

(No Model.)

2 Sheets—Sheet 1.

W. P. HANSELL.

Apparatus for Tempering Coiled Springs.

No. 233,242.

Patented Oct. 12, 1880.

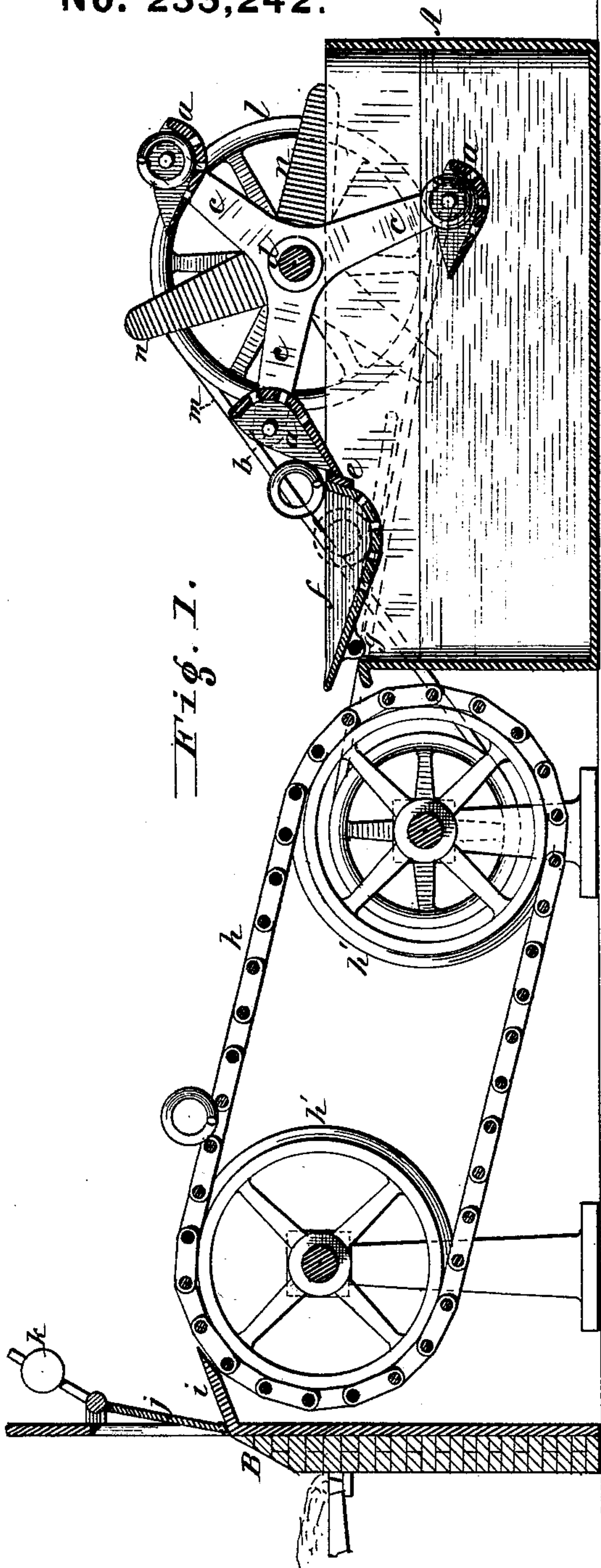


Fig. 1.

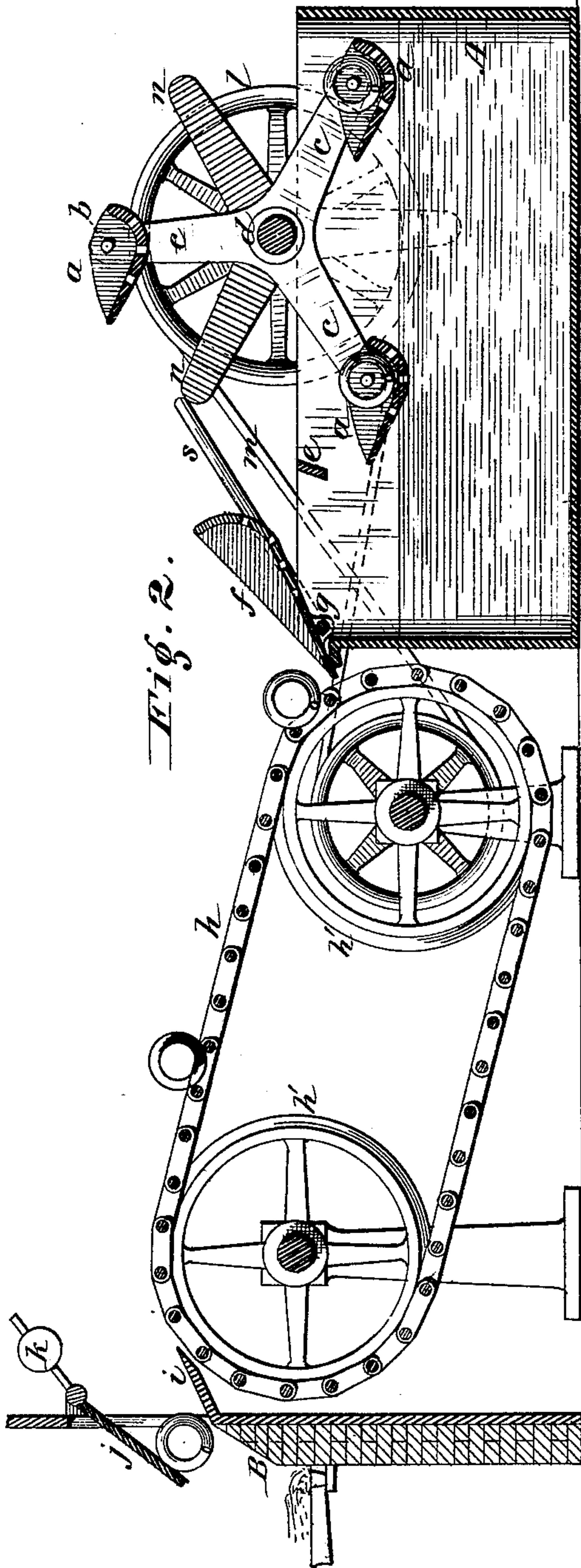


Fig. 2.

Attest:
H. L. Perrine,
Floyd Norris.

Inventor:
Walter P. Hansell,
By Johnson & Johnson,
Atty's.

(No Model.)

2 Sheets—Sheet 2.

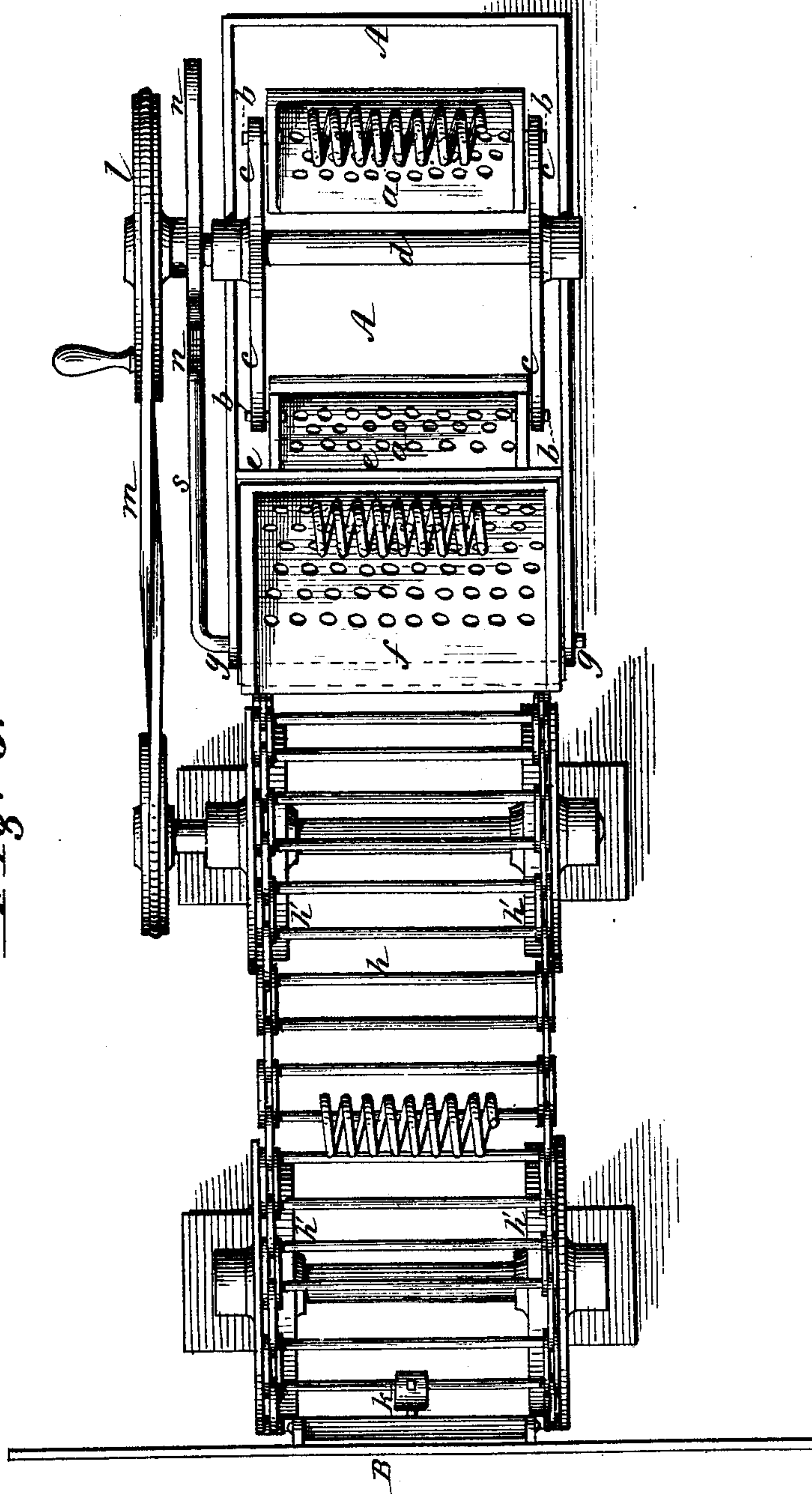
W. P. HANSELL.

Apparatus for Tempering Coiled Springs.

No. 233,242.

Patented Oct. 12, 1880.

Fig. 3.



Attest:
H. L. Perrine,
Floyd Norris.

Inventor:
Walter P. Hansell,
By Johnson & Johnson,
Atty's.

UNITED STATES PATENT OFFICE.

WALTER P. HANSELL, OF PITTSBURG, PENNSYLVANIA.

APPARATUS FOR TEMPERING COILED SPRINGS.

SPECIFICATION forming part of Letters Patent No. 233,242, dated October 12, 1880.

Application filed August 18, 1880. (No model.)

To all whom it may concern:

Be it known that I, WALTER PARKISON HANSELL, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented new and useful Improvements in Apparatus for Tempering Coiled Steel Springs and other Articles, of which the following is a specification.

My invention relates to improvements in apparatus for tempering steel articles, but more particularly coiled springs, in which a quenching or liquid bath is used in the operation of tempering.

By my invention each article, in the operation of being tempered, is supported in a tray, by which it is dipped into the cooling-bath, withdrawn therefrom, and dumped into a draining-tray, from which it is dumped onto an endless carrier, by which it is conveyed to and automatically delivered into a second heating or simply carried away, each article being separately immersed into, carried through, and taken out of the bath, so that it is not liable to be put out of shape.

The object of my invention is to effect mechanically the several operations continuously which have hitherto been done by hand-labor, whereby the work is done in less time, at less expense, and in a better manner than as now practiced. This object I attain by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 represents a vertical longitudinal section of the entire apparatus, in which a spring is shown as having been carried through the bath and as being dumped into the draining-tray, while a succeeding spring is shown immersed into the bath and another in position to be carried down therein; Fig. 2, a similar view, in which the draining-tray is shown as having dumped the spring onto the endless carrier, from which the preceding spring is shown as being delivered into the second heating; and Fig. 3, a top view of the apparatus.

In these several views the same letters refer to the same parts.

In the operations of tempering coiled springs as now practiced they are taken from a heating-furnace, and while hot thrown into a tank

of oil or water to harden them, and from which they are removed and subjected to a second heating to reduce their hardness to the desired temper. In these several steps the spring is subjected to separate handling; but by my invention the hardening or bath operation and the delivering of the article therefrom into the second heating are made automatic, with highly important advantages.

Within a bath-tank, A, of oblong or other suitable form, is arranged a revolving device for dipping into and delivering the springs or other articles from the bath, and a device for receiving and draining each dipped spring and passing it from the bath-tank.

The dipping device consists of one or more trays, *a*, hung by pivots *b* to and between the ends of radial arms *c*, carried by a horizontal shaft, *d*, supported in bearings in or upon and across the top of the tank. The length of these arms must be such as to carry each tray and the spring which it holds and supports down into and through the bath, so that the spring will be fully covered thereby. Each tray is hung so as to sit or be balanced in position to hold the spring as the tray is carried down into, through, and up out of the bath as the shaft is revolved.

The trays are of scoop form—that is, having one side formed so as to easily dump the spring therefrom by being tilted upon their pivots.

The trays are of a length greater than that of the springs and less than the width of the tank, and they are hung parallel with their operating-shaft, so as to maintain a holding position except when tilted, and are perforated so as to allow the liquid to run out as the trays are rising from the bath and before they are tilted to turn or roll out the spring. This tilting action takes place as the trays rise, and at a point at or near the top of the tank, and on a level with the draining-tray when in its normal position of rest, and such dumping action is effected by the scoop-formed edge of the tray coming in contact with a cross-bar, *e*, of the tank, over which the spring is dumped into the draining-tray. This tray *f* is hung at or near the delivering end of the bath-tank by a cross-rod or pivots, *g*, near the trough-shaped or delivery side of said tray,

so that this side will overhang the tank, while its inner side will, by its own weight, rest upon and be supported by the said cross-bar *e*, with the top edges of both preferably coincident.

5 Into this tray the spring is dumped from the dipping-tray and is held for a short interval to allow it to be drained of the liquid, there being perforations in the tray for this purpose. This draining-tray *f* is dumped au-

10 tomatically to roll or deliver the spring onto the endless carrier *h*, which is arranged to travel in the line of the tank to carry the spring away from it and turn or deliver it into a second furnace to complete the tempering.

15 This carrier I prefer to form of endless metallic chain-rods arranged to travel upward upon flanged wheels *h'* from and just beneath the overhanging edge of the draining-tray. The rods are spaced, so as to form holes for the

20 springs, and the travel is upward, so that they shall be so held in horizontal positions between the rods until delivered therefrom. The delivery or upper end of this carrier is arranged in such relation to the door of the reheating-

25 furnace as to be automatically rolled or turned therein; and for this purpose an upwardly-inclined chuteway, *i*, extends from the bottom of the furnace-door, opening upward to the carrier in position to receive the spring there-

30 from and conduct it by gravity against the furnace-door *j*, which, being hung from its top, will be opened thereby and let the spring pass in. For this purpose the door is maintained in a balanced position, or nearly so, by a

35 weighted arm, *k*, or other suitable means, so that it will be self-closing.

The revolving dipping and dumping tray device may be operated, as shown, by hand, with a cranked pulley, *l*, from which the end-

40 less-chain carrier may be also operated by the crossed band *m* passing over a pulley on the lower shaft of said carrier; or these parts may be connected and operated in any suitable manner by power.

45 The draining-tray is operated by the revolving dipping device, on the shaft of which, outside of the tank, there are radial arms *n*, corresponding in number to the dipping-trays, and which, in their revolution, strike an arm,

50 *s*, extending from the bearing-rod of said tray *f*, and raising it, thereby dumping said tray after it has received the article from one of the revolving dipping-trays, leaving it to fall back before the succeeding dipping-tray has reached

55 a position to dump the next spring.

The holding of the article in position to be drained within the tank and without interrupting the operation of the dipping device is important as a means of effecting a saving

60 of oil, if that be used as the cooling medium, and the automatic delivery of the article from the bath into the drainer is of much advantage in such work.

65 The manner of carrying the article through the bath agitates it and keeps it at a more uniform temperature, and the tank can be sur-

rounded by a flowing current of water to keep it cool, if desired.

The endless carrier may be operated independently of the dipping-tray device, and the

70 article may or may not be delivered into a second furnace.

I have shown the revolving dipping device as consisting of three pivoted trays; but it is obvious that their number will be governed to

75 suit convenience in working.

In the operation of the apparatus the article, after being properly heated, is placed in one of the pivoted trays and turned down into the liquid, and the next tray filled and turned

80 down in like manner. This brings the first tray on the ascending turn, and, striking by its scoop edge the cross-bar *e* of the tank, is tilted, and the article thus rolled out into the draining-tray is drained and dumped or rolled

85 out in the way described, these receiving and dumping parts being adapted to resume their normal holding positions immediately after dumping the article.

The dumping action of the draining-tray

90 succeeds the dumping action of the dipping-trays, and the radial arms which effect this are therefore equal in number to and arranged in positions intermediate with the arms to which the dipping-trays are pivoted; but any

95 suitable device for dumping the draining-tray may be used so long as such dumping action is effected at the intervals succeeding the dumping action of the dipping-trays.

I have not shown the primary heating-fur-

100 nace, and have only shown the door-wall B of the reheating-furnace, the construction of which for the purpose is well understood by those skilled in the art.

I claim—

105 1. In apparatus for tempering steel, the combination of a bath-tank with self-balancing trays, whereon the articles are carried and freely supported, means for carrying said trays into and through said bath, and means for

110 dumping said trays upon their ascending movement from said bath to deliver the article, substantially as herein set forth.

2. The combination, in apparatus for tempering steel, of a bath-tank, self-balancing

115 trays, means for carrying them into and through said bath, and means whereby they are dumped upon their ascending movement from said bath to deliver the article, with a pivoted receiving and draining tray and means whereby it

120 is dumped to deliver the article therefrom.

3. In apparatus for tempering steel, the combination of a bath-tank, pivoted self-balancing trays, means for carrying them into and through said bath, and means whereby they

125 are dumped upon their ascending movement therefrom to deliver the article, a receiving and draining tray, and means whereby it is dumped, with an endless carrier adapted to receive and deliver the article from said drain-

130 ing-tray.

4. In apparatus for tempering steel, the com-

5 combination of a bath-tank, self-balancing trays, means whereby they are dumped, a pivoted receiving and draining tray, means whereby it is dumped, and an endless carrier having the described relation to said draining-tray, with a reheating-furnace provided with a self-closing door, opened by the gravity of the article delivered from said carrier, substantially as herein set forth.

10 5. The combination, substantially as described, of a reheating-furnace, a tempering-tank, and means, substantially as described, for receiving steel articles to be tempered from a primary heating-furnace, automatically submerging them in the tempering-liquid within the tank, discharging the same from said tank, and carrying and delivering said articles to the reheating-furnace.

20 6. The combination of a tempering-tank, a series of self-balancing trays, *a*, pivoted to and carried between arms or heads *c* of a revolving shaft, *d*, for freely supporting and carrying the articles into and out of the bath, with a fixed bar or stop, *e*, arranged to intercept the said trays in their ascending movement from the bath and cause them to be turned

upon their pivots and dump the articles therefrom.

7. The combination of a tempering-tank, a series of self-balancing trays, *a*, pivoted to and 30 carried between arms or heads *c* of a revolving shaft, *d*, for freely supporting and carrying the articles into and out of the bath, and a fixed stop, *e*, arranged to intercept and dump said trays in their rising movement from the 35 bath, with the pivoted receiving and draining tray *f*, provided with a dumping-arm, *s*, and the shaft of the submerging-trays provided with a series of tappets or lifting-arms, *n*, the said dumping and lifting arms having such 40 relation to each other and to the submerging-trays as to dump the draining-tray at intervals between the dumping action of said submerging-trays.

In testimony whereof I have hereunto set 45 my hand in the presence of two subscribing witnesses.

WALTER P. HANSELL.

Witnesses:

BIDDLE R. HANSELL,
OLIVER FULTON.