

Sept. 6, 1949.

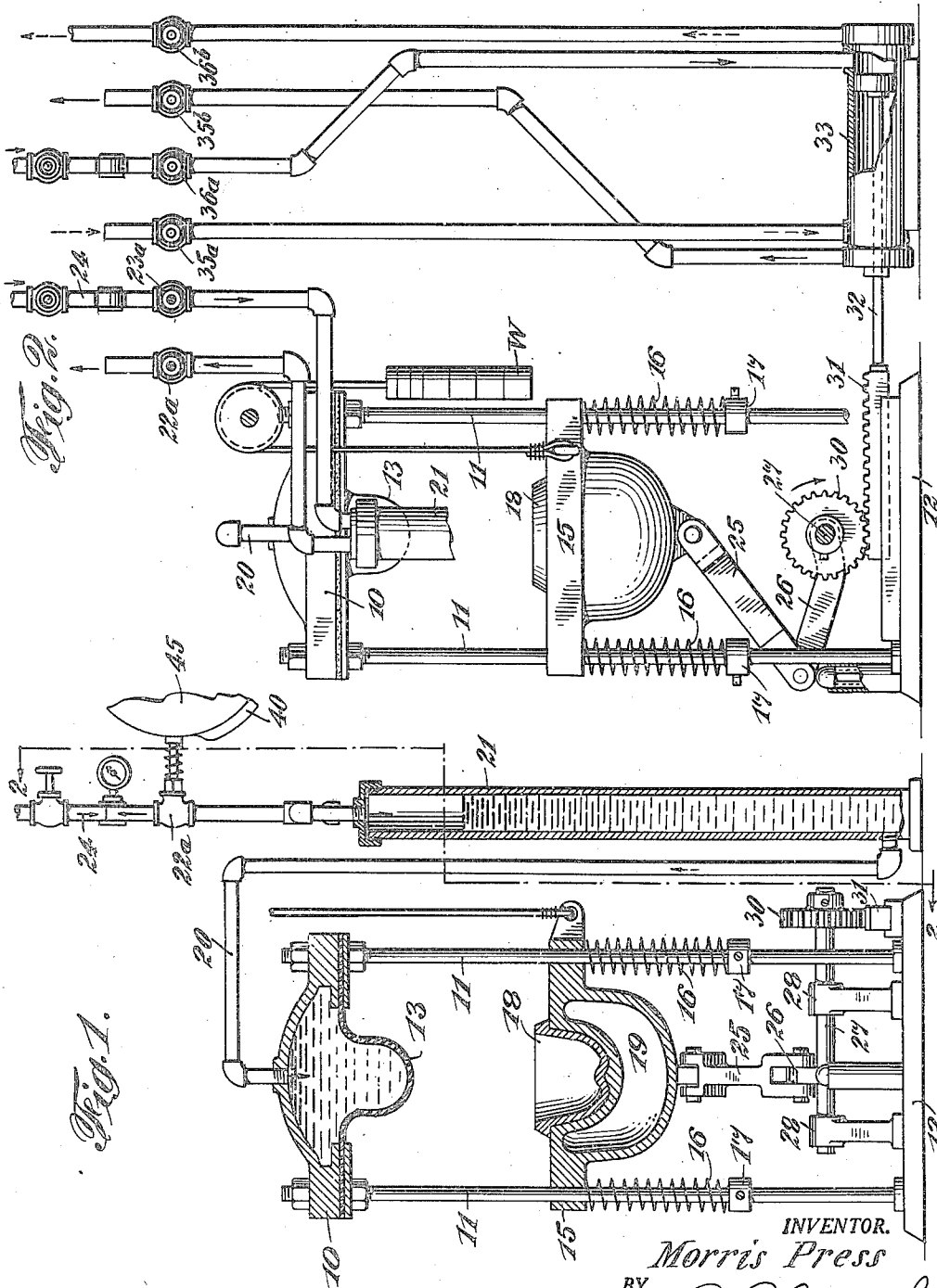
M. PRESS

2,480,960

HAT FORMING MACHINE

Filed Jan. 15, 1947

3 Sheets-Sheet 1



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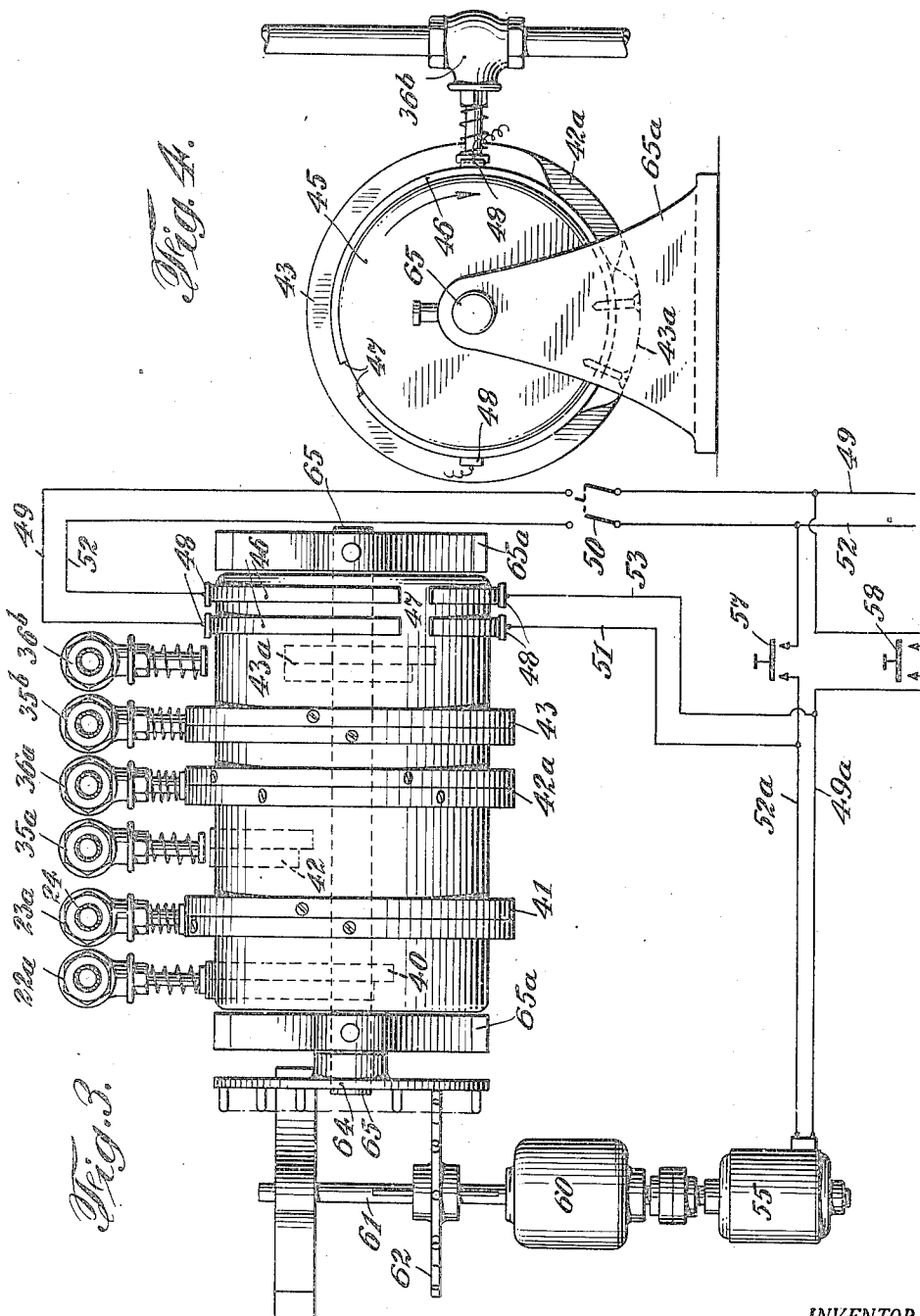
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3 Sheets-Sheet 2



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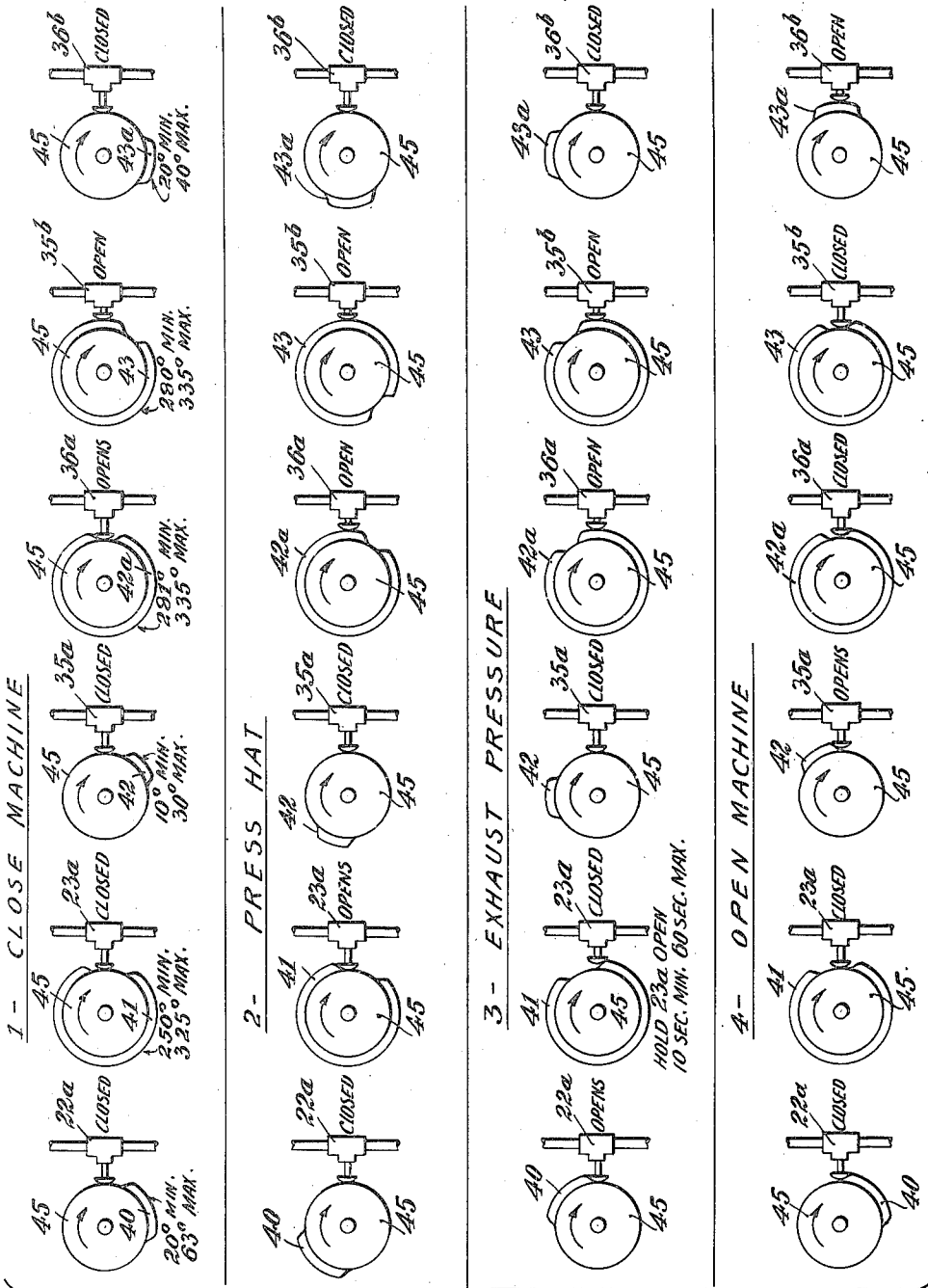
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3 Sheets-Sheet 3



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2,480,960

HAT FORMING MACHINE

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2 Claims. (Cl. 223-13)

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This invention relates to hat forming machines and has for its object to provide an automatic hydraulic hat forming machine which will save labor and eliminate fatigue of operators.

For this purpose the invention consists of attachments to existing hat forming machines, these attachments being so arranged as to permit operation of the machine under control of a timing device regulated to conform to time requirements for the various operations performed on a hat in this machine. This timing device is capable of adjustment to varying requirements of the different materials used for hats.

More particularly, the invention consists in an attachment to a known hat making machine, which has an upper head having an inflatable hat forming body, a lower head having a complementary hat forming body, and operating means for each of said heads, which attachment includes a rotatable drum, a plurality of valves disposed in alignment along said rotatable drum, means on the drum for opening or closing said valves, said means being spaced from each other on the drum along the aligned valves, means controlled by certain of said valves to control the operating means for the inflatable hat forming head, means controlled by certain of said valves to control the operating means for the lower head, and means for rotating the drum, whereby the upper and lower heads are moved towards each other, and the upper head conditioned for forming the hat, and are moved from each other, when the hat is formed, in timed relation with the actuation of said valves.

The invention also includes a special mechanism to carry out the operation of the foregoing structure including an electric circuit of electric conductors cooperating with brushes acting on the valve opening and closing means.

The invention will be more fully described hereinafter, embodiments thereof shown in the drawings, and the invention will be finally pointed out in the claims.

In the accompanying drawings,

Fig. 1 is a front view in section of a hat forming machine, connected to an attachment for regulating the operative parts of the hat forming machine;

Fig. 2 is a side view of the same taken on line 2-2 of Fig. 1;

Fig. 3 is a diagrammatic top view of the timing device for automatic operation of the machine.

Fig. 4 is a partial end view of Fig. 3, and

Fig. 5 is a diagrammatic layout of the cam action timer.

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Similar characters of reference indicate corresponding parts throughout the various views.

Referring to the drawings, Figures 1 and 2 show the general construction of a hat forming machine, as known, with the improvement connected therewith to automatically operate the same. As known the hat forming machine consists of the stationary head 10 supported by frame rods 11 secured to base 12. The upper head 10 has a flexible pressure bag 13 which is filled with fluid under pressure when a hat blank is formed. The lower head 15 is movable vertically and is cushioned in its lower position by springs 16, acting against it, which springs are adjustable by collars 17 on standards 11. The lower or movable head 15 has a mould 18 which fits into a steam jacketed cavity 19. The weight of head 15 is counter-balanced by weight W.

In operation of the machine as known with head 15 in its lower position, a hat form is placed in mould 18. The head 15 is brought to its upper position in contact with head 10 by use of hand levers not shown. In this position the bag 13 is inside the mould 18. Heretofore pressure was applied inside bag 13 through a hydraulic hand operated pump, not shown. This pressure is held on the hat form for a pre-determined time and then released after which head 15 is returned to its lower position and the formed hat removed.

The purpose of this improvement is to eliminate the hand work referred to above and provide uniform timing and pressure. Referring again to Figure 1 and Figure 2 attachments and mechanism is shown for moving head 15 and for applying pressure to bag 13. In Figure 2 a cylinder and piston 33 is connected to air or fluid under pressure so that the piston may be caused to reciprocate by admitting and exhausting air or fluid. In the arrangement shown this piston carries a rod 32 connected to a rack 31 which meshes with a gear 30 which is fixed to shaft 27. It will be seen that admitting pressure to one side of the piston will cause rack 31 to move turning gear 30 and shaft 27 causing head 15 to be moved by links 25 and 26. It is understood that the cylinder and piston may be connected to this linkage by other suitable means. Pressure is applied inside bag 13 through pipe 20 connected to reservoir 21. Reservoir 21 is partly filled with fluid which is acted upon by air supplied under pressure through pipe 24.

The hat forming machine may be operated as follows: With head 15 in its lower position, a hat blank is placed in mould 18. With valve 35a closed, valve 35b open, valve 35c closed, valve

36a is opened admitting air or fluid under pressure to right end of cylinder 33 causing rack 31 to move toward the left, turning gear 30 and shaft 27 and moving head 15 to its upper position through links 25 and 26. Valve 22a is closed and valve 23a opened, admitting air under pressure to reservoir 21. The pressure of this air is transmitted through pipe 20 to bag 13. After proper time has elapsed valve 23a is closed, and valve 22a opened, exhausting air from reservoir 21 and relieving pressure in bag 13. Valve 35a is then opened, valve 36a closed, valve 36b opened, and valve 35b closed, admitting air or fluid to the left hand end of cylinder 33 actuating parts and causing head 15 to return to its lower position. The formed hat blank is then removed from 18.

In order to save time and effort the timing device shown in Figure 3 and Figure 4 is provided to open and close these valves in sequence. To accomplish this an electric motor 55 drives a speed reducer 60 and a pin gear 62 which engages pin gear 64 which has several rows of pin teeth. Gear 62 is slidable on its shaft 61 giving a variable ratio between 62 and 64 so as to permit variations of speed of rotations of gear 64. Gear 64 is fixed to a shaft 65 on which is mounted drum 45, and which shaft is supported by standards 65a (Fig. 4). Drum 45 carries cam blocks 40, 41, 42, 42a, 43, 43a, which depress stems of valves 22a, 23a, 35a, 36a, 35b, 36b, to open valves. Valves are closed by springs around the valve stems. Motor 55 receives electric current through a circuit as shown through circular conductors 46 which are insulated from drum 45. The conductors 46 have a gap 47 which is wider than contacts 48 so that they will drop into this gap breaking the electric circuit and stopping motor 55 once per each revolution of drum 45. Contacts 48 are long enough to bridge this gap so that they do not intercept the circuit at this gap. Push buttons 57 and 58 are located a sufficient distance apart to require operator to use both hands to start the motor. This is a safety provision. Cam blocks 40, 41, 42, 42a, 43, 43a, 46 are made in two or more pieces which may be moved to give longer or shorter cams as the timing of the operations require.

The electrical circuit shown consists of two conductors 52 and 49 connected with a source of power, and with the upper brushes 48, and have a control switch 50. To these conductors 52 and 49 conductors 52a and 49a are connected, which conductors 52a and 49a are connected with the motor 55. The switch 57 is in series with the conductor 52a and the switch 58 is in series with the conductor 49a. To the conductors 52 and 49a are connected conductors 51 and 53, connected with the lower brushes 48.

In operation buttons 57 and 58 are pressed, starting motor 55. After contacts 48 cross gap 47 the motor continues to run after pressure is removed from 57 and 58. As drum 45 turns stem of valves 22a, 23a, 35a, 36a, 35b, 36b, are depressed in proper sequence by cams 40, 41, 42, 42a, 43, 43a, 46, and held open or left closed for length of time dependent on length of cams, and speed of rotation of drum 45. After one rotation of drum 45 completing one cycle of operations motor 55 is stopped by contact 48 interrupting the electric circuit, after which the formed hat is removed.

Preferably, the motor 55 rotates at 1750 R. P. M., which is reduced by 900:1, the shaft 61 rotating at 1.94 R. P. M. The shaft 64 rotates respectively at 2.60, 2.05, 1.40 and .85 R. P. M.

In Fig. 5 is shown a self explanatory diagram

of the drum cooperating with the respective valves.

The angles shown for each cam are based on the following cycle; these being given as examples:

	Seconds, minimum	Seconds, maximum
(1) Close Machine	2	2
(2) Turn on pressure	2	2
(3) Hold pressure	10	60
(4) Exhaust pressure	4	4
(5) Open Machine	2	2
(6) Lag	3	3

I have described several forms of my invention, but obviously various changes may be made in the details disclosed without departing from the spirit of the invention as set out in the following claims.

I claim:

1. In a hat forming machine having an upper head with an inflatable hat forming body, a lower head with a hat forming body, means for operating the inflatable hat forming body, and means for operating the lower head, the combination of a rotatable drum, a plurality of valves disposed in alignment along said rotatable drum, means on the drum for opening or closing said valves, said means being spaced from each other on the drum along the aligned valves, means controlled by certain of said valves to control the aforesaid operating means for the inflatable hat forming body, means controlled by the other valves to control the aforesaid operating means for the lower head, and means for rotating the drum, whereby the lower head is moved towards the upper head and the upper head operatively conditioned for forming the hat, and the lower head is moved away from the upper head, when the hat is formed, in timed relation with the actuation of said valves.

2. In a hat forming machine having an upper head having an inflatable hat forming body, a lower head with a hat forming body, means for operating said inflatable hat forming body, means for operating the lower head, the combination of a fluid pressure mechanism for the inflatable hat forming body, a piston with rack and gear connection, a plurality of valves disposed in alignment along a rotatable drum having means thereon for opening or closing said valves, said means being spaced from each other along the aligned valves, electric conductors spaced circumferentially on said drum, brushes for said conductors, means controlled by certain of said valves to control the aforesaid fluid pressure mechanism, means controlled by the other valves to control the piston, and means for rotating the drum including a motor, a speed reducer, a pin gear cooperating with the drum, and an electric circuit connected with the brushes, with a manually controlled switch for the motor, whereby the lower head is moved towards the upper head, and the upper head operatively conditioned for forming the hat, and the lower head is moved away from the upper head when the hat is formed, in timed relation with the actuation of said valves.

MORRIS PRESS.

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The following references are of record in the file of this patent:

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