

(No Model.)

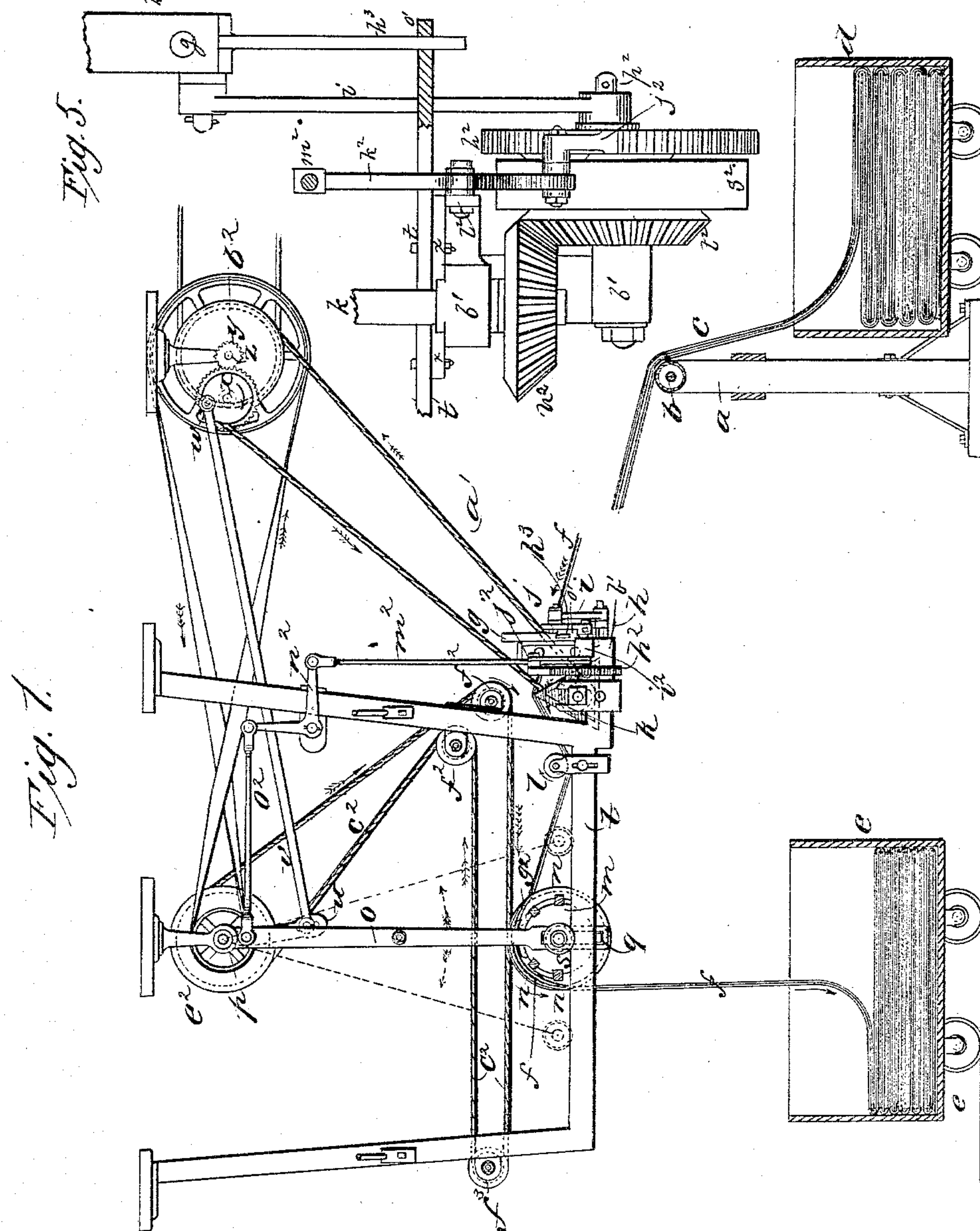
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A. MUNGALL.

MACHINE FOR SEPARATING WARP YARN CHAINS.

No. 323,355.

Patented July 28, 1885.



WITNESSES:

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Francis McArdle.
C. Sedgwick

INVENTOR:

BY *A. Mungall*
Munro & Co
ATTORNEYS.

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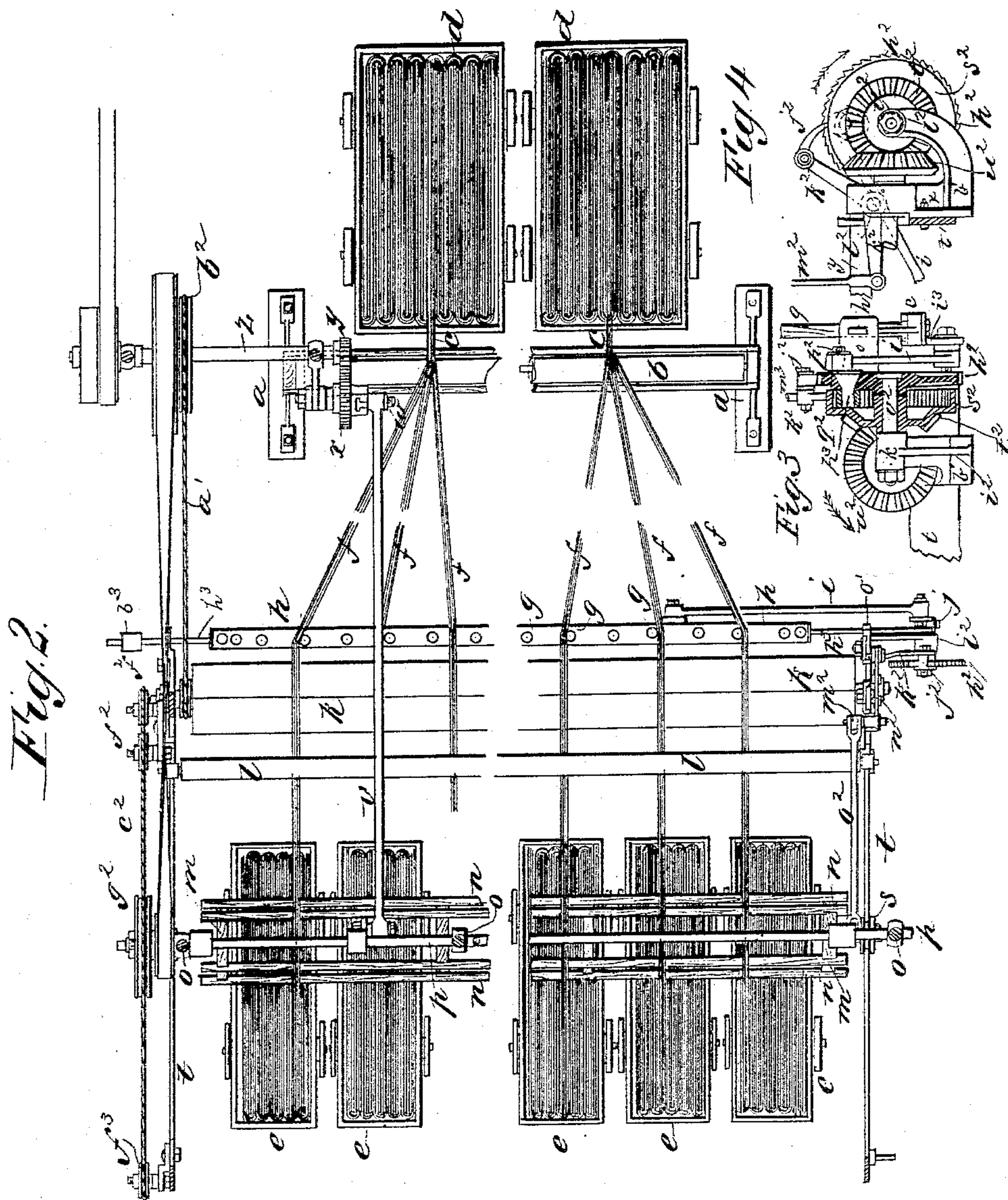
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UNITED STATES PATENT OFFICE.

ANDREW MUNGALL, OF MANCHESTER, NEW HAMPSHIRE.

MACHINE FOR SEPARATING WARP-YARN CHAINS.

SPECIFICATION forming part of Letters Patent No. 323,355, dated July 28, 1885.

Application filed October 15, 1883. (No model.) Patented in England November 7, 1877, No. 4,149.

To all whom it may concern:

Be it known that I, ANDREW MUNGALL, of Manchester, in the county of Hillsborough and State of New Hampshire, have invented a new and Improved Machine for Separating Warp-Yarn Chains, of which the following is a full, clear, and exact description.

My invention consists of an improved apparatus for separating the doubled or compound chains of warp-yarns into single chains after being dyed, washed, or bleached, in a more simple, expeditious, and perfect manner than has been heretofore done by hand or hand machines.

The said improved apparatus consists of a reciprocating comb or heck, one or more drawing and shaking rollers and delivering-rollers arranged for drawing the doubled or compound chains from boxes in which the yarns are brought to the machine or directly from the machinery of the dyeing, washing, and bleaching apparatus, separating the single chains and laying them in separate boxes or other receptacles, all as hereinafter fully described.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of my improved machine and sections of a box from which the doubled yarns are taken and another box into which one of the single chains is delivered after being separated from the rest. Fig. 2 is a plan view, partially in section and parts being broken away, of the machine and a number of boxes from which the yarns are taken and to which they are delivered after the separation. Figs. 3 and 4 are sectional and side elevations, respectively, of a modification of the mechanism for operating the comb; and Fig. 5 is a plan view of the same on an enlarged scale.

In the first place, I provide a little stand, *a*, of any approved form or construction, in the top of which is a long carrying or guiding roller, *b*, over which the doubled or compound chains *c* of warp-yarns are to be drawn from the wheeled boxes *d*, in which they are brought from the dyeing, washing, and bleaching house, and from which they may be drawn slowly and continuously to be sepa-

rated and separately delivered into other boxes or receptacles, *e*, of any kind. A suitable distance from said roller and in a higher plane, the single chains *f*, having been properly separated to begin with, are made to pass between the pins or fingers *g* of a separating comb or heck, the head or bar *h* of which is attached to guide-bars *h*³, working in a slot in the end *o'* of the rail *t*, attached to the bracket *b'*, and in a slot in the bracket *b*³ at the other side of the machine, and is connected by a rod, *i*, with a crank, *j*, by which it is made to traverse forward and backward slowly transversely to the lines along which the chains are drawn for the purpose of coiling them side by side in the boxes *e*, to which they are delivered after being separated. From the comb the separated chains pass over the drawing and shaking roller *k*, of triangular or other form in cross-section, having flat sides and angular edges to impart a rising and falling motion to the chains for shaking them apart between said roller *k* and the carrying roller *b*, and also for taking hold of the chains more effectually for driving them than a cylindrical roller would. From this roller *k* the chains pass under the depressing-roller *l* and onto another drawing, shaking, and delivering roller *m*, this roller also having angles like roller *k*, but it is somewhat differently constructed to form said angles, the construction consisting of bars *n*, extending from end to end of the roller and attached to heads of said roller at suitable distances apart; but I do not limit myself to any particular construction of either of these rollers for providing the angles or the planes between the angles. After passing over this latter roller, *m*, the separate chains *f* fall into a separate receptacle, *e*, for each to be disposed of as required in the next step in the use of said yarns, said boxes *e* being preferably mounted on wheels for convenience in handling them. The roller *m* is journaled in boxes in arms *o*, hanging from and swinging on pivots *p*, suspended from the floor or roof above in any approved way, the object being to traverse the roller *m* the length of the boxes *e* for laying the chains therein. The boxes of the roller-journals are arranged in slots *q* of the hangers *o*, and they have grooved rollers *s* running on rails *t* of the roller-sup-

porting frame to support the roller and cause it to traverse in a level plane. The hangers *o* are made to swing by the arm *u*, connecting-rod *v*, and the crank-pin *w* of the wheel *x*, which is geared with the pinion *y* on the counter-shaft *z*, by which the power is also applied for driving the rollers *k* and *m*, the roller *k* being driven by a belt, *a'*, directly from a pulley, *b*², on the counter-shaft *z*, and the roller *m* by a belt, *c*², from a pulley, *e*², on the axis *p* of the vibrating-hangers *o*, passing over the guide-pulleys *f*² *f*³ on the supporting-frame, and around a pulley, *g*², on the roller, this arrangement being to enable the power to be applied to said roller *m* for turning it at the same time that it is reciprocated for laying the yarn in the boxes.

The crank *j*, by which the comb *g h* is reciprocated, is attached to the shaft of a ratchet-wheel, *h*², supported in a bearing, *i*², and worked by a pawl, *j*², in a pawl-lever, *k*², pivoted on the shaft or pivot-stud of ratchet-wheel *h*², as shown in Figs. 1 and 2, and connected by rod *m*² with the bell-crank *n*², which is connected by rod *o*² with one of the vibrating bars *o*; but any other approved arrangement of mechanism may be employed, as preferred.

To give a quick forward and backward jiggling motion to the comb at the same time that it has the slower motion, above described, and for shaking the yarn for the better separation of the yarn-chains, the crank *j* is dispensed with, and the rod *i* is connected to a cranked pin, *p*², (see Figs. 3, 4, and 5,) on a short shaft, *p*³, mounted in the ratchet-wheel *h*², so as to be revolved therein, and having a pinion, *q*², gearing with the internally-toothed wheel *s*², turning loosely on the pivot-stud *v*², and in the same direction as the ratchet-wheel *h*², and having a beveled-toothed face, *t*², gearing with a bevel-pinion, *u*², on the shaft of roller *k*, so that the shaft carrying said pin, *p*², being turned rapidly on its own axis by means of the shaft of the roller *k*, the bevel-gear *u*², the bevel-pinion *t*², the internally-toothed wheel *s*², and pinion *q*², imparts a quick, short jiggling to the comb at the same time that it gives the longer and the slower transverse motion to the comb by revolving around the axis of the ratchet-wheel, which carries it and which receives its motion through the pawl *j*², pawl-lever *k*², and rod *m*². In this case the pawl lever *k*² is pivoted at *l*² to the bracket *b'*, which bracket is attached to the rail *t* by means of bolts passing through said rail and the plate *x* of the bracket, as clearly shown in Figs. 4 and 5. In the bracket *b'* the shaft of the roller *k* and the pivot-stud *v*² have their bearings.

The connecting-rod *i*, in Figs. 3, 4, and 5, is shown attached to the hanger *i*³ on the under side of the inner edge of the comb head, instead of the outer edge, as in Figs. 1 and 2.

I prefer to make the rollers *k* and *m* hollow, using either metal or wood, and may use one or more of each or either, as preferred, said

rollers being turned in the same direction and at about the same rate of speed, the delivery roller or rollers being preferably arranged a little higher than the drawing-roller.

The roller *m* may be carried in the swinging bars *o* without rolling on the rails *t*, if preferred, and the swinging bars *o* may each have a connecting-rod, *v*, for swinging the roller forward and backward to lay the yarn. When the roller *m* swings away from the roller *k*, it travels in the same direction as the belt *c*² that turns it; consequently its rotating motion will be slower than when it travels toward roller *k*, so that it will not overdraw the yarn in one direction, nor slack-draw it in the other direction. As the rollers *k m* are swiftly turned the frictional action of their angled corners or ridges draws forward the whole transverse row of yarns, which are separated or divided by and while passing toward and through the comb, assisted by the shaking action given them by the polygonal roller *k*.

Instead of delivering the chains to the separating-machine from the boxes *d* they might be brought directly to the roller *b* from the pressing-rollers of the dyeing-vats, used for pressing the dyeing-liquid out of the yarn.

It is to be understood that the improved separating-machine herein described is to be constructed in any desired size and width required.

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

1. The combination, with the supporting-frame and the shaking-roller *k*, of a comb or heck and means for reciprocating the same and rotating the shaking-roller, substantially as herein shown and described.

2. The combination, with the supporting-frame, the shaking-roller *k*, the delivery-roller *m*, and means for operating the said rollers, of a reciprocating comb or heck and means for reciprocating the same, substantially as herein shown and described.

3. The combination, with the supporting-frame, the shaking-roller *k*, the delivery-roller *m*, the reciprocating comb or heck *g h*, and means for operating the said rollers and comb, of the carrying-roller *b*, substantially as herein shown and described.

4. The combination, with the supporting-frame, the delivery-roller *m*, and means for revolving and vibrating the delivery-roller, of a comb or heck and intermediate mechanism for operating the comb by the vibratory movement of the delivery-roller, substantially as herein shown and described.

5. The combination, with the supporting-frame, of the pivoted hangers *o*, the delivery-roller *m*, journaled in the lower ends of said hangers, the reciprocating comb or heck *g h*, and means for revolving said roller, vibrating the hangers, and reciprocating the comb or heck, substantially as herein shown and described.

6. The combination, with the supporting-

frame, the hangers *o*, the delivery-roller *m*,
journaled in the lower ends of said hangers,
and means for vibrating said hangers, of the
comb *h g* and intermediate mechanism for re-
ciprocating the comb from the hangers, sub-
stantially as herein shown and described.

7. The combination, with the pivoted hang-
ers *o*, the delivery-roller *m*, the pulley *g*², on
said roller, and means for vibrating the said
hangers, of the pulley *e*², the guide-pulleys *f*²
*f*³, and the belt *e*², substantially as herein shown
and described.

8. The combination, with the delivery-roller
m, the hangers *o*, and means for rotating the
said roller, of the comb or heck *g h*, connect-
ing-rod *i*, ratchet-wheel *h*², provided with a
crank, the pawl *j*², the pivoted pawl lever *k*²,
the rod *m*², the bell crank *n*², and the rod *o*²,
substantially as herein shown and described.

9. The combination, with the comb or heck 20
g h, provided with guide-bars working in ways
in the frame, of the ratchet-wheel *h*², provided
with a crank-pin, the rod *i*, connecting the
comb to the crank-pin, and means for operat-
ing said ratchet-wheel, substantially as herein 25
shown and described.

10. The combination, with the comb or heck
g h, of the ratchet-wheel *h*², the crank-pin *p*²,
the connecting-rod *i*, the shaft *p*³, the pinion
*q*², the internally-toothed wheel *s*², and means 30
for operating the ratchet-wheel and the in-
ternally-toothed wheel *s*², substantially as
herein shown and described.

ANDREW MUNGALL.

Witnesses:

A. MUNGALL, Jr.,
THOMAS MUNGALL.