

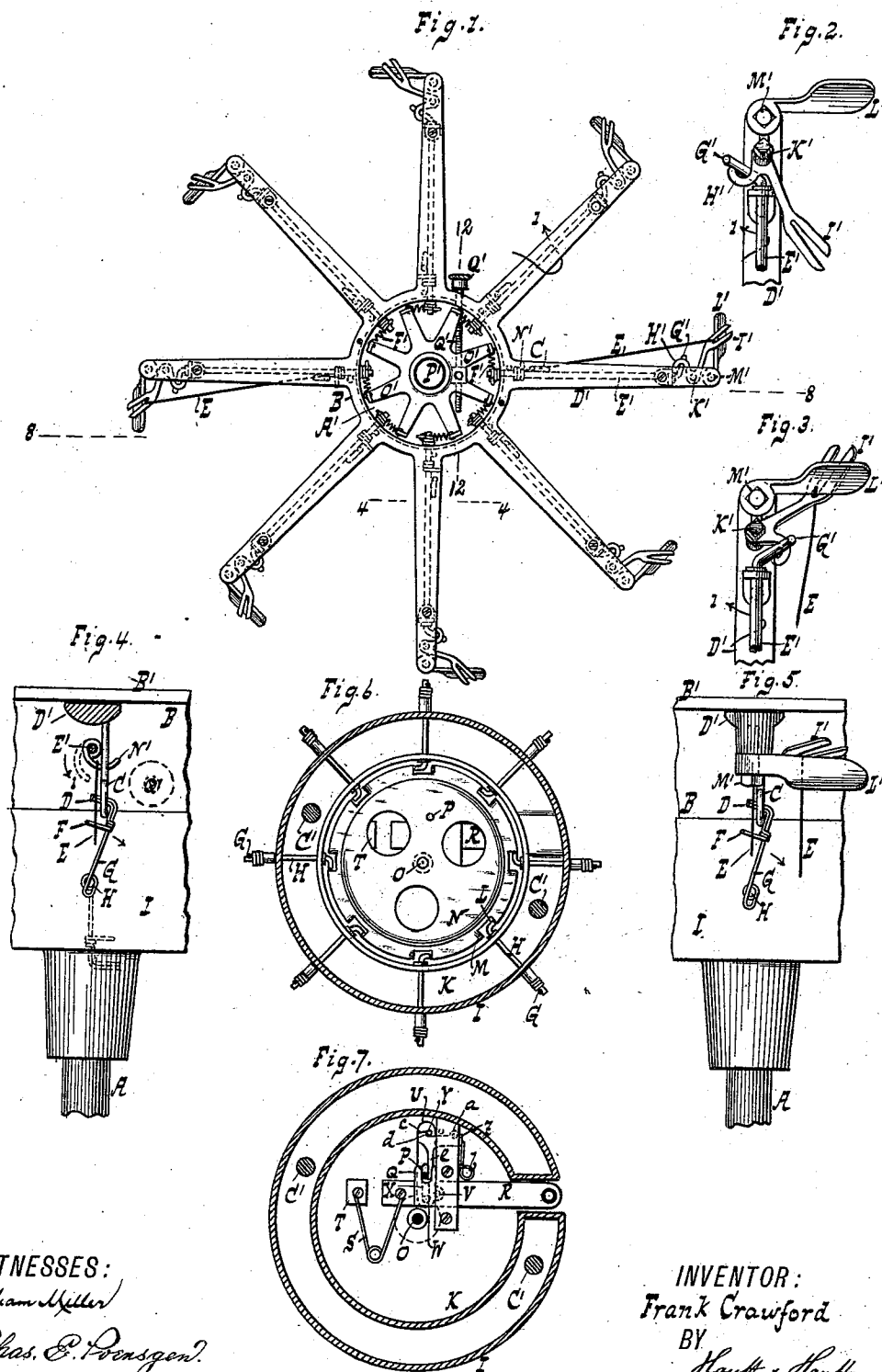
(No Model.)

3 Sheets—Sheet 1.

F. CRAWFORD.
STOP MECHANISM FOR KNITTING MACHINES.

No. 510,839.

Patented Dec. 12, 1893.



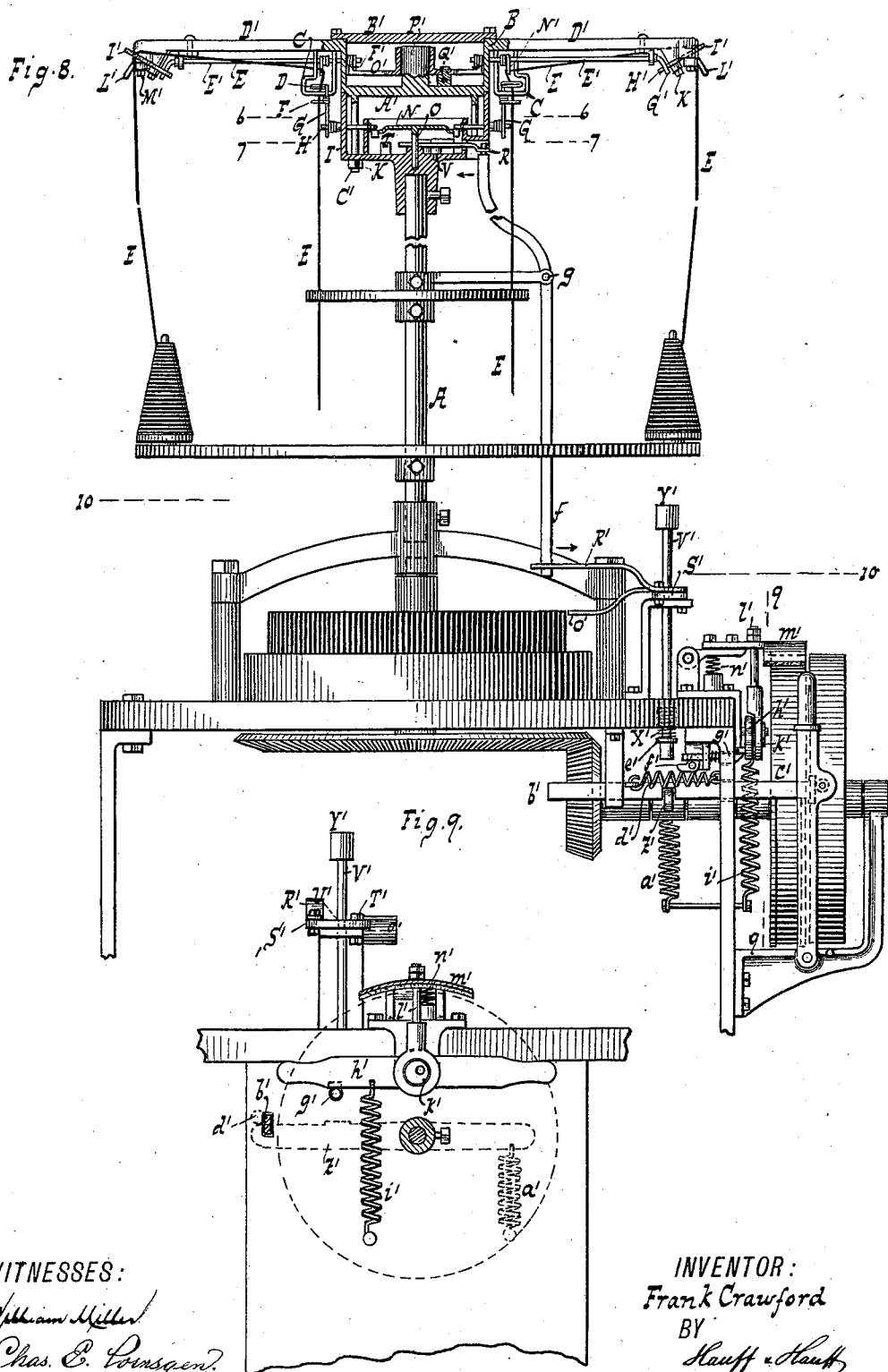
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3 Sheets—Sheet 2.

No. 510,839.

Patented Dec. 12, 1893.



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(No Model.)

3 Sheets—Sheet 3.

F. CRAWFORD.
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Fig. 10.

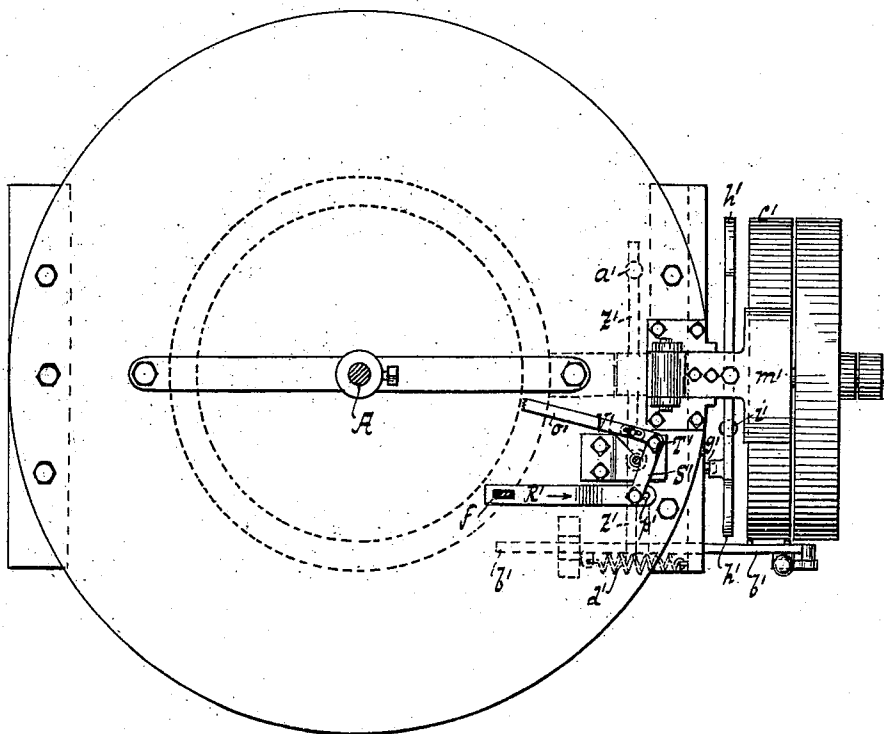


Fig. 11.

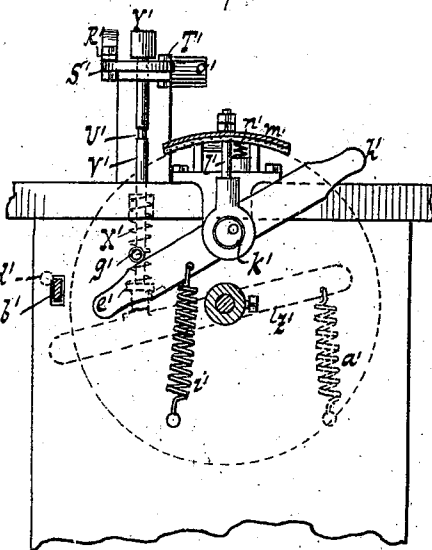


Fig. 13.

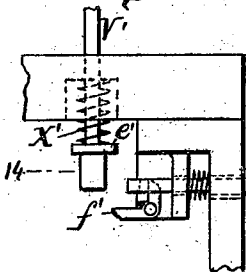
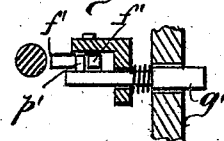


Fig. 14.

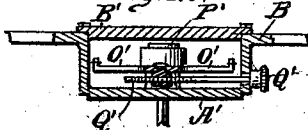


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Fig. 12.



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UNITED STATES PATENT OFFICE.

FRANK CRAWFORD, OF NEW BRUNSWICK, NEW JERSEY, ASSIGNOR OF ONE-HALF TO ALFRED MARCH, OF SAME PLACE.

STOP MECHANISM FOR KNITTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 510,839, dated December 12, 1893.

Application filed June 1, 1893. Serial No. 476,197. (No model.)

To all whom it may concern:

Be it known that I, FRANK CRAWFORD, a citizen of the United States, residing at New Brunswick, in the county of Middlesex and State of New Jersey, have invented new and useful Improvements in Stop Mechanism for Knitting-Machines, of which the following is a specification.

This invention relates to stop mechanism of the kind employed in knitting machines and the invention consists in the novel features of construction set forth in the following specification and claims and illustrated in the annexed drawings, in which—

Figure 1 is a plan view of thread guides. Fig. 2 is an inverted detail plan view of a guiding fork in releasing position. Fig. 3 is a similar view of a guiding fork in engaging position. Fig. 4 is a section along 4 4 Fig. 1. Fig. 5 is a side elevation of a releasing finger. Fig. 6 is a section along 6 6 Fig. 8. Fig. 7 is a section along 7 7 Fig. 8. Fig. 8 is a section along 8 8 Fig. 1. Fig. 9 is a section along 9 9 Fig. 8 showing a brake out of action. Fig. 10 is a section along 10, 10, Fig. 8. Fig. 11 is a view similar to Fig. 9 showing a brake in action. Fig. 12 is a detail sectional view taken on the line 12, Fig. 1. Fig. 13 is a detail side elevation of the latch, &c.; and Fig. 14 is a detail sectional view taken on the line 14, Fig. 13.

In the drawings the letter G indicates the releasing finger which while held up by thread E will be out of action but when said finger drops the machine is stopped in manner similar to that set forth in United States Letters Patent No. 445,465, granted on my application January 27, 1891. The finger G has its pin or axle H extending through a suitable eye in the rim I of casing K mounted on the column or supporting stem A. The stud L of the axle H striking shoulder M of disk N will rotate the disk upon pivot O so that the stud P in the fork Q on slide R will press the tail e of catch Z swinging at a so as to release the catch against the pressure of spring b so that said catch frees stud Y on lever U. This lever U is fulcrumed at V and has a pin and slot connection W X with slide R. When lever U is released as stated the slide R is moved by spring S against stop T. The mov-

ing of slide R away from stop T causes the stud Y of lever U to ride over the inclined face c on catch Z and to be locked by the shoulder d on said catch. The operation of these parts is more fully set forth in said Patent No. 445,465. The movement of slide R toward stop T actuates the lever f fulcrumed at g so as to stop the machine as hereinafter set forth. On the rim I sits a plate A' (Fig. 8) having a rim B on which sits a cover B' which is removed in Fig. 1 to expose the interior of rim B. The plate A' is secured to plate K by bolts or fastenings C' on removing or loosening which the plate A' can be taken away. From the rim B extend arms D'. The number of arms corresponds to the number of threads or to the maximum number of threads which may be employed in the machine. Each arm D' supports a rock shaft E' the inner end of which extends through a suitable eye in rim B and said inner end is suitably bent or provided with an arm for the attachment of a spring F' which tends to rotate shaft E' in the direction of arrow 1. The outer end of shaft E' is provided with an arm G' engaging arm H' of the bell crank lever H' I' fulcrumed at K'. The tendency of rock shaft E' under tension of spring F' is to swing the lever H' I' so as to throw its arm I' outward toward the guard L' pivoted or jointed at M' to the outer or free end of arm D'. The rock shaft E' is provided with a hook N' (Fig. 4) over which the thread E is guided. The thread coming from a suitable spool or supply as seen in Fig. 8 passes under guard L' and between the branches of arm I' which is forked, thence to guide hook N' and into engagement or contact with the hooks D F on finger G and with the rod or finger C suspended from or fixed to arm D'. In the regular working of the machine the thread E is under sufficient tension to hold up the finger G but said tension is not powerful enough to swing hook N' or rock shaft E' against the tension of spring F'. Should the strain however become excessive as by a kink or knot in the thread catching in fork I' said tension will swing hook N' to the position shown in Fig. 4 in dotted lines so that the thread will drop off said hook. At the same time said thread will slip out of the finger hooks D F

which are open outward or toward the free end of arm D'. The finger G thus not only is free to drop but at the same time the thread slipping out of engagement with hook N' and hooks D F will be considerably slackened so as not to be broken. A continued strain on the thread would also cause the latter to swing the forked arm I' inward to the position shown in Fig. 2 so as to release the thread which is thus further slackened by slipping out of fork I'. The fork I' of the lever H' I' as seen in Fig. 8 is pivoted at an angle relatively to the stem or column A so that said fork I' will swing inward or toward the column A at an incline to readily allow the thread to drop when the fork I' has swung in. The guard L' can be set about its pivot M' as required to keep the thread from jumping out of fork I' and by swinging the guard L' inward so as to exert slight pressure or friction on the thread as it travels along any slight kink in the thread will be straightened out. By thus giving slack to the thread at the moment the thread under excessive strain slips out of the finger hooks D F, the thread will not be broken in case the machine under its momentum should continue working for a time after the finger G has dropped.

The spring F' is secured to or braced against an arm O' and by adjusting this arm the tension of the spring can be regulated. In the drawings a series of arms O' corresponding to the rock shafts E' or their springs F' are arranged in form of a spider about hub P' and by rotating or setting the spider about the hub by means of set screw Q' the tensions of the springs can be regulated. The shank of the screw Q' extends through a hole in the side of casing B, the head of the screw being located outside the casing so as to be within easy reach of the operator. The tendency of springs F' is to draw the head of screw Q' against the casing, but this screw-head is so large that it cannot slip through the hole in the casing made for the passage of the shank of screw Q', and the tapped eye or lug depending from spider O' for the reception of the shank of screw Q' is swiveled to the spider so as to turn on the latter while being set by the rotation of screw Q'.

The lever f' (Figs. 8 and 10) when actuated by slide R will actuate link R' so as to swing arm S' about pivot T', causing arm S' to pass out of the notch U' (Fig. 11) in the rod V'. The arm S' engaging into notch U' will hold rod V' up against the action of its spring X'. When the arm S' is moved out of said notch U' the rod V' descends until arrested by its enlarged head Y'. In its descent the rod V' will swing lever Z' against the action of its spring d' so that said lever will release the shifter rod b' which then under the action of its spring d' shifts the driving belt off the fast pulley c'. In its descent the rod V' also puts into action a brake. This rod V' has near its lower end a shoulder e' adapted to engage a lever f' for withdrawing a latch g' from under lever h'. This lever h' when freed is actuated by spring i' so as to turn the eccentric k' on said lever so that said eccentric draws on link l' and brake shoe m' so that the latter will be pressed against the fast pulley c' and the machine which tends to continue running by its momentum after the belt is shifted off the fast pulley c' will then be quickly stopped by the action of the brake. When the lever h' is set back into engagement with the spring-actuated catch or latch g' the brake shoe m' will be raised out of action by the releasing spring n'. The lever f' for the engagement of the shoulder e' may be any suitable well known bell-crank lever, as seen in Figs. 13 and 14, the vertical arm of which bell-crank lever on the descent of rod V' will press against a lug or shoulder p' (Fig. 14) on latch g' so as to withdraw the latter, but on the rise of rod V' the vertical arm of lever f' will swing away from lug p' without actuating the latch g' which latter is provided with a spring tending to press the latch into position to engage lever h'.

I have mentioned that an excessive strain on the thread will cause the latter to drop off its guides or supports and to release the finger G but it is of course obvious that in case the thread breaks or runs out the finger G will likewise drop.

From the arm S' extends an arm o' forming a bell crank lever therewith, said arm extending into proximity with the needles so that if any bunching or imperfection occurs at the needles the bunch will catch said arm o' to actuate the latter and arm S' so that the arm S' releases the plunger V' as above described. A slot p' in link R' allows the lever S' o' to move independently of link R' a slight distance sufficient to allow the arm o' to move arm S' when the arm o' is caught or actuated by a thread bunch or imperfection at the needles.

What I claim as new, and desire to secure by Letters Patent, is—

1. A thread guide for a stop mechanism, said guide consisting of a hook N' and a rock shaft for supporting the hook, and a spring connected to the rock shaft for normally holding the hook under the thread to support the latter and leaving the hook free to be swung to its releasing position under excessive strain of the thread so as to allow the latter to drop off the hook substantially as described.

2. A thread guide for a stop mechanism, said guide consisting of a hook N' and a rock shaft for supporting the hook, in combination with a spring for holding the rock shaft to its engaging position and an adjusting arm and set screw for the spring substantially as described.

3. A series of thread guides for stop mechanism, each guide consisting of a hook and a rock shaft for supporting the hook, in combination with springs for holding the rock shafts in engaging position, a rotary spider to which the springs are connected and an

adjusting screw for the spider substantially as described.

4. A thread guide for a stop mechanism, said guide consisting of a spring actuated rock shaft and a swinging fork I' held to its engaging position by the rock shaft and adapted to be swung to its releasing position under excessive strain of the thread substantially as described.

10 5. A thread guide for a stop mechanism, said guide consisting of a swinging fork I', a spring actuated rock shaft E' for holding the fork to its engaging position while leaving said fork free to move to its releasing position under excessive strain of the thread, and a guard for keeping the yarn on the fork when the latter is in engaging position substantially as described.

20 6. The combination with a supporting column or leg A of a thread guide for a stop mechanism mounted on said column, said guide consisting of a spring actuated rock shaft and a swinging fork I' held to its engaging position by the rock shaft, said fork being mounted at an angle relatively to the column so as to swing toward the same at an incline under excessive strain of the thread substantially as described.

30 7. A thread guide for a stop mechanism, said guide consisting of a swinging fork, a spring actuated rock shaft for holding the fork to its engaging position and an adjustable guard mounted in proximity to the fork substantially as described.

35 8. The combination with a movable hook or thread guide N' and a spring connected to the hook for holding the latter to its engaging position while leaving said hook free to be moved to its releasing position by an excess-

ive strain of the thread, of a releasing finger 40 for a stop mechanism, said finger being provided with a laterally open hook adapted for engagement by the thread when held by the guide and which allows the thread to drop or pass out of engagement with the finger when 45 released by the guide substantially as described.

9. A releasing finger for a stop mechanism provided with a laterally open hook, in combination with a rod or finger C placed in proximity to the hook, said rod and hook being 50 adapted for engagement by the thread for holding the finger out of action and allowing the thread when excessively slackened to drop or pass out of engagement with the hook 55 to release the finger substantially as described.

10. The combination with a releasing finger, a spring actuated slide R, mechanism, substantially as described, actuated by said finger for freeing the slide, and a lever f' actuated by the slide, of a link R', and trip or arm S' actuated by said lever, a plunger or rod V' adapted to be freed by the trip, a lever f' and latch g' actuated by the plunger, 65 a lever h' released by the actuation of the latch, an actuating spring i' for the lever h', an eccentric k' actuated by the lever h', and a link l' and brake m' actuated by said eccentric, substantially as described. 70

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

FRANK CRAWFORD.

Witnesses:

WM. C. HAUFF,
E. F. KASTENHUBER.