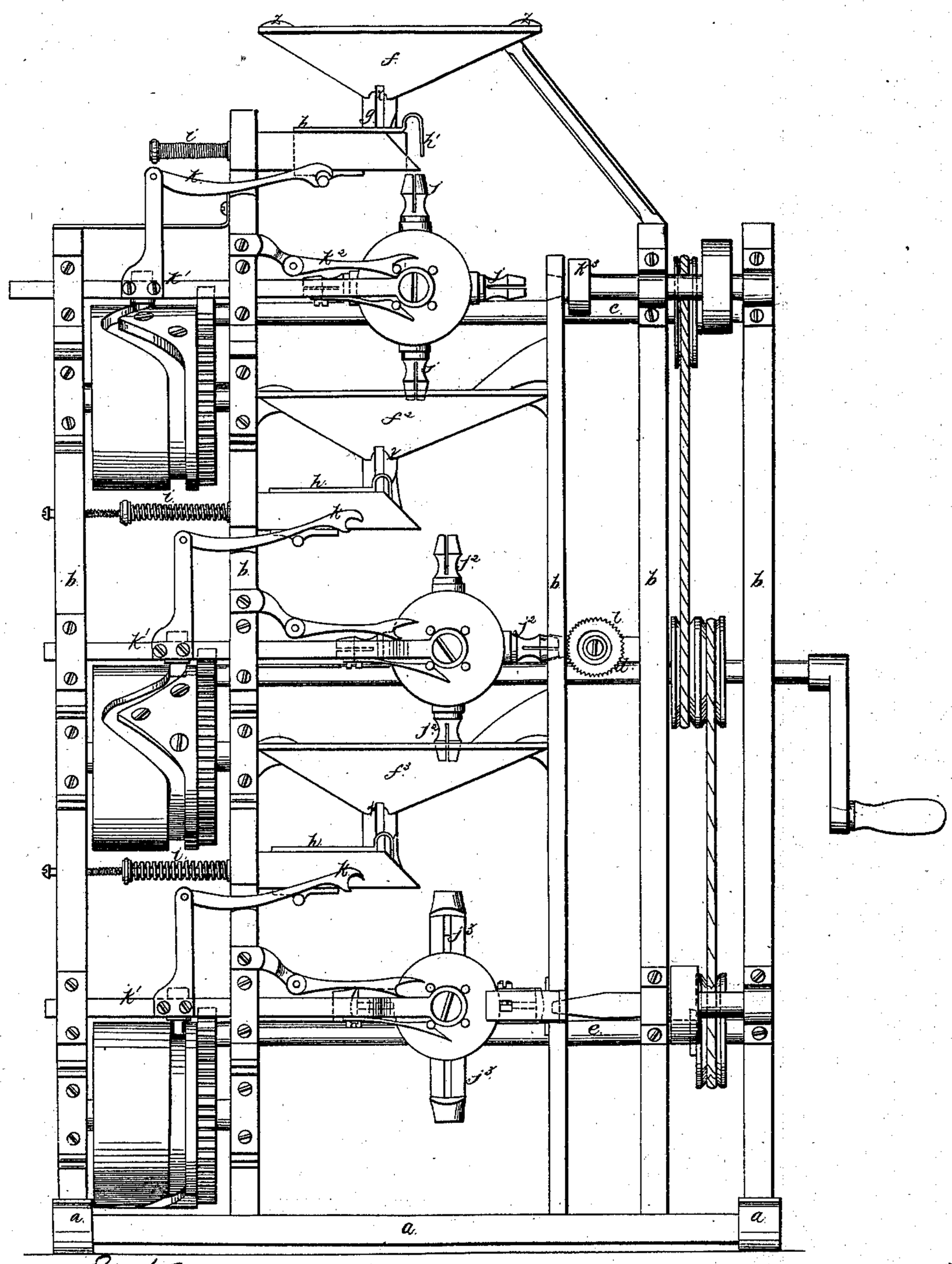
Sheet 1- 2 Sheets.

H. A. Harvey,

Screw-Blank Feeder,

No. 47,549. Fig: 1. Patented May 2, 1865



Witnesses: Edw. L. Payson
Edw. E. Quimby.

Inventor: H. A. Harvey

Sheet 2-2 Sheets.

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Fig: 2.

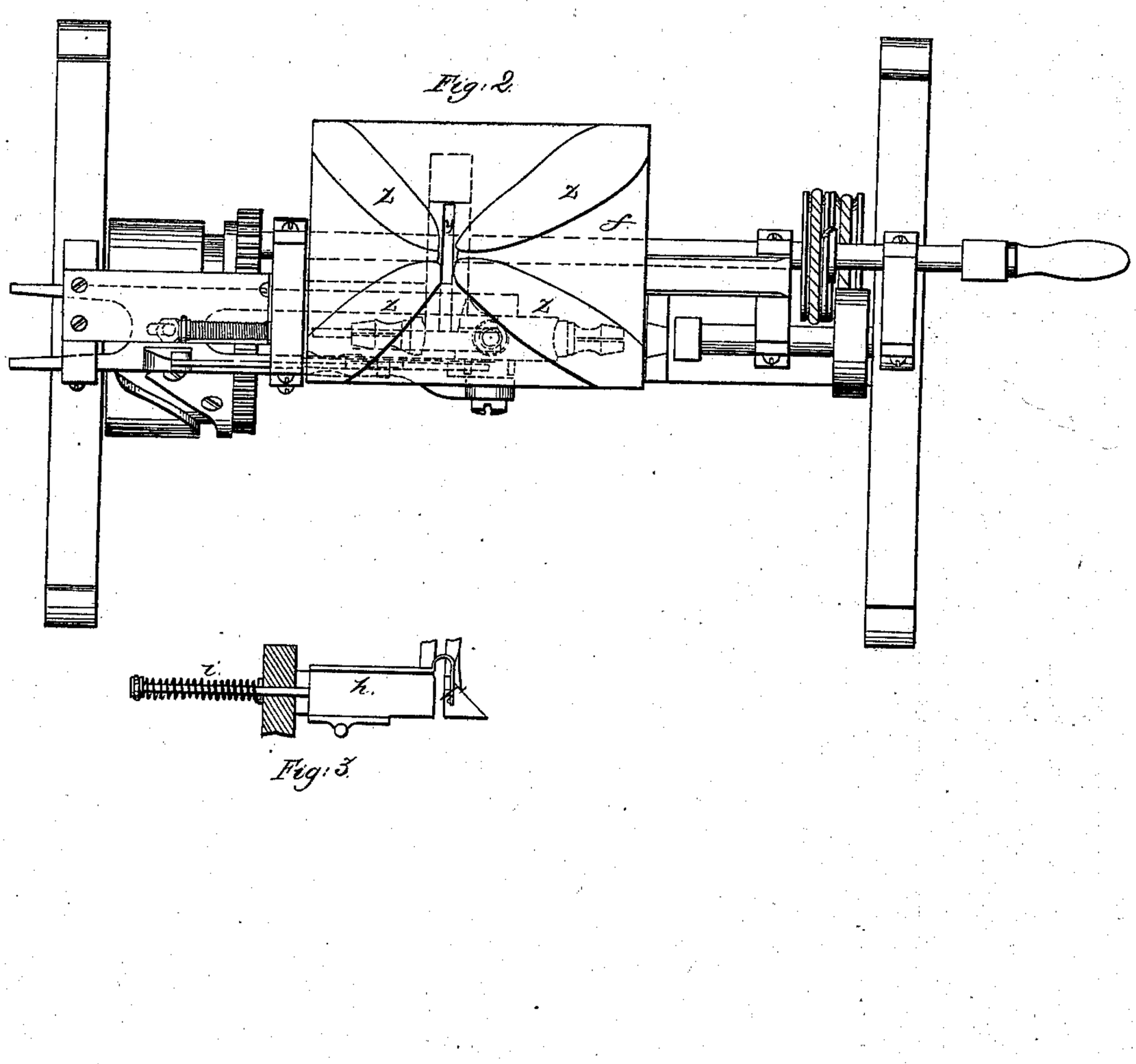

Fig: 3.

Witnesses:
Edw.d Payson
Edw. E. Quinby

Inventor:
H. A. Harvey

UNITED STATES PATENT OFFICE.

H. A. HARVEY, OF NEW YORK, N. Y.

IMPROVEMENT IN MACHINERY FOR MAKING SCREWS.

Specification forming part of Letters Patent No. **47,519**, dated May 2, 1865.

To all whom it may concern:

Be it known that I, HAYWARD A. HARVEY, of the city, county, and State of New York, have invented certain new and useful improvements in the manufacture of screws, consisting in certain combinations of machinery by means of which screw-blanks may be converted into screws without handling, the chief agent in the transfer of blanks from one machine to another in the process of manufacture being the force of gravity, certain parts of which are useful out of such combination; and I declare that the following, taken in connection with the drawings, is a full, clear, and exact description thereof.

In the drawings, which illustrate the invention in the mode preferred by me, Figure 1 is a front elevation of a series of machines for performing various operations on screw-blanks, and also of the transferring machinery. Fig. 2 is a plan or top view thereof, and Fig. 3 is a detail view illustrating a separating and delivering contrivance.

In the manufacture of screws from screw-blanks, which are pieces of wire with heads thereon, it is customary, first, to shave the heads of the blanks; second, to nick them, and lastly, to cut the threads; and it is customary to feed each of the machines performing these operations by hand, or to put the blanks by hand into inclined ways, from which they are delivered by proper apparatus to some one machine, or, thirdly, to place the blanks in mass in arranging apparatus of various kinds, from which they are transferred to the inclined forwarding-ways by proper machinery and thence delivered as before stated. It has also been essayed in various ways to make a single machine, performing more than one of the operations necessary to convert a blank into a screw, in which the blanks after one operation had been performed upon them were transferred to other parts of the machine by spring-fingers, or by means of tubes with punches acting in them, but up to the present time such inventions have, on account of various objections which it is unnecessary to recite, failed to come into practical use.

In the plan herein described the various machines are separate and distinct, as usual, and any one may be used when the others are out of order, and the chief agent in the transfer of blanks is the force of gravity operating through the intervention of suitable machinery. The machines must therefore be arranged on different levels, or at different distances from the earth, and the shaver must be the highest and the threader or threaders the lowest in the series, and the blank must descend from machine to machine until it is finished.

The principle upon which the apparatus is based is as follows: Blanks are to be thrown into an arranger, thence by means of ways they are forwarded to a delivering apparatus which delivers them to a shaver. As they fall or are discharged from the shaver they are received by a second arranger or receptacle, which delivers them to ways whose ends are in connection with delivering apparatus which delivers them to a nicker, and as the blanks fall or are discharged from the nicker they are by a similar train of machinery delivered to a threader or threaders, from whence they fall or are discharged finished screws.

My invention is not based upon or confined to any special kinds of machines for operating on blanks and special kinds of delivering apparatus, or any special kinds of hopper, receptacles, or arrangers, although I have herein described machines and delivering apparatus invented by myself, and claimed in other patents, and notwithstanding that there is described herein a hopper or arranging apparatus, which I herein claim by itself as new and useful out of the combination which is herein set forth as of my invention.

In the drawings, a bed-plate, table, or stand is represented at *a a*, from which rise standards *b b b*, supporting the various parts of the apparatus. In these standards are mounted three shafts, *c d e*, connected by pulleys and belts so that all may be revolved together, and each of these shafts actuates one machine. On top of the whole contrivance is an arranging apparatus, *f*, which may be of any proper or usual construction so long as it arranges blanks thrown into it, causing them to hang by their heads in the ways *g*. In the drawings this apparatus is represented as shaped on the outside like an ordinary four-sided pyramidal hopper, but it may have any number of sides, or may be conical, and by reference to Fig. 2 it will be perceived that it has secured in each corner a piece, *z*, with a U-shaped cross-section, which divides each face of the hopper from its neighbor by a low

round-topped wall or partition, the apex of the wall slanting downward at about the same angle to the horizon as the side of the hopper. These partitions or walls exercise an important influence on the blanks, tending to cause them to be with the heads upward as they slide down the hopper. It will further be seen that one side of the hopper is slotted, as at *y*, with a slot extending upward from the apex sufficiently wide to receive the bodies of blanks, but so narrow that their heads cannot pass through. This slot is in continuation of the slot in the forwarding-ways *g*, and a small opening, *x*, is cut in one of the sides of the hopper so as to permit the heads of blanks to pass as the latter go into the ways. I prefer to continue the ways under the hopper and let it rest upon them. This slot through one side, at least, of the bottom, is important, although it is difficult to explain exactly how it acts in connection with the surface of the hopper in turning blanks heads up. Similar slots may be made in all the faces or sides of the hopper, provided they end in the ways. From the hopper or arranger leads the inclining ways *g*, slotted, as such ways usually are, so as to hold a column of blanks by their heads. This ways is bent at its lower end, and in the bent part plays a slide or gate, *h*, fitting in the slot of the ways and moved in one direction by a spring, *i*, in the other by a sliding panel, *k*. When this panel is drawn away from the end of the ways, (see Fig. 3,) a screw-blank will descend by gravity and lie in front of it. When it is moved toward the end of the ways, it will push the blank in front of it out of the ways, the head of the blank sliding down the ways, and the slide holding back those blanks that are in that part of the ways above the bend. When the gate returns again into position, as shown in Fig. 3, leaving the channel or slot in the ways open, another blank will slide down in front of it in readiness to be delivered by the gate. A U-shaped piece of metal, *h'*, may be attached to the slide and will prevent blanks from being thrown too fast by the blow of the gate when the contrivance is moving rapidly. This gate, acting in connection with the bent ways, constitutes a delivering and separating apparatus, and as many kinds of apparatus performing the same office are known, they, or suitable apparatus performing these offices, may be located in the ends of the ways as substitutes for the apparatus herein specially described. A shaving-machine is located in proximity to this delivering and separating apparatus in such manner that it shall receive and act upon blanks delivered to or fed into it by suitable machinery, as described. This machine may be of any suitable or usual kind, but I prefer the machine invented by myself, (Letters Patent for which were allowed on the 26th day of January, A. D. 1864,) one of whose features is a series of rotating and sliding receivers and holders, such as are shown at *j' j'*, mounted on a star-wheel carried by a slide, *k'*, which is actuated by a cam, clearly shown in the drawings. These holders are spring-holders, and as the slide which carries the wheel in which they are mounted draws it away from the revolving head k^3 (containing the shaving-tools) one of the pins on the wheel strikes against the panel k^2, which causes the wheel to revolve through an arc equal to that between any two receivers. When so revolved, one of the receivers will lie immediately under the corner formed by the bend in the ways, and the gate will be in position, as shown in Fig. 3. As the gate advances, the slide causes the receiver under it to advance, and the blank in front of the gate will gradually enter the receiver. At a subsequent motion of the slide another receiver will be brought under the corner and a second blank received and the first submitted to the action of the shaving-tools, and so on in succession. After each blank is shaved the receiver containing it will rotate so that the blank can drop out into the arranger or receiving-hopper f^2. As this shaver forms no part of this invention, and as other suitable shaving machines may be substituted for the one illustrated in the drawings, and as various shaving-machines are well known to those conversant with wood-screw machinery, further description of a shaver is deemed unnecessary; but whatever shaver may be preferred by those using my invention must be located so as to receive blanks from a delivering apparatus and discharge them into a receptacle or hopper which is in connection with a nicking-machine, substantially as hereinafter described.

The hopper or arranger preferred for receiving blanks discharged or falling from the shaver is shown at f^2, it being the same in all respects as the one before described, and provided like it with ways and a separating and deliverir g apparatus. Any other suitable hopper or arranger may be substituted for it, provided it occupies such a position as to receive shaved blanks delivered from a shaver and cause them to be arranged in inclined ways, connecting by means of a separating and delivering apparatus with a machine for nicking the heads of blanks.

The nicking-machine lies below the shaver and below the second set of ways, and the drawings illustrate a machine invented by myself, with a series of sliding and revolving receivers and holders, j^2 j^2, acting like those before described, in so far as they receive and hold blanks, transfer them to be operated upon, and drop them after they have been acted upon by the machine. A nicking-saw is shown at *l*. As this nicker is described in a patent allowed to me on the 26th January, 1864, and as other suitable nickers, which may be substituted for it in the combination, are well known to those learned in the art of making screws, a minute description of a nicking-machine is deemed unnecessary, but when

used in my combination the nicking-machine must be arranged on a lower level than the shaver, so as to receive blanks which have been operated upon by the shaver, through the agency of a hopper or receptacle, inclined ways, and a delivering apparatus, and must then deliver them into a receptacle, hopper, or arranging apparatus, which is by means of inclined ways and a delivering apparatus, or two of them, in connection with a machine or machines for threading screws.

A receptacle or arranger, f^3, receives blanks delivered from the nicker and acts upon them, so that they are located in a ways, down which they slide to a delivering apparatus, and all the remarks as to the construction of the receptacle, ways, and delivery apparatus that forward blanks from the shaver to the nicker apply to these, but these last, whatever may be their special peculiarities of construction, must, as a whole, receive nicked blanks from a nicker and transfer them, delivering them to a threader, which is located on a lower level than the nicker.

I prefer to use a threading-machine of my own invention (a patent for which was allowed) in this combination, and the rotating and vibrating receivers and holders of such a machine, acting to receive, hold, and discharge blanks, as before described, are represented at j^3 j^3 in the drawings; but any suitable threading-machine may be employed, so long as it is located on a lower level than the nicker and receives nicked blanks through the agency of an arranger or hopper, forwarding ways, and a delivering apparatus.

As the construction and action of arrangers, ways, and delivering apparatus in the form preferred by me has already been described, further description is deemed unnecessary; and as any suitable threader may be used, so long as it is located and receives nicked blanks, as before stated, a precise description of a threading-machine is considered immaterial.

In the use of the combination, as a whole, thus described, headed blanks are to be thrown into the uppermost arranger, from which they descend and are delivered to a shaver and have their heads shaved. As shaved blanks are dropped or discharged from the shaver they enter the middlemost arranger, are arranged, descend, and are delivered to the nicker, by which the heads are nicked, and nicked blanks are delivered or discharged into the lowermost hopper or arranger. From this lowermost hopper, through the lowermost ways and delivering apparatus, nicked blanks are fed to the threader, threaded and discharged, and no manual labor is needed during the time that a headed blank is being converted into a finished screw.

Experience in screw-machinery has proved that nickers and shavers, when run at a proper speed, operate upon about twice as many blanks as can be threaded by a single threader. I therefore intend at times to locate two hoppers with their ways and delivering apparatus, and a threading-machine for each, below the nicker, and to deliver the blanks from the nicker upon an inclined plane, the lower end of which is vibrated by a motion taken from the nicker in such wise that it shall deposit each alternate screw in a different hopper, or else to use in place of the arranger and distributer shown in the drawings and lowest in the series some one of the arrangers previously patented by me, capable of distributing blanks to two or more machines.

I intend at times to give a jarring motion to the hoppers, to increase their capability for arranging blanks.

If the shaver should get out of order shaved blanks are to be thrown by hand into the middle hopper until the machine is repaired. If the nicker gets out of order blanks suitable to be acted upon by each machine may be thrown into the hoppers of the shaver and threader.

I intend at times to use a shaver and nicker connected by a receptacle and its accessories without any threader in the same series, and at other times to use a nicker in connection in the same manner with one or two threaders without any shaver in the series.

I claim as of my own invention—

1. The combination, substantially as described herein, of hoppers or receptacles, forwarding-ways, delivering apparatus, and shaving, nicking, and threading machines, whereby headed blanks may be thrown into a hopper and converted into screws without manual labor, the machines operating on the blanks being arranged on different levels, as described, and the blanks descending from one machine to another, substantially as set forth.

2. The combination of a nicking and shaving machine on different levels and in working connection with each other by means of apparatus substantially such as described, the whole arranged and operating substantially as set forth.

3. The combination of a nicking-machine with a threading-machine on different levels and in working connection with each other by means of apparatus substantially such as described, the whole arranged and operating substantially as specified.

4. Arranging, shaving, and nicking, also nicking and threading, and also shaving, nicking, and threading machines on different levels, in such manner, substantially as described, that blanks may be transferred from one machine to another without handling, substantially as set forth.

In testimony whereof I have hereunto subscribed my name.

H. A. HARVEY.

In presence of—
EDWD. PAYSON,
EDW. E. QUIMBY.