No. 762,705. PATENTED JUNE 14, 1904.

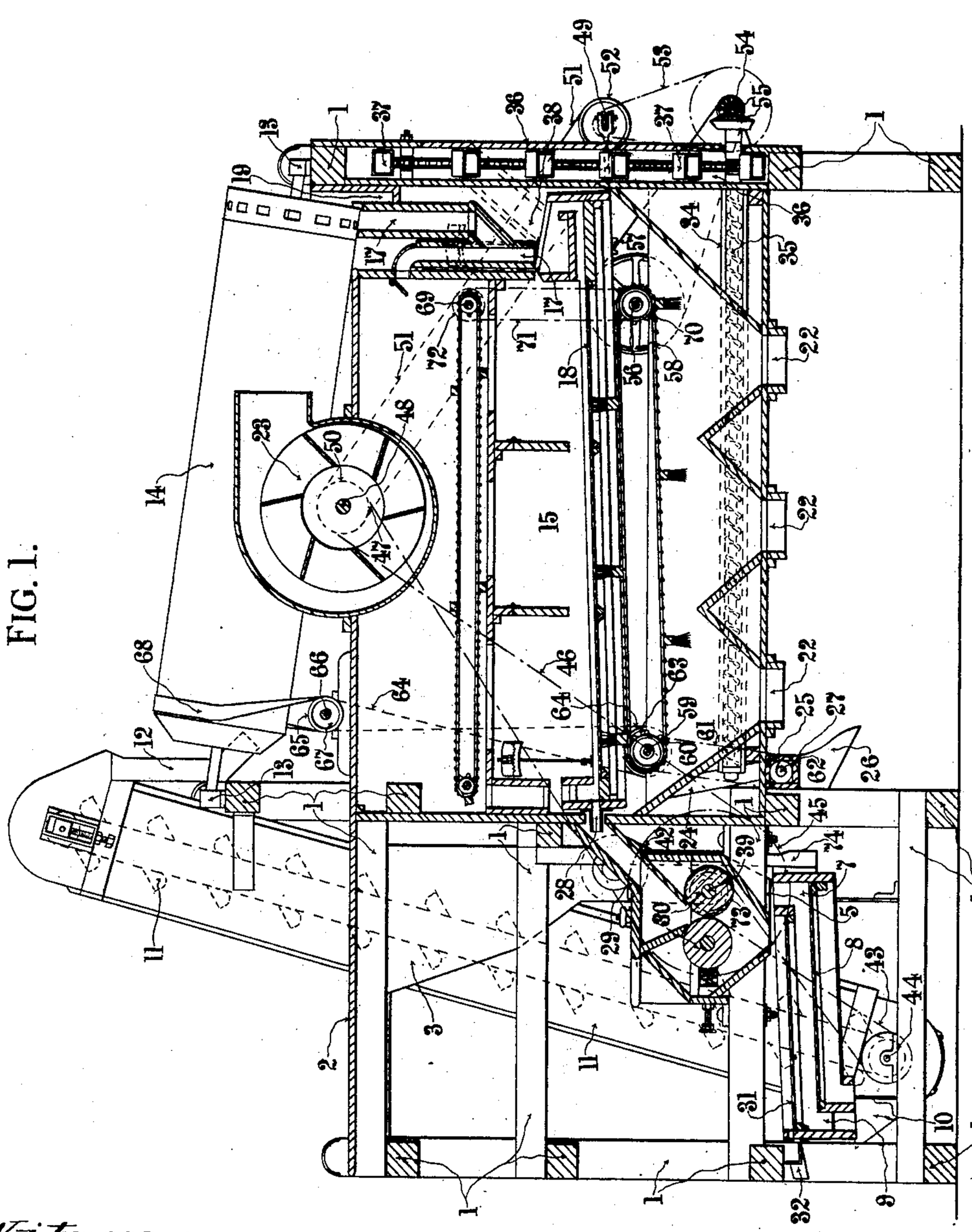
S. K. GREEN.

COMBINED MACHINE FOR NIBBING, GRADING AND WINNOWING COCOA BEANS OR THE LIKE.

APPLICATION FILED NOV. 12, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

FIG. 1.



Witnesses

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NO MODEL. 2 SHEETS—SHEET 2.

FIG. 3.

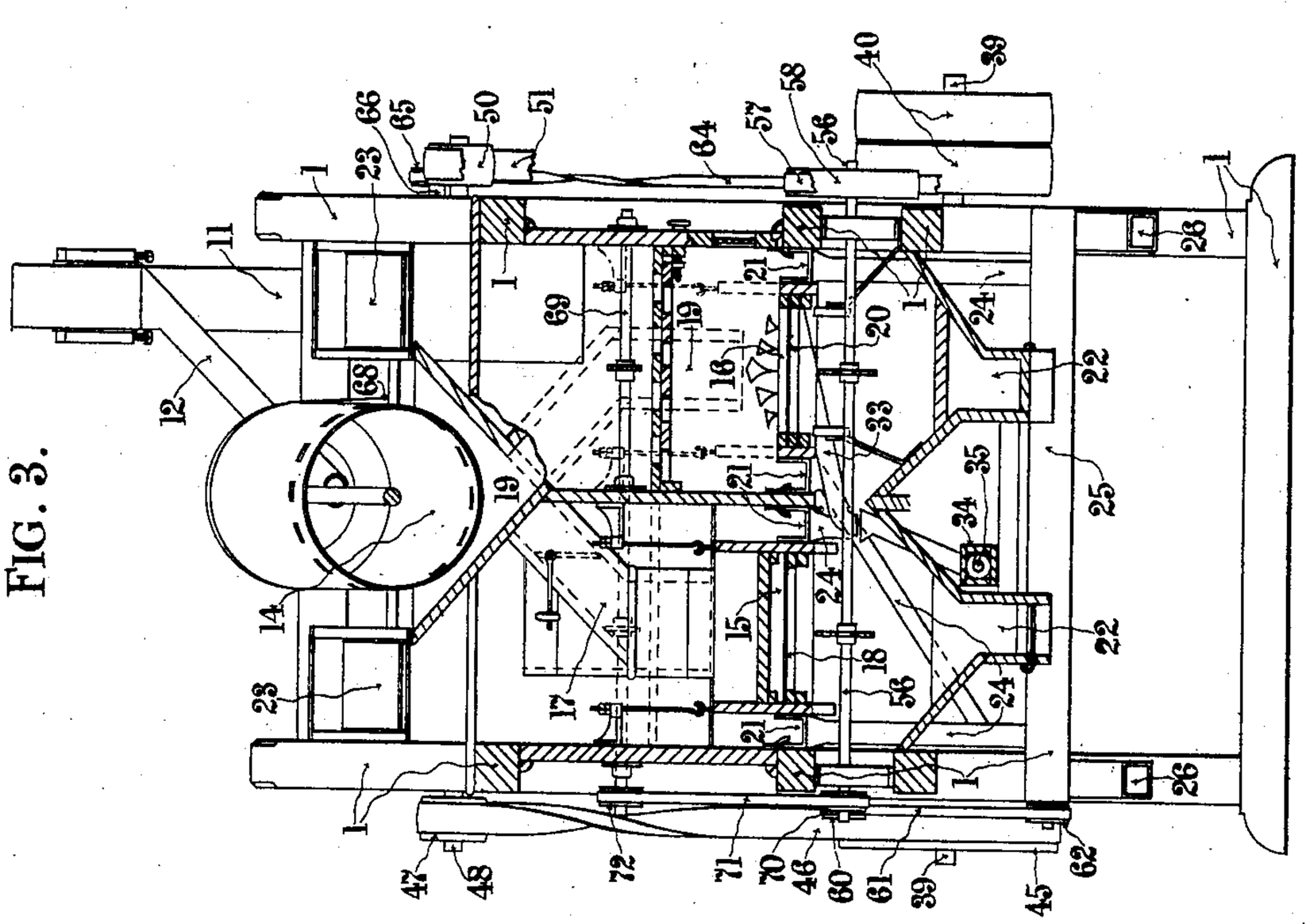
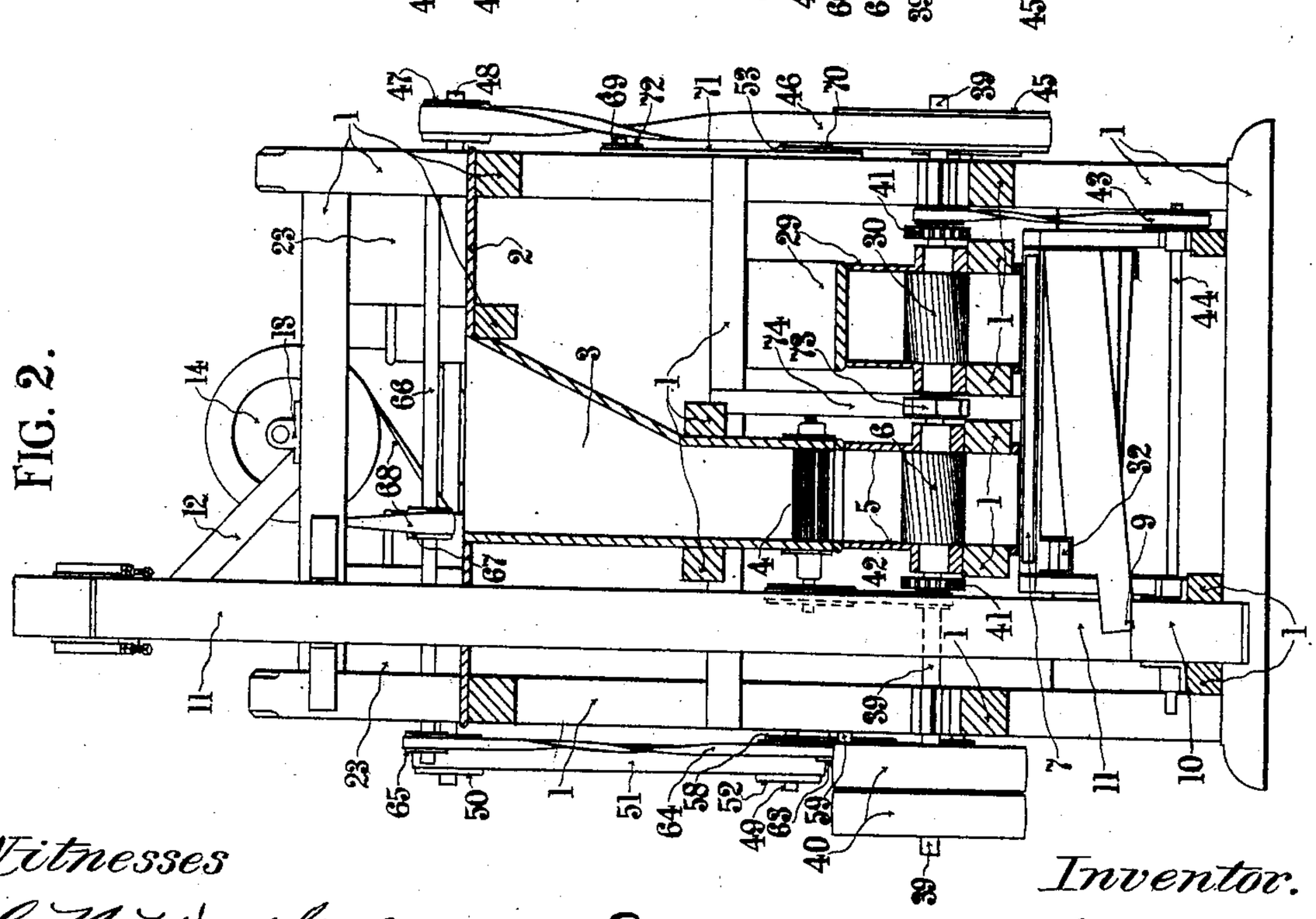


FIG. 2.



Witnesses
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No. 762,705. Patented June 14, 1904.

UNITED STATES PATENT OFFICE.

SAMUEL KITSON GREEN, OF LEEDS, ENGLAND.

COMBINED MACHINE FOR NIBBING, GRADING, AND WINNOWING COCOA-BEANS OR THE LIKE.

SPECIFICATION forming part of Letters Patent No. 762,705, dated June 14, 1904.

Application filed November 12, 1903. Serial No. 180,915. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL KITSON GREEN, milling expert, a subject of the King of Great Britain and Ireland, residing at 53 Bruce street, Wellington road, Leeds, in the county of York, England, have invented a certain new and useful Combined Machine for Nibbing, Grading, and Winnowing Cocoa-Beans or the Like, (for which I have, in conjunction with another, made application for a patent in Great Britain, No. 12,621, bearing date June 4, 1903,) of which the following is a specification.

In treating cocoa-beans and the like (hereinafter termed "beans") it has hitherto been customary to employ a separate machine for each separate operation; but this arrangement is not satisfactory in practice, as by employing a series of machines the process is rendered slow and tedious, while the cost of the various machines is very great and the amount of floor-space occupied by the machines is considerable.

Now this invention relates to a new or improved combined machine, as hereinafter described, for treating beans whereby the nibbing, grading, and winnowing operations may be successively performed in a speedy and efficient manner in one and the same machine, thus entirely overcoming the difficulties and disadvantages above referred to.

In order that my invention may be clearly understood, I will proceed to describe the same with reference to the accompanying drawings, wherein—

Figure 1 is an irregular longitudinal section of a machine constructed in accordance with my invention; and Figs. 2 and 3 are irregular transverse sections of the same machine, taken as looking from the left-hand side and the right-hand side, respectively.

According to my invention the machine consists, essentially, of a framing 1, at the front end of which is provided an elevated platform 2 for the reception of the beans to be treated, and below this platform 2 between the framing 1 is located a hopper 3, adapted to receive the beans from the said platform. The hopper 3 is provided with a feed-roller 4, while below the said hopper 3 is a casing 5, containing a pair of fluted nibbing-rollers 6, adapted to receive and crack or break up the beans delivered thereto from the hopper, and immediately below the casing 5 is located an inclined shaker 7, carrying a sieve 8, adapted to receive the cracked beans from the rollers 6. This sieve 8 is provided with a discharge-opening 9 in connection with a trough 10 of an elevator 11 of the endless bucket type, the said elevator 11 being arranged between the framing 1 and passing upward at one side of the hopper 3 and being adapted to receive the cracked beans from the sieve and carry them upward to a discharge-spout 12, located at the upper end of the said elevator 11.

The upper part of the framing 1 is provided with bearings 13, carrying a central inclined cylindrical grader 14, into the raised end of which the spout 12 of the elevator 11 passes, which grader is so arranged and adapted as to receive the cracked beans and divide them into two grades, while at each side and below the grader 14, between the framing 1 and located side by side, are two winnowing arrangements 15 16, preferably of the type described in the specification of British Patent No. 11,158 of 1892. The grader 14 in the specific machine represented by the drawings is of an ordinary and well-known type having internal plates which pick up the fine particles and deliver them directly over the lower edge of the grader, while the coarse particles pass down the grader and out at apertures *a* around its periphery. The winnower 15 is provided with a spout 17, adapted to receive and conduct the coarse particles from the grader 14 onto the sieve 18, while the winnower 16 is provided with a spout 19, adapted to receive and conduct the fine particles from the grader 14 onto the sieve 20, and the sieves 18 20 of the winnowers 15 16 are each provided with collecting-gutters 21, discharge-chutes 22, and overhead exhaust-fans 23.

The collecting-gutters 21 are provided with discharge-spouts 24, arranged in connection with a trough 25, having discharge-outlets 26, the said trough 25 being provided with a right and left hand conducting-worm 27. In connection with the sieve 18 at its discharge end are provided a spout 28 and a casing 29,

containing a pair of auxiliary fluted nibbing-rollers 30, adapted to receive and break up the tailings delivered thereto from the sieve 18, and these auxiliary rollers 30 are located alongside the nibbing-rollers 6 over the shaker 7, which latter is provided with a sieve 31 and a discharge-spout 32. To the discharge end of the sieve 20 is attached a spout 33, arranged in connection with a trough 34, provided with a worm 35, adapted to conduct and deliver the tailings from the said sieve 20 across the machine to a casing 36, which latter is provided with an auxiliary elevator 37 for receiving, raising, and delivering the tailings to the sieve 18 by way of a spout 38.

39 is the main shaft, which is provided with driving-pulleys 40, on which shaft 39 is located one of the rollers of each pair of the nibbing-rollers 6 and 30, the other roller of each pair of the nibbing-rollers being driven from the said shaft 39 by spur-gearing 41. The feed-roller 4 is driven from the main shaft 39 by a belt 42, while the bucket elevator 11 is driven from the said main shaft 39 by a belt 43 and shaft 44. On the opposite end of the shaft 39 to that of the driving-pulleys 40 is a pulley 45, provided with a belt 46, which drives the fans 23 through the medium of a pulley 47 and shaft 48, while the latter drives a shaft 49 and its cams for vibrating the sieves 18 20 through the medium of a pulley 50, belt 51, and pulley 52, while the shaft 49 drives the worm 35 and bucket elevator 37 through the medium of a belt 53, shaft 54, and bevel-gearing 55. The shaft 56 of the endless-brush arrangement for cleaning the sieves 18 20 is driven from the shaft 54 by a belt 57 and pulley 58, while the shaft 59 of the brush arrangement drives the worm 27 through the medium of a pulley 60, belt 61, and pulley 62, and the said shaft 59 also drives the cylindrical grader 14 through pulley 63, belt 64, pulley 65, shaft 66, pulley 67, and belt 68, while the shaft 69 of the endless-scraper arrangement is driven from the shaft 56 through the medium of a pulley 70, belt 71, and pulley 72, and an irregular-shaped wheel 73 on the main shaft 39 engages a spring part 74 of the shaker 7 for vibrating the latter.

In action the machine works as follows: The beans to be treated are fed from the platform 2 into the hopper 3, from which the said beans are delivered by the feed-roller 4 to the casing 5 and between the nibbing-rollers 6, which crack or break up the beans. The cracked or broken beans then pass out at the bottom of the casing 5 onto the sieve 8 of the shaker 7, the dust passing through the said sieve, while the cracked beans fall into the trough 10, from which they are raised by the endless bucket elevator 11 and delivered at the upper end thereof down the spout 12 into the grader 14. The grader 14 then divides the cracked beans into two grades and delivers the coarse particles down the spout 17 onto the sieve 18 of the winnower 15 and the fine particles down the spout 19 onto the sieve 20 of the winnower 16, the clean nibs passing through the sieves and being delivered at the base of the machine by way of the discharge-chutes 22, while the light particles of the shells of the beans are drawn off by the exhaust-fans 23, and the heavy particles of the shells, which are collected by the gutters 21 of the sieves 18 20, pass out at the delivery end of the sieves, down the spouts 24, to the trough 25, from whence they are conducted by the worm 27 to the outlets 26. The tailings from the coarse side winnower 15 pass over the end of the sieve 18, down the spout 28, to the casing 29 and between the auxiliary nibbing-rollers 30, which crack or break up the said tailings, and these are delivered onto the inclined sieve 31, which is of such a mesh that the nibs and small shells pass through to the sieve 8 and thence to the elevator 11, which transfers them to the grader 14, while the large shells pass directly over the end of the sieve 31 and are conducted away by the spout 32. The tailings from the fine side winnower 16 pass over the end of the sieve 20, down the spout 33, to the worm 35, which conducts the said tailings across to the back of the machine, where they are received by the auxiliary elevator 37, carried upward thereby and delivered down the spout 38 onto the the sieve 18 of the coarse side winnower 15, where they are again treated, and these operations are continued in cycle in the manner above described.

The machine above described is thus self-contained, and by employing this combined machine great economy in floor-space is effected over the old method of employing a separate machine for each separate operation, while the cost of manufacture is considerably reduced and economy in driving power is also effected.

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

1. A self-contained machine for treating beans having, in combination with a suitable framing and with each other, an elevated platform for the reception of the beans, a subjacent feed-hopper, a pair of main nibbing-rollers located below said hopper and fed thereby, a shaker situated below the outlet of said nibbing-rollers, an elevator receiving the nibbed beans from said shaker, a grader into which said elevator discharges and which separates the nibbed beans into two grades, two winnowers located side by side below said grader, spouts receiving and transferring the coarse and fine particles respectively to the respective winnowers, auxiliary nibbing-rollers, means for conveying and transferring the tailings from the coarse side winnower to said auxiliary nibbing-rollers, and means for con-

ducting and transferring the tailings of the fine side winnower onto the sieve of said coarse side winnower, substantially as hereinbefore specified.

2. A self-contained machine for treating beans having, in combination with a suitable framing and with each other, an elevated platform for the reception of the beans, a subjacent feed-hopper, a pair of main nibbing-rollers located below said hopper and fed thereby, a shaker situated below the outlet of said nibbing-rollers, an elevator receiving the nibbed beans from said shaker, a grader into which said elevator discharges and which separates the nibbed beans into two grades, two winnowers located side by side below said grader, spouts receiving and transferring the coarse and fine particles respectively to the respective winnowers, auxiliary nibbing-rollers, means for conveying and transferring the tailings from the coarse side winnower to said auxiliary nibbing-rollers, means for conducting and transferring the tailings of the fine side winnower onto the sieve of said coarse side winnower, a driving-shaft common to the two sets of nibbing-rollers, and means for transmitting motion from said driving-shaft to said grader, winnowers and elevators and to other moving parts of the machine, substantially as hereinbefore specified.

3. A self-contained machine for treating cocoa-beans and the like having, in combination, an elevated platform for the reception of the beans, a subjacent hopper which receives the beans from said platform, subjacent nibbing-rollers into which the beans are fed by said hopper, a shaker onto which said nibbing-rollers discharge, an elevator conveying the nibbed beans from said shaker to the top of the machine, a grader at the top of the machine into which said elevator discharges and which is adapted to separate the nibbed beans into two grades, coarse and fine, two winnowers arranged side by side below said grader and in communication with its respective discharges, discharge-chutes beneath the respective winnowers, auxiliary nibbing-rollers in line with the nibbing-rollers first named, means for conveying and transferring the tailings from the coarse side winnower to said auxiliary rollers, means for conveying and transferring the tailings of the fine side winnower onto the sieve of said coarse side winnower, a driving-shaft common to one of each pair of nibbing-rollers, and mechanism for transmitting motion from said driving-shaft to the other moving parts of the machine, substantially as hereinbefore specified.

In witness whereof I have hereunto set my hand in presence of two witnesses.

SAMUEL KITSON GREEN.

Witnesses:

JOHN JOWETT,

VANCE E. GALLOWAY.