D. Hussey.

Let-Off for Loom.

No. 76,636. Patented Apr. 14, 1868.

Fig. 1

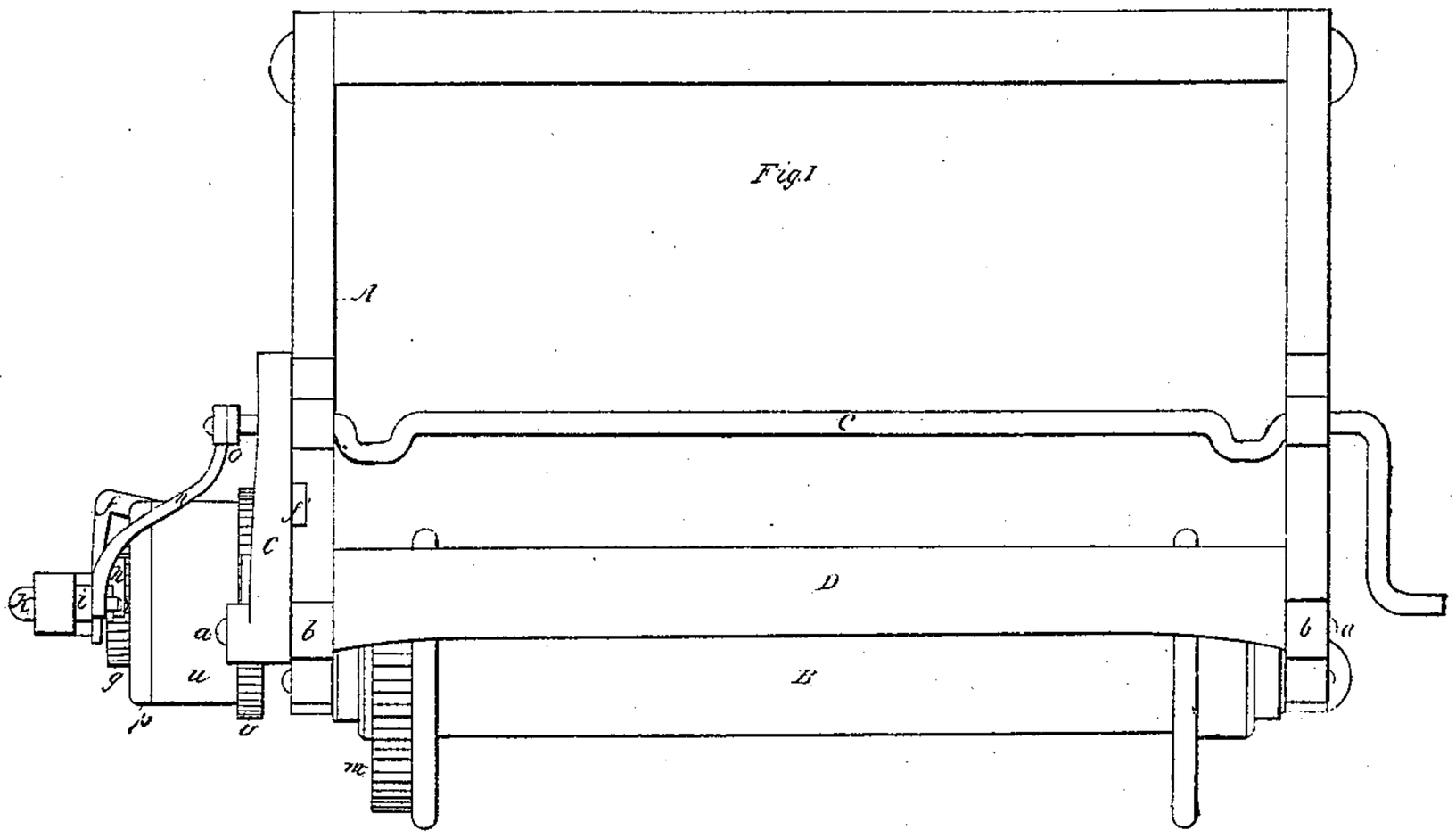


Fig. 2.

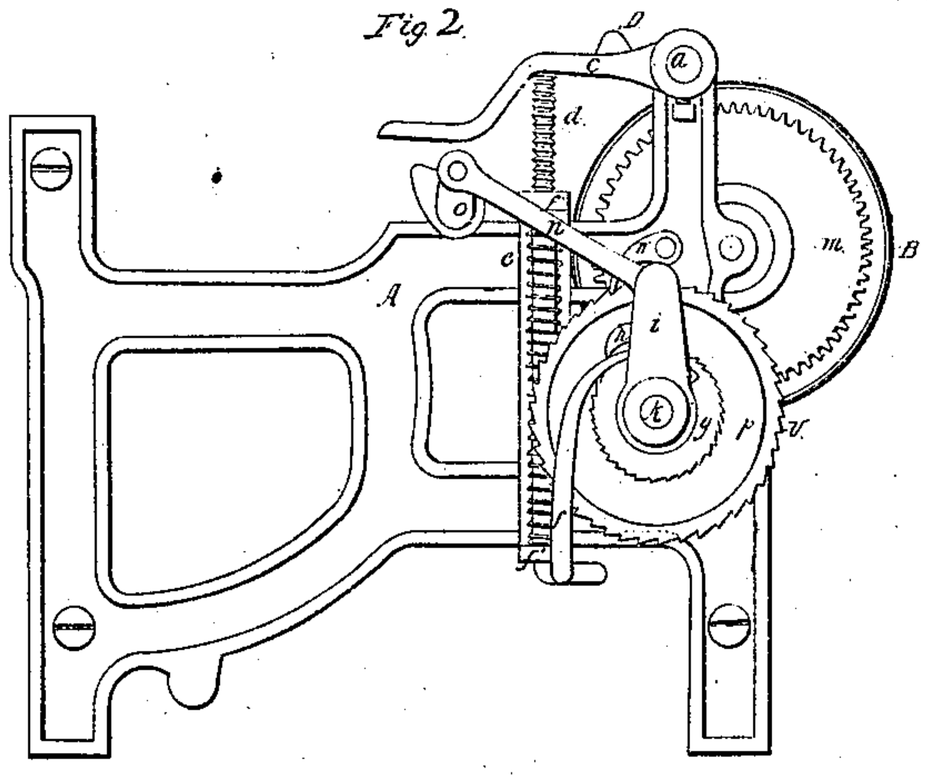
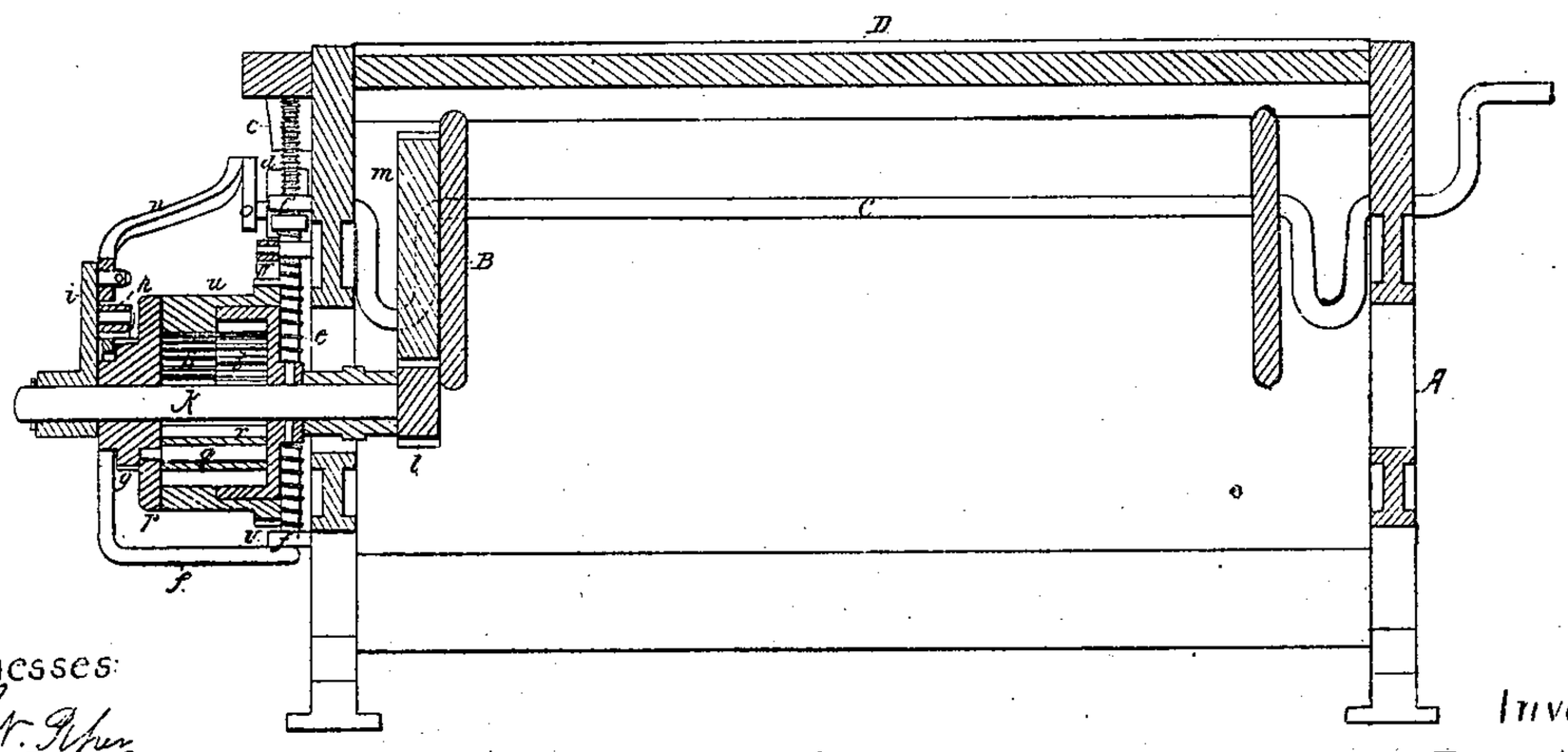


Fig 3



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DANIEL HUSSEY, OF NASHUA, NEW HAMPSHIRE.

Letters Patent No. 76,636, *dated April* 14, 1868.

IMPROVEMENT IN LET-OFF MECHANISM FOR LOOMS.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL PERSONS TO WHOM THESE PRESENTS MAY COME:

Be it known that I, DANIEL HUSSEY, of Nashua, in the county of Hillsboro, and State of New Hampshire, have invented a new and useful Let-Off Mechanism for Looms for weaving cloth; and I do hereby declare the same to be fully described in the following specification, and represented in the accompanying drawings, of which—

Figure 1 is a top view, and

Figure 2 an end elevation of a loom-frame provided with my invention.

Figure 3 is a vertical section, taken through the "differential gears," to be hereinafter described, the plane of section being in line with the axis of said gears.

In the said drawings, A denotes the loom-frame, B the yarn-beam, and C the lay-shaft.

Over the yarn-beam is what is termed the "whip-roll" bar or depresser, D, whose journals, *a a*, are supported in bearings, *b b*, of the loom-frame. An arm, *c*, extended from one of such journals, rests on the top of a vertical slide-rod, *d*, which is encompassed and supported by a spring, *e*, and arranged so as to be capable of being slid vertically in guides *f' f'*.

From the lower end of the slide-rod, a pawl-elevator, *f*, of the form shown in the drawings, projects, and extends alongside of a ratchet, *g*, and underneath and against a pawl, *h*, to operate in such ratchet, or with its teeth. The said pawl is carried by a crank, *i*, which turns loosely on and is supported by a shaft, *k*, that, on its inner end, carries a pinion, *l*. Such pinion engages with a gear, *m*, fixed on the shaft or one head of the yarn-beam or roller B. A connecting-rod, *n*, jointed to the crank *i*, leads therefrom to and is jointed to a crank, *o*, fixed on the end of the lay-shaft.

From the above, it will be seen that, when the lay-shaft is in revolution, a reciprocating vibratory motion will be imparted to the crank *i*, and so as to cause its pawl, *h*, to be moved, forward and back, on or over the periphery of the ratchet *g*. Thus, when the pawl is lowered into contact with the teeth of the ratchet while in motion forward, such pawl will turn the ratchet, but, when raised out of engagement with such teeth by the elevator *f*, the pawl will be moved on the elevator, and not turn the ratchet. The said ratchet is attached to the side of a disk, *p*, that turns freely on the shaft *k*. On a journal, *q*, extended from the said disk, a long pinion or gear, *r*, is placed, so as to be capable of revolving freely on such journal. This pinion engages with two internal gears, *s t*, arranged, with respect to each other, as represented. There is one or more less teeth in one of such gears than in the other; or, in other words, the gear *s* has one more tooth than the gear *t*. The gear *t* is fastened to and so as to revolve with the shaft *k*, the gear *s* being formed within a tube or hollow shaft, *u*, which encircles the gear *t*, and carries a ratchet, *v*, with which a retaining-pawl, *w*, supported on a pin extended from the loom-frame, engages.

The gears *r s t* are termed "differential gears," their operation being well understood by mechanicians. With the ratchet *v*, and pawl *w*, the shaft *k*, and the gears *l m*, the differential gears operate, to hold the yarn-beam from revolving under the strain of the warps, but when the tension of the yarns may be so great as to force downward the whip-roll or bar D, the arm *c* will depress the elevator *f*, and thus allow the pawl *h* to engage with and actuate the ratchet *g*. The said ratchet will revolve the disk or wheel *p*, which, with the gears *s t*, will cause the pinion *r* to have an orbital revolution.

As the gear *s* will be held stationary by its ratchet, *v*, and pawl, *w*, the pinion *r* will be revolved on its axis. In going around the entire circle of orbital revolution, such pinion, by action of its teeth on those of the gears *s t*, will revolve the gear *t* a distance of one tooth, and, of course, the shaft *k* will be revolved a corresponding arcal measure by the wheel *t*. As the gear *l* will be turned by the shaft *k*, the gear *m* will be revolved, so as to cause the yarn-beam to turn and deliver the yarn to the amount required. As the yarn may slacken, the whip-roll or depresser D, and the pawl-elevator *f*, will be thrown up by the action of the spring *e*, the rising of the elevator causing the pawl *h* to be thrown out of engagement with the ratchet *g*, whereby the delivery of the yarn will be arrested until such time as the said pawl may again be lowered into engagement with the ratchet.

During each rotary movement of the ratchet *g* in the fractional part of a circle, the pinion *l* will have mparted to it a degree of rotary motion which will be in proportion to the arcal movement of the shaft *k*, produced by one orbital revolution of the pinion *r*, as the fractional rotary movement of the ratchet *g* is to one entire revolution thereof. Thus, it will be seen that a large amount of movement of the ratchet *g* will be attended with a production of a very small amount of rotary motion of the yarn-beam, the motion of the pawl *h*, while the lay-shaft may be in revolution, being what is usually termed a "positive motion."

Great advantages result from the above-described "let-off mechanism," as, by lifting the pawl *w* out of action with the ratchet *v*, a workman can easily move back the yarn-beam, so as to slacken up the warps, whenever it may be desirable to do so for any purpose; and, furthermore, it dispenses with the usual friction-brake or apparatus used in various "let-off motions" or mechanisms in use.

I claim the combination of the differential gears *r s t*, their ratchets *g v*, and holding and impelling-pawls *h w*, with the shaft *k* of the yarn-beam gearing, and with the whip-roller or depresser D, and mechanisms for actuating the impelling-pawl *h*, substantially in the ways as hereinbefore described.

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Witnesses:

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