(12) **United States Patent**
Graham

(10) **Patent No.: X7059**
(45) **Date of Patent: May 15, 1832**

(54) **HATS, BODIES,FORMING**

(76) Inventor: **Seth Graham**

Seth Graham

Dec. 30, 1847. No. 7

The Schedule referred to in these Letters Patent and making part of the same containing a description in the words of the said Seth Graham himself of his improvement in the machine for forming Steel Bodies.

This machine is intended for the use of a carding machine and is intimately connected with it both in its construction and operation. The wool is discharged from a cylinder of the carding machine called the doffer in a thin web which passes under the corner of a wire which carries from one side of the carding machine to the other in a curved form. The web is formed into Steel bodies by the operation of three conical blocks that lay in a horizontal position and in their operation receive three different motions. These conical blocks which are seventeen inches in length are so placed that the two larger bases come in close contact with each other. The diameter of the larger base being fourteen and half inches, and the diameter of the smaller base seven inches and one fourth. The small ends being globated. The blocks are placed on two pairs of cone rollers which are twenty one and a half inches in length. seven inches diameter at the larger end three inches and a half at the smaller ends — The small ends of these also are globated. The cone rollers and also the blocks are made hollow: and thro the centre of the rollers are small iron shafts the ends of which project and sufficient length for gudgeons. The rollers revolve in and towards the carding machine and in their operation they give motion to the blocks — The blocks and rollers together with their appendages have two vibrating motions. The first is from right to left alternately and is effected by a piece of the machine called the vibrating floor. This floor is a piece of plank of pine or other suitable kind of wood about forty inches in length and twenty two inches in width and its form is nearly that of an open fan cut off at the place where

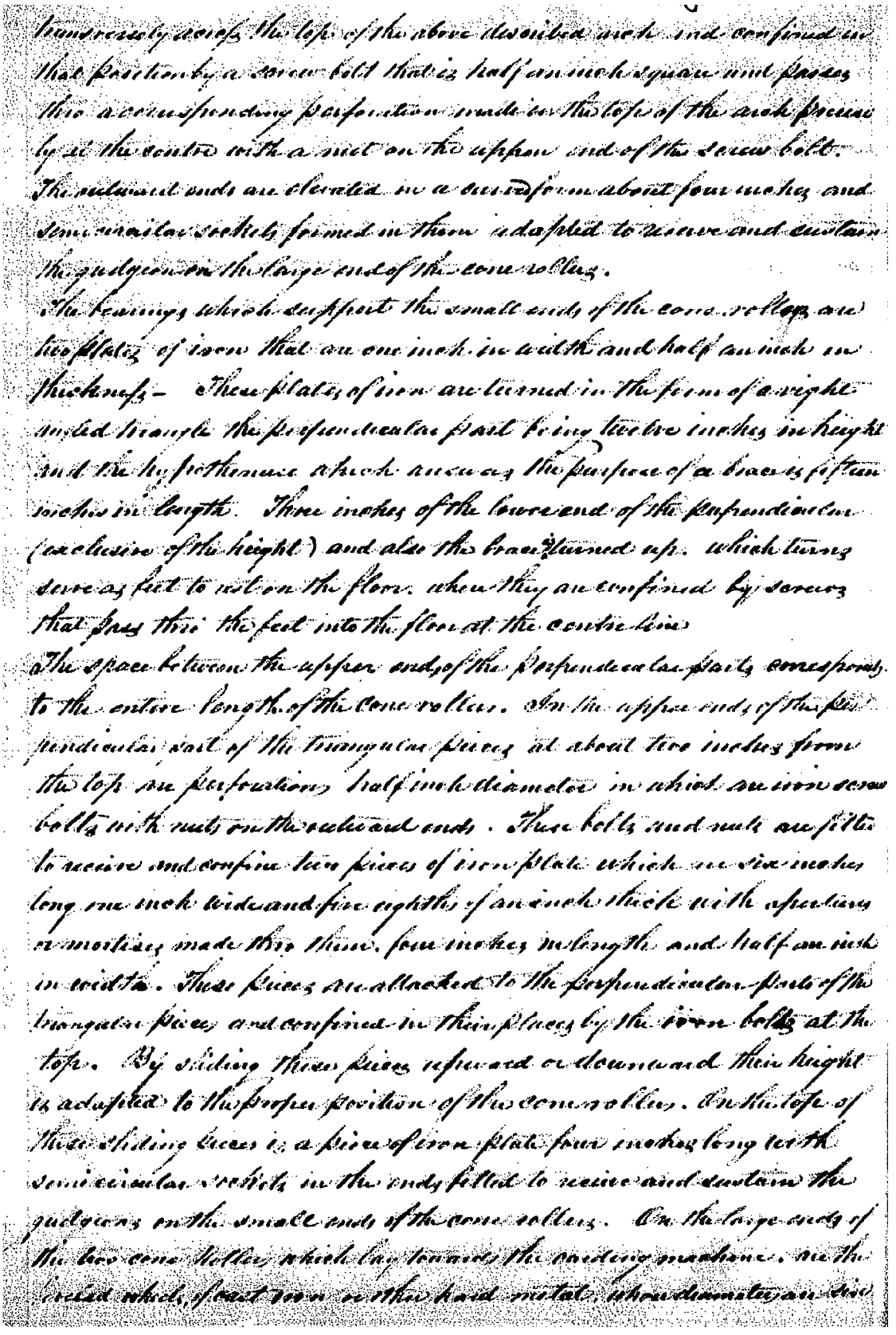
the sticks made with the spread substituting for the pad a sponge of a form that is sixty four inches in length and three by two inches square at the outward end of which and about two inches from the end is a perforation half an inch diameter which works on a pivot that is connected to the floor of the machine building.

The vibrating floor works on a curved railway of sufficient length to accommodate the extent of the motion or vibration — The railway is composed of a curved piece of board about three inches in width and one inch thick confined to the floor of the machine building by any suitable fastenings with the convex edge towards the carding machine. A piece of iron plate one inch in width and three sixteenths of an inch thick is firmly fixed to the convex edge of the curved piece of board. The length of the plate corresponding to the length of the board and the edge of the plate projecting above the surface of the board half an inch. on the projection two friction Rollers barrel which work in suitable notches made in the vibrating floor. These friction Rollers are three and half inches diameter and half an inch thick with grooves adapted to work on the projection of the railway. The distance from the friction Rollers to the outward edge of the floor is five inches and a half and the space between the rollers is two inches and three fourths. The second vibrating motion is effected by another piece of the machine. which is a piece of board in the form of a diamond. four feet in length from one point to the other (the points being rounded a little) and eighteen inches in width called the upper vibrating floor. and the space occupied between the floors is about two inches — The upper floor is supported by a piece of iron plate in the form of an arch which stands upon the lower floor directly over the centre line and two inches from the front side. This arch is confined in its place by screw fastenings A perforation half inch diameter is made through the upper floor. on the centre line at a distance of three inches and a half from the front side and an iron bolt passes thro this and a corresponding perforation made in the top of the iron arch. on which the floor rolls

The flanmeons upon this bolt as upon a pivot. To facilitate the revolution of the floor a curve railway is fixed on the under surface of the floor with the concave side towards the pivot on which the floor turns. This railway may be of cast iron or other hard metal & is twenty inches in length one inch and a half in width and half an inch thick with a projection rising on the convex side one fourth of an inch. This railway is fitted to operate in grooves made in the circumference of the friction rollers that are two inches and a half in diameter and half an inch thick. These friction rollers work in grooves made in the lower floor one circle of eleven inches and three eighths from the centre of the motion to the centres of the grooves in revolution — All the friction rollers may be made of cast iron or other hard metal — The machines in which the large friction rollers work are covered with wooden cases which are about four inches long two inches wide and one inch thick. To prevent the upper railway from being interrupted in its motion by the cogs pieces small grooves are made in the upper surface corresponding to the size and motion of the railway — The distance from the centre bolt on the lower floor to the centre of the grooves in the last mentioned friction rollers respectively is four inches and three fourths.

An arch is erected on the upper floor the feet of which stand on a double line drawn lengthwise of the floor. This arch is a curve piece of iron that is an inch and a half in width and half an inch thick. The distance from the floor to the top of the arch is seven inches, and the space contained between the feet of the arch is about twelve inches. The feet which stand outward two inches are confined to the floor by screws which pass thro' perforations made in them.

The bearings which sustain the large ends of the Concentring cones consists of two pieces of iron each of which is two inches in length one inch in width and half an inch in thickness. In one end of these pieces is an oblong aperture two inches in length and half an inch in width. These ends are placed one upon another so that they may take each three inches and hang thus united. They are placed



immediately across the top of the above described mortise and confined in that position by a screw bolt that is half an inch square and passes thro a corresponding perforation made in the top of the rock frame by it the centre with a nut on the upper end of the screw bolt.
The reduced ends are elevated in a curved form about four inches and semi circular sockets formed in them adapted to receive and sustain the gudgeons on the large ends of the cone rollers.
The bearings which support the small ends of the cone rollers are two plates of iron that are one inch in width and half an inch in thickness – These plates of iron are turned in the form of a right angled triangle the perpendicular part being twelve inches in height and the hypothenuse which answers the purpose of a brace fifteen inches in length. Three inches of the lower end of the perpendicular (exclusive of the height) and also the brace turned up. which turns serve as feet to rest on the floor. when they are confined by screws that pass thro the feet into the floor at the centre line
The space between the upper ends of the perpendicular parts corresponds to the entire length of the cone roller. On the upper ends of the perpendicular part of the triangular pieces at about two inches from the top are perforations half inch in diameter in which are iron screw bolts with nuts on the reduced ends. These bolts and nuts are fitted to receive and confine two pieces of iron plate which are six inches long one inch wide and five eighths of an inch thick with square mortises made thro them four inches in length and half an inch in width. These pieces are attached to the perpendicular parts of the triangular pieces and confined in their places by the iron bolts at the top. By sliding these pieces upward or downward their height is adjusted to the proper position of the cone roller. On the top of these sliding pieces is a piece of iron plate four inches long with semi circular recesses in the ends fitted to receive and sustain the gudgeons on the small ends of the cone rollers. On the large ends of the two cone rollers which lay between the crushing machines are two cast iron wheels of cast iron or other hard metal, three diameter and one

inches and a half and a cog of cogs constructed on the inside surface of each of them which interlock each other. on the large end of the left hand one roller which lies in front is a circular piece of iron or tin plate. the diameter of which is seven inches giving a projection of one fourth of an inch from the surface of the roller. and this projected part of the plate works in the seam between the large ends of the blocks.

A small beveled wheel three inches and one fourth diameter. the cogs of which interlock with the cogs on the right hand of the two above described wheels. works horizontally on a small iron shaft that is three inches in length and stands in a vertical position directly under the gudgeons on the same roller. The gudgeon on the upper end of this shaft works in a perforation made in. and near the end of a piece of iron plate that is nine inches in length. one inch in width and one fourth of an inch thick. the inward end of which passes under the arch piece with a perforation made in it fitted to receive the iron bolt at the top of the arch by which bolt this end is confined. In the middle it is confined to the iron which lays above by perforations that pass thro both pieces. The gudgeon on the lower end of this shaft works in a similar piece of iron secured by similar fastenings at the same ends. Under the bevel wheel and on the same shaft is a wood en pulley three inches diameter and one and a half thick. on the opposite side of. and at an equal distance from the arch is another small iron shaft six inches in length in a vertical position near the upper end of which is a pulley. three and half inches diameter and one inch and a half thick. This pulley is connected with the one on the other shaft by a suitable band. Near the lower end of the shaft is another wooden pulley three inches diameter. and two inch es in thickness. The gudgeon on the lower end of this shaft works in a socket that is confined to the upper vibrating piece and the gudgeon on the other end works in a perforation made in a piece of iron plate. that is two inches long. one inch and one fourth in width and one fourth of an inch thick. the other end being confined to the arch by the bolt that passes through each piece at the top. The

cone rollers receive motion from the doffer. The intermediums of a series of pulleys band and wheels is as follows viz. A pulley two inches diameter is fitted on the left end of the doffer inside of the pulley that belongs to the doffer and this pulley is connected with another nearly under it. The shaft of which extends across the whole width of the carding machine. The gudgeons of this shaft being supported by suitable bearings that are confined on the upper surface of the side rails. On the front of this shaft and inside of the opposite side rail is another pulley or cylinder of a length suited to present three plain surfaces of different diameters which are of sufficient width to receive a suitable band. The smallest diameter is five inches and lays towards the opposite side of the machine. The larger diameter is seven inches and the largest is eight inches. This cylinder is connected by a band with another of like construction. The shaft of which extends across the width of the carding machine at a small distance from the outward end of the stem of the lower front and the gudgeons of this shaft are confined to the inside of the side rails. The smallest diameter of the last mentioned cylinder placed in a direction opposite to that with which it is connected. The several surfaces of different diameters mounted on the periphery of these two cylinders are designed to vary the speed of the cone rollers by moving the band that connects them from larger to smaller and vice versa. On the middle of the shaft on which the last mentioned pulley works is a spur wheel five inches diameter which intermeshes with another of like form and dimensions and the mesh of these two wheels must be directly over the pivot on which the vibrating stem operates. A pulley two inches thick and six inches diameter is placed on the shaft of the last mentioned spur wheel and comes in close contact with the left side of it. The shaft of this wheel and pulley is four inches in length and the gudgeons work in perforations made in circular pieces of iron plate that are confined to the ends of the vibrating stem. The last described pulley is connected by a band with the pulley on the lower end of the vertical shaft stationed on the front of the upper vibrating

and the pulley on the upper end of the shaft being connected with the pulley on the opposite side of the arch as before described completes the series of parts which communicate motion from the doffer to the comb rollers.

The lower vibrating floor receives motion from a cylinder of the carding machine called the feeder through the medium of a series of parts. The first of which is a pulley five inches diameter that works on the shaft of the feeder pinion. This pulley is connected by a band with another which works directly under it, and is eight inches diameter. The shaft of this pulley is supported by iron bearings, one of which is confined to the side of the carding machine, and the other is confined to the floor of the machine building. On the same shaft and inside of the pulley last described is another pulley which is three inches diameter and is connected by a band with another twelve inches diameter that works in a horizontal position out side of the carding machine about twenty four inches from end of the iron post. Grooves are made in the circumference of these two pulleys filled to receive the band that operates on them. The horizontal wheel is connected with the vibrating stem by an iron rod or arm with perforations made in it near each end. The perforation in one end receives a pivot inserted in the vibrating stem at the post directly opposite to the centre of the horizontal wheel and the perforation on the other end of the arm works on a moveable pivot which is fixed on the upper surface of the horizontal wheel at about two inches from the circumference. The moveable quality of the pivot on the wheel is designed to vary the extent of vibration so as to correspond with the size of the blocks that are used whether they be larger or smaller. By the operation of the horizontal wheel upon the vibrating stem the lower floor and its dependents are moved alternately from right to left — The second vibrating motion of the upper floor is effected by means of two cords which pass around a pulley three inches diameter that works horizontally on the vibrating stem at a distance of six inches from the floor. One end of each cord is attached to the ends of the upper floor, and passing around the pulley to the same side of the carding machine is there confined as the upper floor moves

obliquely to the right or left the cord on the opposite end proceeds upon making a circuitous motion like the other flow and consequently the cone rollers and blocks are kept in a position parallel to the cylinder from which the web of wool is discharged.

The specific size of the parts of this machine as they are stated in this specification are such as are found to be convenient but they may be varied without injuring the general construction of the machine. To work the machine above described the attendance of two workmen is necessary one to feed the carding machine, and the other to wind the cone blocks. The workman receives the web as it is discharged from the doffer and affixes the end to the blocks which form it into two flat bodies that are separated by cutting with a pair of shears. Between the large ends of the blocks and while the web is winding round one block the hat body is removed from the other and the block returned to its place in season to receive the web in its return — The machine above described. I claim as the first and sole inventor

Wm. Graham

Test. Witness
W. F. Deane
Henry Craig