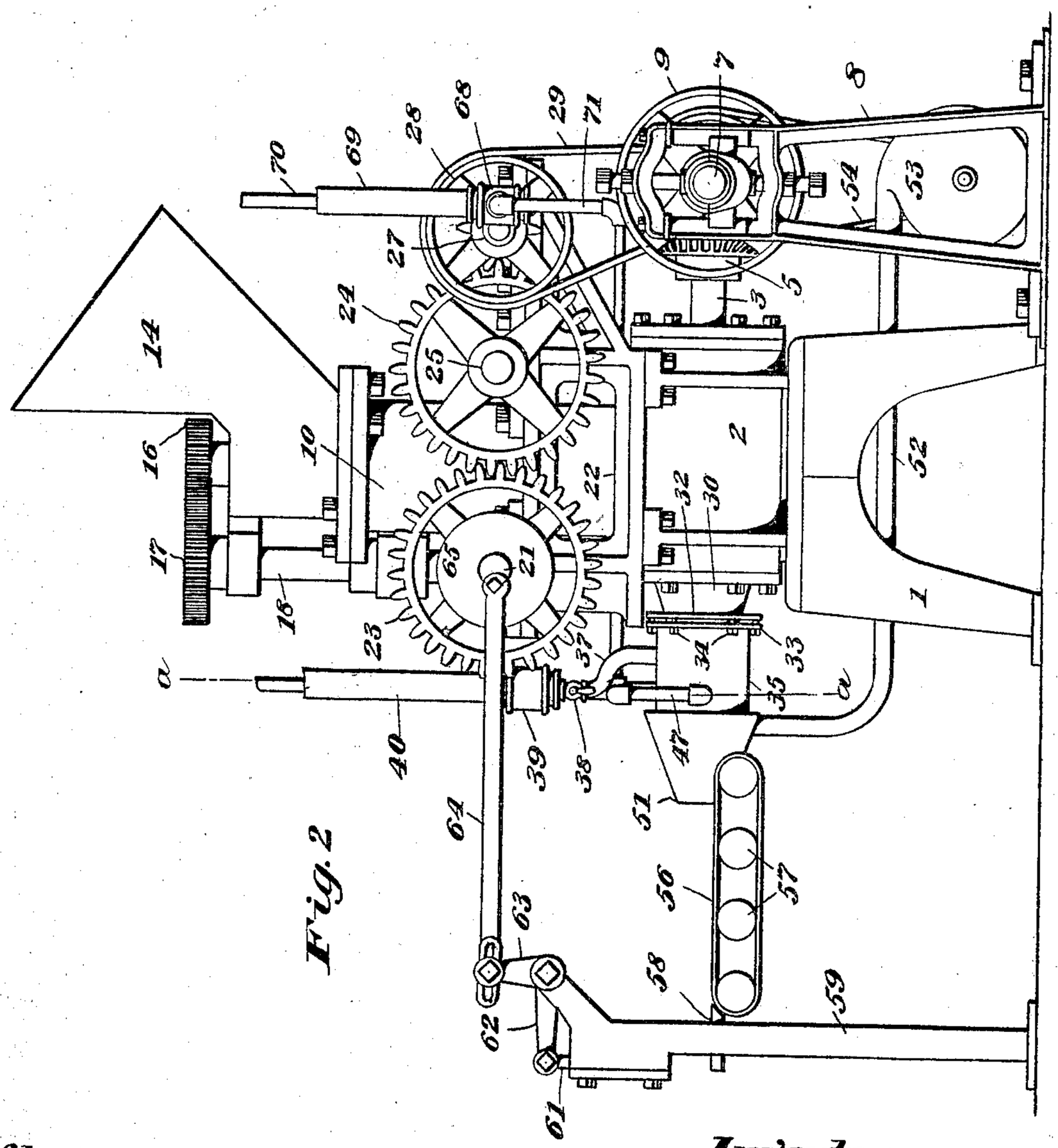

Fig. 2

Witnesses

L. D. Thorne

Stuart Hopper.

Inventors

Charles Hoff and
George H. Klotter,
by John Elias Jones,
their Attorney.

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Fig. 4

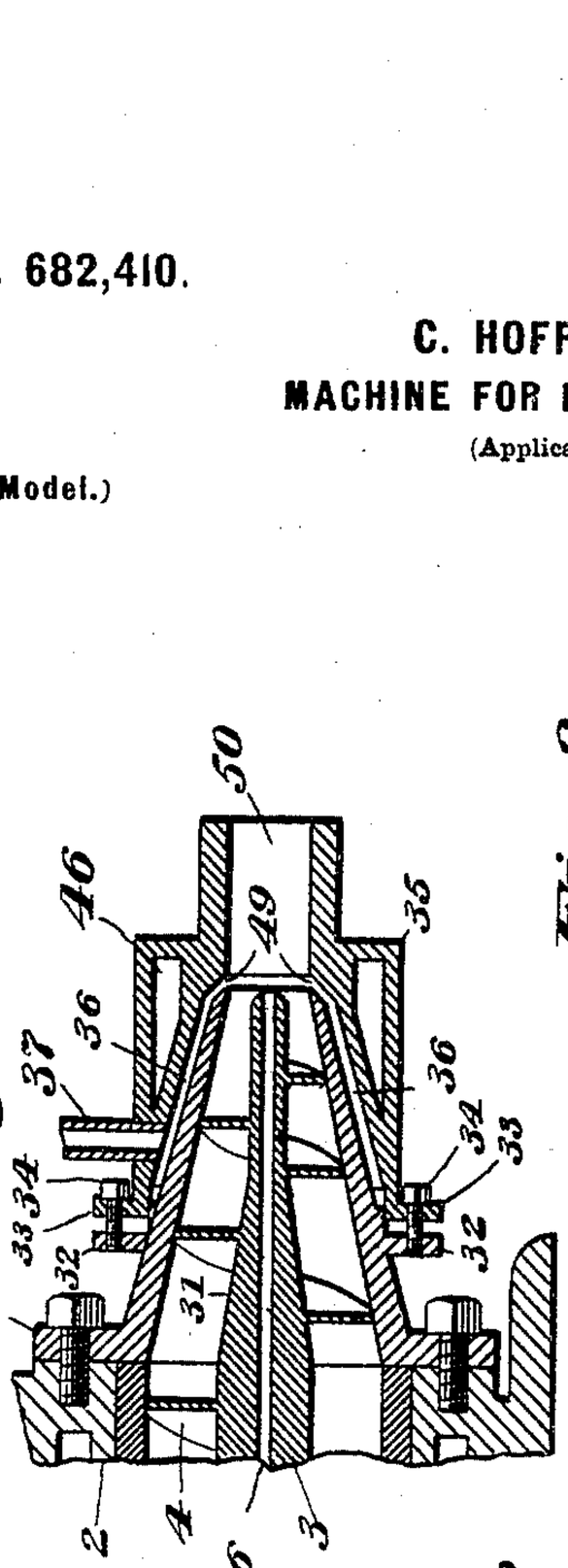

Fig. 5

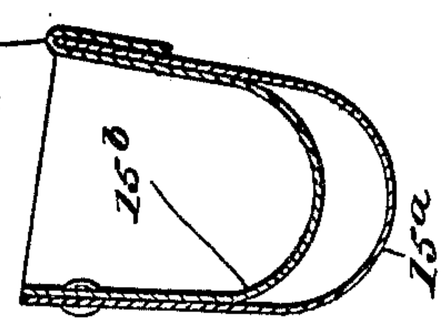

Fig. 3

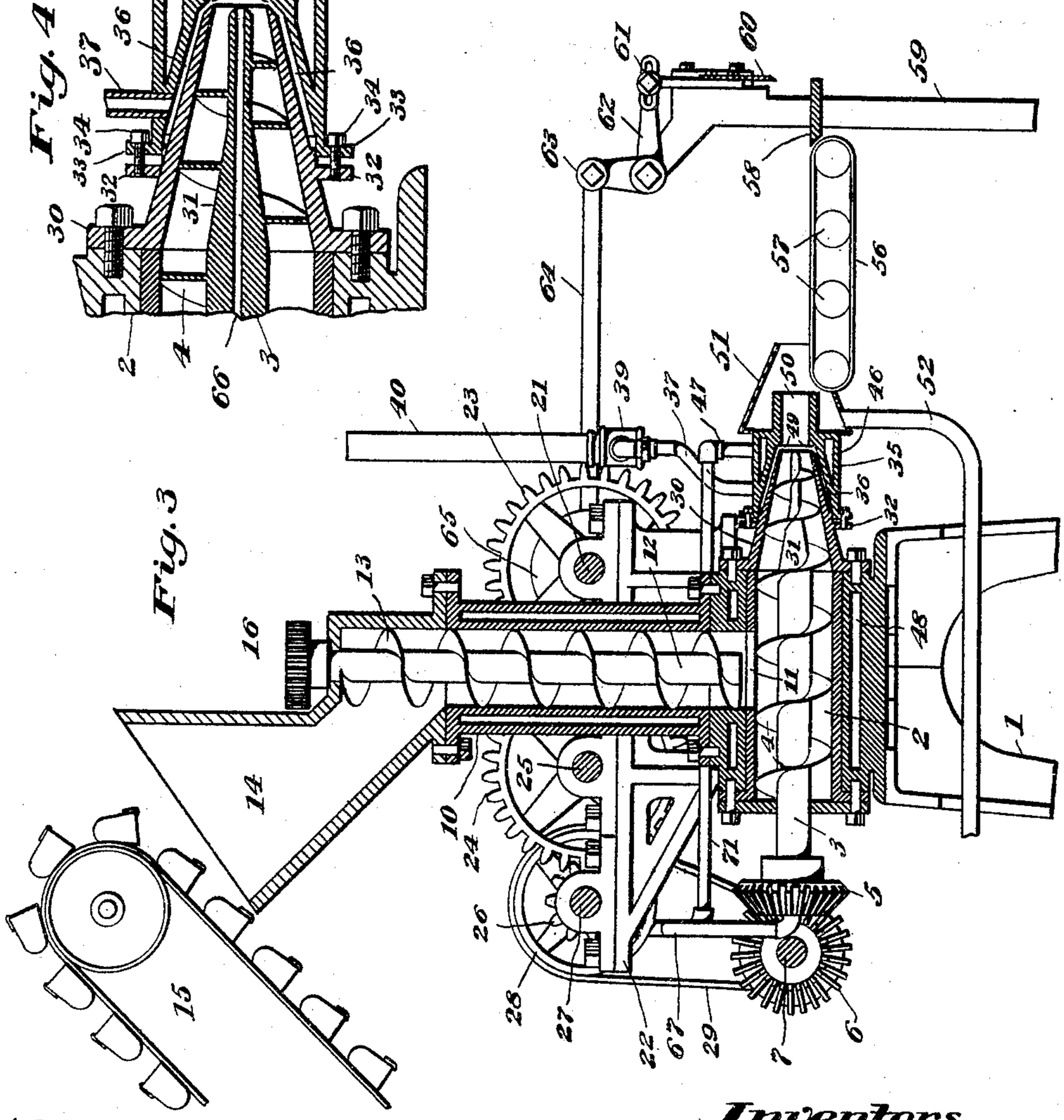

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Fig. 5

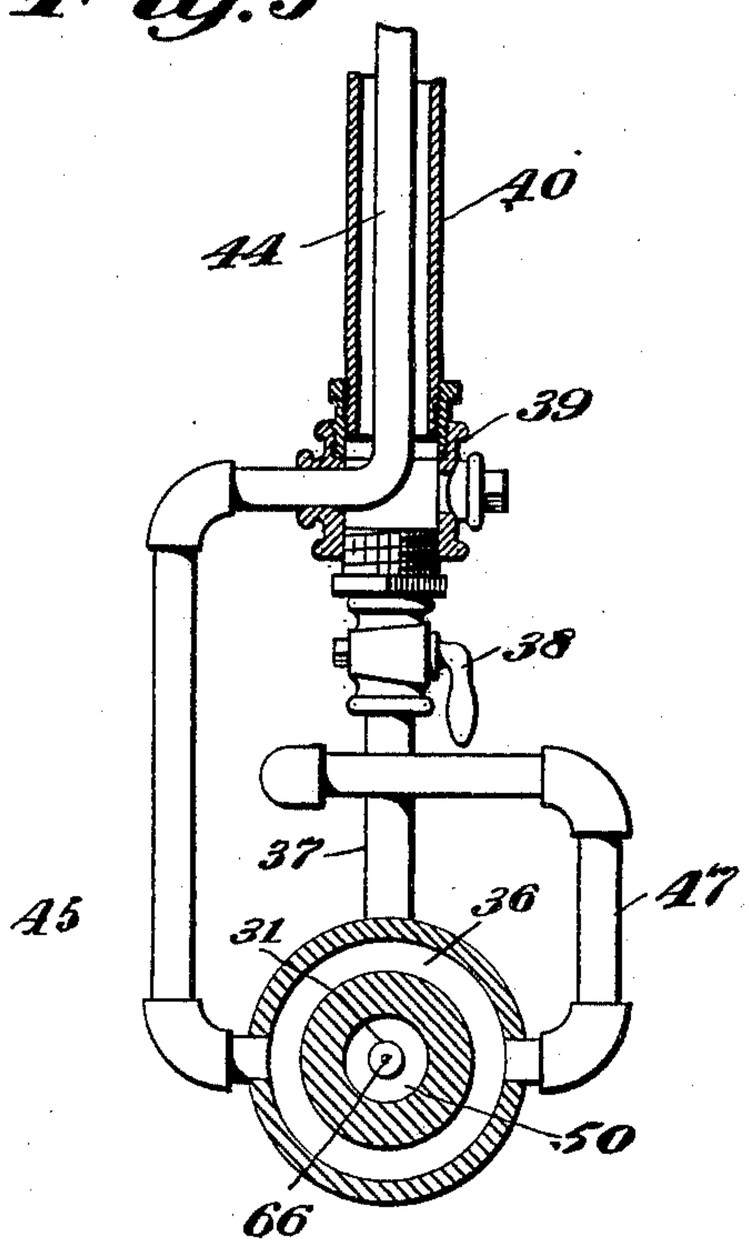


Fig. 7

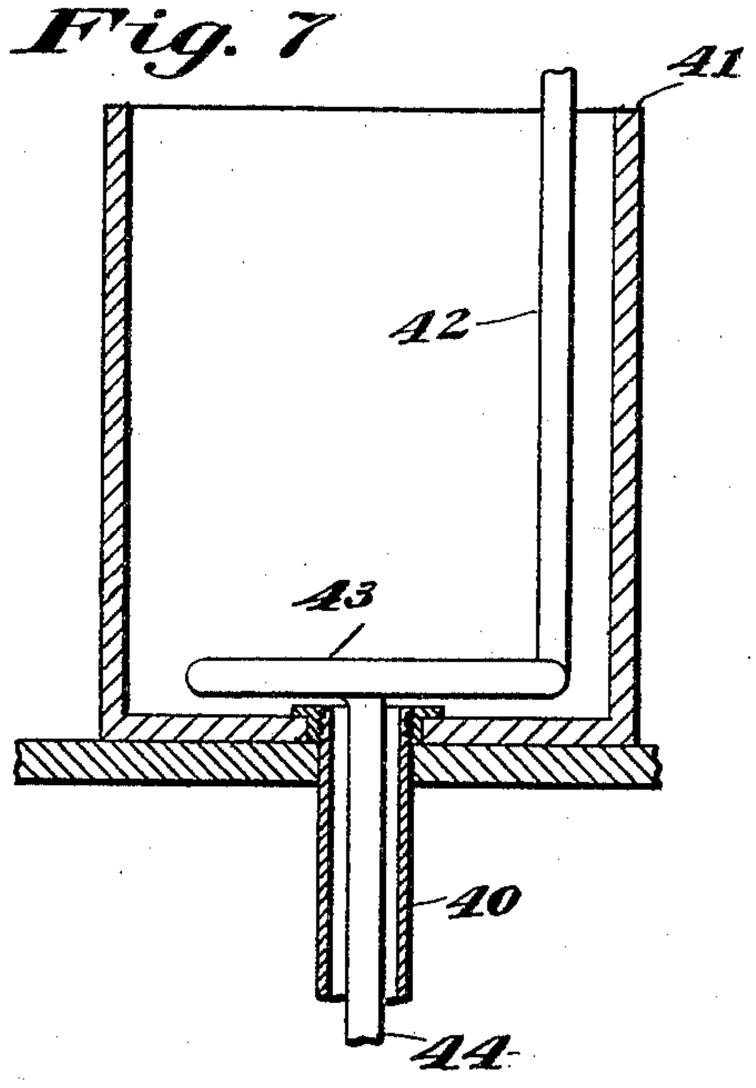


Fig. 8

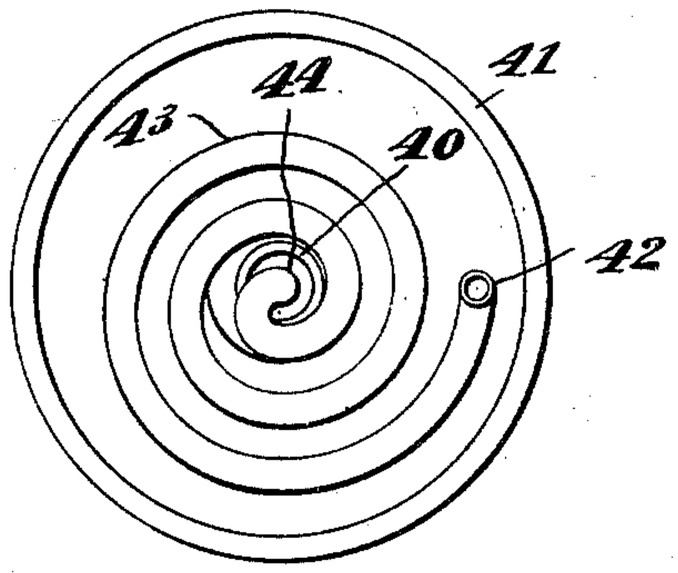
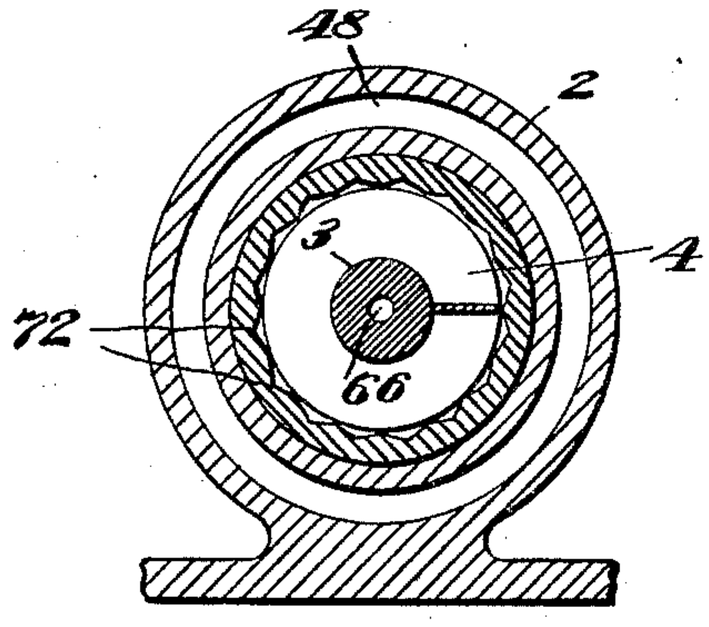


Fig. 6



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J. D. Thorne
Stuart Harper.

Inventors
Charles Hoff and
George H. Klotter,
by John Blair Jones,
their Attorney.

UNITED STATES PATENT OFFICE.

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

MACHINE FOR MAKING FIRE-KINDLERS, &c.

SPECIFICATION forming part of Letters Patent No. 682,410, dated September 10, 1901.

Application filed September 27, 1900. Serial No. 31,255. (No model.)

To all whom it may concern:

Be it known that we, CHARLES HOFF and GEORGE H. 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 Making Fire-Kindlers and other Articles, of which the following is a specification.

This invention relates to certain improvements in machines for molding or forming articles—such as fire-kindlers, for example—from plastic or semiplastic materials; and the object of the invention is to provide a machine of this character of a simple and inexpensive nature and of a strong, durable, and compact construction adapted for molding or forming the materials in a substantially continuous manner, so as to permit of operating the machine at a high rate of speed without danger of clogging the same.

The invention consists in certain novel features of the construction, combination, and arrangement of the several parts of the improved molding or forming machine whereby certain important advantages are attained and the machine is made simpler, cheaper, and otherwise better adapted and more convenient for use, all as will behereinafter 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 an elevation looking toward one side of a machine constructed according to our invention, and Fig. 2 is an elevation looking toward the other side of the machine. Fig. 3 is a longitudinal mid-section taken vertically through the improved machine. Fig. 4 is an enlarged partial mid-section showing the discharging end of the cylinder of the machine. Fig. 5 is an enlarged sectional view taken in the plane indicated by the line *a a* in Fig. 2 and showing the arrangement of pipes for supplying liquid material to the machine. Fig. 6 is an enlarged sectional view taken transversely of the cylinder and showing the arrangement of the feeding means therein. Fig. 7 is an enlarged sectional view taken through the tank or holder for the liquid material. Fig. 8 is a plan view of the said liquid tank or holder shown in Fig. 7. Fig. 9 is a sectional view showing a preferred form of elevator-bucket adapted for use in connection with the improved machine.

In the views, 1 indicates the base of the machine, and 2 indicates the compression-cylinder mounted thereon and having a shaft 3 extended in its axis and projected through its rear end, being provided within the cylinder with a spiral flange 4, forming a screw or worm adapted to press the material lengthwise along the cylinder to the discharge end thereof. The projecting rear end of shaft 3 carries a bevel-gear 5, meshing with a similar gear 6 on the machine-shaft 7, journaled in bearings 8 and extended at right angles to shaft 3 and behind cylinder 2. The shaft 7 has a pulley 9, by means of which it may be driven from a suitable source of power.

Upon the top of the cylinder 2 is mounted a vertical cylinder 10, having its bore in communication with the bore of the compression-cylinder 2 by means of a port 11, as shown in Fig. 3, and in said vertical or feed cylinder 10 is mounted to turn a vertically-arranged shaft 12 at right angles to the shaft 3 and having a spiral wing 13 produced upon it to feed the material supplied to the upper end of said feed-cylinder downward into the compression-cylinder 2, and the shaft 3 in said compression-cylinder is provided with a similar spiral wing adapted for pressing the material thus supplied to said compression-cylinder along toward the discharge end of that cylinder and compressing said material, as will be hereinafter explained.

At the top of the machine is arranged a hopper 14, adapted for communication with the vertical feed-cylinder 10 and capable of being supplied with material from a suitable source by means of an elevator or conveyer 15, herein shown as formed with open-topped buckets 15^a, having false bottoms formed of metal plates 15^b, each plate being secured near one end to the back wall of the bucket and having its other edge free and adapted to be bent, as shown at 15^c in Fig. 9, over the front edge of the bucket. By varying the position of the bend 15^c in the false bottom it is evident that the bucket may be varied as to its capacity.

The upper end of the shaft 12 above the

feed-cylinder 10 is provided with a gear-wheel 16, meshing with a similar gear-wheel 17 on the upper end of a vertical shaft 18, journaled in suitable bearings at the side of the vertical cylinder of the machine and having at its lower end a miter-gear 19, meshing with a similar gear 20 on a horizontal shaft 21, held in bearings and extended transversely of the machine above the compression-cylinder 2. On the shaft 21 is a gear-wheel 23, meshing with a similar gear-wheel 24 on a transverse shaft 25, parallel with shaft 21, but at the rear of the compression-cylinder, and said gear-wheel 24 also meshes with a pinion 26 on a shaft 27, parallel with and behind the shaft 25. On the shaft 27 is a pulley 28, over which passes a belt, chain, or the like 29, whereby said shaft 27 and the parts connected therewith are driven from the machine-shaft 7.

At the forward or discharge end of the compression-cylinder 2 is arranged a tapered discharge-section 30, having a tapered hollow communicating with the bore of the compression-cylinder 2 and adapted to offer some resistance to the passage of the materials from said cylinder, so as to properly compress and form said materials in a well-known way. The portion of the shaft 3 in said tapered hollow of the discharge-section is also made similarly tapered, as shown at 31. The discharge-section 30 is provided about centrally of its outer surface with an annular projecting flange 32, to which is secured, by means of bolts or screws 33, a die 35, having a flange 34, similar to the flange 32, and through which the bolts or screws 33 extend. The die 35 is formed in its rear part with a tapered recess 36 to receive the tapered front end of the discharge-section 30, but of a somewhat larger diameter than the same, so as to produce when the parts are assembled a conical space or chamber surrounding the front or discharge end of the discharge-section 30 and tapering toward the extremity of the same. The front end of the die 35 is formed with a contracted passage 50, substantially equal to that of the smaller end of the discharge-section, and with said passage 50 is adapted for communication the smaller forward end of the space 36, as shown at 49 in Fig. 4. A pipe 37 communicates with the rear upper part of the space or chamber 36 for the supply of liquid material thereto, and, as clearly shown in Figs. 2 and 5, said pipe extends upward and is provided with a cock or valve 38, by means of which the flow of liquid through it may be regulated. The pipe above the cock 38 connects with a casing 39 at the lower end of a stand-pipe 40, the upper end of which is adapted to receive liquid material from the base of a suitable tank or holder 41, located above the machine, as shown in Figs. 1 and 7.

In the manufacture of fire-kindlers the liquid material ordinarily employed is melted rosin, and in order to maintain and supply the rosin in a liquid state I provide a steam-supply pipe 42, extended into the tank or holder 41 and formed into a heating-coil near the bottom thereof. From the coil 43 of the steam-pipe this pipe is extended, as shown at 44, down inside of the stand-pipe 40, the steam-pipe being of less diameter than the internal diameter of the stand-pipe, whereby a space is provided therein for the downward passage of the melted rosin. At the casing 39 the steam-pipe 44 is carried outside of the stand-pipe, as shown at 45, and is extended downward and connected with a jacket 46, inclosing the die 35, and from said jacket the steam is conveyed by way of a pipe 47 to a jacket 48, surrounding the compression-cylinder 2.

At the discharge or delivery end of the die 35 is arranged a conical hood 51, adapted to receive air by way of a pipe 52 from a fan or blower 53, driven by a belt 54 or the like from the machine-shaft 7, and the air thus supplied being discharged from the contracted front end of said conical hood assists in cooling the molded articles as they are discharged from the die.

An endless apron 56 is arranged in front of the die, being supported upon rolls 57, and is adapted to receive the molded articles and to carry them while still exposed to the cooling-draft from the fan or blower to a table 58, supported upon standards 59, beneath a knife 60, (see Fig. 3,) held upon a slide 61, mounted in vertical guideways at the upper parts of the standards and actuated by its connection with one arm 62 of an elbow-lever pivoted on one of the standards and having its other arm 63 connected to the forward end of a rod or link 64, the rear end of which has a connection with a crank-disk 65 upon the shaft 21, as clearly shown in Fig. 2.

In the shaft 3 of the compression-cylinder 2 is formed an axial passage 66, with which is adapted for communication at the rear end of the shaft a pipe 67, adapted to convey melted rosin from a casing 68, similar to the casing 39 above described, but located at the rear part of the machine, as shown in Fig. 2. The casing 68 is arranged at the base of a stand-pipe 69, which is extended up and adapted for connection with a tank or holder (not shown) similar to the tank 41 above referred to, in which the rosin is maintained in a melted condition by means of a steam-pipe, which is extended down, as shown at 70 in Fig. 2, within the stand-pipe and is at the casing 68 carried outside the same, as shown at 71, being at this point adapted for connection with the jacket 48 of the compression-cylinder 2.

In the compression-cylinder 2 are produced a series of parallel longitudinal grooves or channels 72, extended lengthwise of the bore thereof and adapted to impede rotatory movements of the materials fed into said com-

pression-cylinder and to cause said materials to traverse the length of said cylinder under the influence of the spiral wing thereof.

The wings 4 and 13 upon the shafts 3 and 12 form screws adapted to convey the materials along the length of the feed and compression cylinders, and in the operation of the machine the materials are by said screws caused to traverse the two cylinders, being compressed and discharged at the forward end of the discharge-section 30 into the die 35, where they are exteriorly coated with the liquid rosin supplied through the annular opening 49 from the chamber or space 36. The shaft 3 being tapered and extended to the discharge end of the compression-cylinder serves to produce a central flue or passage extending through the completed article when discharged into the die, and by reason of the passage 66 in said shaft the walls of said central flue or passage will also be coated with the melted rosin, as will be readily understood. As the completed articles are discharged from the die 35 they fall upon the apron 56, along which they pass under the cooling influence of the blast from the fan or blower to the table 58, where they are divided into suitable lengths by the vertically-movable knife 60.

From the above description it will be seen that the improved machine constructed as above described is of an extremely simple and inexpensive nature and is especially well adapted for the manufacture of fire-kindlers and the like which may be formed from various waste substances—such as wood chips, shavings, sawdust, and the like—bound together by rosin or equivalent material. The kindlers produced from these substances by the machine being coated over with the rosin do not crumble, as in the case where there is a simple admixture of the materials, and the melted rosin not being supplied to the feed or compression cylinders does not tend to clog the machine upon cooling, as in other machines designed for this purpose. It will also be obvious from the above description that the improved machine is capable of some modification without material departure from the spirit and principles of the invention in order to adapt it for different purposes and materials, 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 a compression-chamber, a shaft arranged therein and provided with a passage for conveying liquid material, said passage being arranged to discharge liquid at the discharge end of the compression-chamber, means for causing solid materials to traverse said chamber and means for coating the materials with liquid substance after passage through said compression-chamber, substantially as set forth.

2. In a machine of the character described, the combination of a compression-chamber, a shaft arranged therein and having driving devices and provided with a spiral wing and a tapered end portion at the discharge end of the chamber, a tapered discharge-section at the discharge end of the chamber, means for maintaining the substances in a heated condition while passing through the discharge-section of the chamber, and means, located at said discharge end of the compression-chamber, for supplying liquid materials to the substances passed through the chamber, substantially as set forth.

3. In a machine of the character described, the combination of a compression-chamber, a shaft arranged therein and having driving means and provided with a spiral wing and a tapered end portion at the discharge end of the chamber, a tapered discharge-section for the chamber, a die inclosing the discharge-section of the chamber and forming between itself and said section a chamber inclosing said section and adapted for communication with the bore of the die by an annular opening at its smaller end, and means for supplying liquid material to said space, substantially as set forth.

4. In an apparatus of the character described, the combination of a compression-cylinder having a discharge-section, a heating-jacket inclosing the compression-chamber, a die inclosing the discharge-section and having a passage for the molded articles, and also provided with a space between itself and the discharge-section which space is adapted for communication with said passage, means for supplying liquid material to said space, and a heating-jacket inclosing said die, substantially as set forth.

5. In an apparatus of the character described, the combination of a compression-chamber having a discharge-section, means for causing solid materials to traverse said chamber, and means for supplying liquid to the discharge-section of the chamber, said liquid-supplying means comprising a tank or holder having a heating-coil, a stand-pipe arranged for communication with said tank or holder and a heating-pipe extended in said stand-pipe and connected with said heating-coil, substantially as set forth.

6. In a machine of the character described, the combination of a die for molding substances, means for compressing such substances and supplying them while compressed to said die, means for supplying liquid material to the die for coating such compressed substances, a steam-jacket for maintaining the substances in heated condition while being molded, and a steam-pipe for supplying steam to said jacket and arranged to inclose the liquid-supplying means, substantially as set forth.

7. In a machine of the character described, the combination of means for compressing and molding substances, means for supplying liquid for coating the substances, a heating device for maintaining the substances in a heated condition while being coated, and a pipe for supplying said heating device and arranged to inclose the liquid-supplying means, substantially as set forth.

8. In a machine of the character described, the combination of a compression-cylinder, means for causing substances to traverse said compression-cylinder, means for molding the substances after passage through the compression-cylinder, a vertical feed-cylinder arranged above and adapted to discharge into the compression-cylinder and a screw having operating devices and arranged in the feed-cylinder for causing the substances to traverse the same to the compression-cylinder, substantially as set forth.

9. In a machine of the character described, the combination of a compression-chamber, means for causing substances to traverse the same, a die for molding the substances discharged from the compression-chamber, a conical hood inclosing the die and through which the substances when molded by said die are caused to pass, a carrier for receiving and conveying the molded substances from the said die, and a blower arranged to supply air to said hood for cooling the molded substances discharged from said die, substantially as set forth.

Signed by us at Cincinnati, Ohio, this 28th day of July, 1900.

CHARLES HOFF.
GEORGE H. KLOTTER.

Witnesses:
JOHN ELIAS JONES,
J. F. LUDDON.